



OCCUPATIONAL FRAMEWORK

SECTION J: INFORMATION AND COMMUNICATION

DIVISION 63: INFORMATION SERVICE ACTIVITIES

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Occupational Framework
Information Service Activities
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ABSTRACT

An Occupational Framework (OF) is the outcome of the analysis conducted in identifying the work scope of the occupational areas in terms of competencies. It is used to analyse skilled manpower 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, where the OF identified the suitable occupational areas which either require development of skills training programmes or the review and enhancement of existing skills training programmes. The OF for Information Service Activities such as data processing, hosting and related activities, web portals, and other information service activities are based on the Malaysian Standards Industrial Classification 2008 (MSIC 2008) under Section J – Information and Communication, Division 63 – Information Service Activities, Group 631 – Data processing, hosting and related activities, web portals; and Group 639 – Other information service activities. This document is divided into several chapters, Chapter 1 includes the standard definitions of terminology used in Department of Skills Development skills training system and documentation, followed by the objectives, scope and justification of the OF development for the data processing, hosting and related activities, web portals and other information service activities. 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 explained the methodology used in the OF development such as qualitative analysis through brainstorming discussion sessions. Chapter 4 discussed the findings from the focus group discussion conducted that be translated into the Occupational Structure, Occupational Description, Jobs in Demand, Skills in Demand and Emerging Skills. Lastly, Chapter 5 concluded the total number of job area identified is 13 with 81 job titles and 26 job titles identified as critical job titles.

ABSTRAK

Rangka Kerja Pekerjaan (OF – *Occupational Framework*) adalah hasil analisis yang dijalankan dalam mengenalpasti skop kerja bidang kerja dari segi kompetensi. Ia digunakan untuk menganalisis keperluan kecekapan tenaga kerja mahir untuk industri. OF bertujuan untuk memberikan pandangan keseluruhan mengenai Struktur Pekerjaan (OS – *Occupational Structure*) industri dan mengenalpasti jurang kemahiran, jawatan pekerjaan kritikal dan Deskripsi Pekerjaan (OD – *Occupational Descriptions*) yang akan membantu dalam memahami lagi keperluan kerja pelbagai pekerjaan dalam industri. Jabatan Pembangunan Kemahiran (JPK) adalah jabatan yang bertanggungjawab dalam membangunkan dokumen ini, di mana OF mengenal pasti bidang pekerjaan yang sesuai sama ada memerlukan pembangunan program latihan kemahiran atau kajian semula dan peningkatan program latihan kemahiran yang sedia ada. Aktiviti Perkhidmatan Maklumat seperti pemprosesan data, hosting dan aktiviti berkaitan, portal web, dan aktiviti perkhidmatan maklumat lain adalah berdasarkan Klasifikasi Perindustrian Piawaian Malaysia 2008 (MSIC 2008) di bawah Seksyen J - Maklumat Dan Komunikasi, Bahagian 63 - Aktiviti Perkhidmatan Maklumat, Kumpulan 631 - Aktiviti prosesan data, *hosting* dan aktiviti lain yang berkaitan; web portal dan Kumpulan 639 - Aktiviti perkhidmatan maklumat lain. Dokumen ini dibahagikan kepada beberapa bab iaitu, Bab 1 merangkumi takrif istilah terminologi yang digunakan dalam sistem latihan kemahiran Jabatan Pembangunan Kemahiran dan dokumentasi, diikuti oleh objektif, skop dan justifikasi pembangunan untuk Aktiviti prosesan data, *hosting* dan aktiviti lain yang berkaitan; web portal dan aktiviti perkhidmatan maklumat lain. Bab 2 merangkumi gambaran industri yang menonjolkan definisi dan skop industri, pihak berkepentingan, perundangan, inisiatif dan kecerdasan pasaran. Bab 3 menjelaskan metodologi yang digunakan dalam pembangunan seperti analisis kualitatif melalui sesi perbincangan berkumpulan. Bab 4 membincangkan penemuan dari perbincangan kumpulan fokus yang diterjemahkan ke dalam Struktur Pekerjaan, Deskripsi Pekerjaan, Pekerjaan yang Diperlukan, Kemahiran yang Diperlukan dan Kemahiran Baru Muncul. Akhir sekali, Bab 5 menyimpulkan jumlah bidang kerja yang dikenalpasti adalah 13 bidang dengan 81 jawatan pekerjaan dan 26 jawatan pekerjaan yang dikenalpasti sebagai jawatan pekerjaan kritikal.

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LIST OF ABBREVIATION

BSJ	Bernama School of Journalism
CBT	Competency Based Training
CNII	Critical National Information Infrastructures
DDI	Domestic Direct Investments
DOSM	Department of Statistics Malaysia
DSD	Department of Skills Development
EC	Economic Census
EU	European Union
FDI	Foreign Direct Investments
GDP	Gross Domestic Product
ICT	Information and Communication Technology
IPPTAR	<i>Institut Penyiaran Dan Penerangan Tun Abdul Razak</i>
IR4.0	Industrial Revolution 4.0
ISIC	International Standard Industrial Classification
JPK	<i>Jabatan Pembangunan Kemahiran</i>
LFPR	Labour Force Participation Rate
MaGIC	Malaysia Global Innovation and Creative Centre
MASCO	Malaysia Standard Classification of Occupations
MCI	Malaysia Co-operative Institute
MCMC	Malaysian Communications and Multimedia Commission
MDEC	Malaysia Digital Economy Corporation
MIDA	Malaysian Investment Development Authority
MITI	Ministry of International Trade and Industry
MOSQF	Malaysia Occupational Skills Qualification Framework
MP	Malaysia Plan
MPI	Malaysia Press Institute
MPPA	Malaysia Professional Press Photographer Association
MQA	Malaysian Qualifications Agency
MQF	Malaysia Qualifications Framework
MSC	Multimedia Super Corridor
MSIC	Malaysian Standards Industrial Classification

LIST OF ABBREVIATION

NACSA	National Cyber Security Agency
NCS	National Competency Standards
NOSS	National Occupational Skills Standard
NPC	National Press Club
NUJ	National Union of Journalist
OD	Occupational Description
OECD	Organization for Economic Co-operation and Development
OF	Occupational Framework
OS	Occupational Structure
PERGRAKAN	<i>Pertubuhan Pereka Grafik Kebangsaan</i>
PIKOM	<i>Persatuan Industri Komputer dan Multimedia Malaysia</i>
PSICTSA	Public Sector ICT Strategic Plan
SSM	<i>Suruhanjaya Syarikat Malaysia</i>
TVET	Technical and Vocational Education and Training

GLOSSARY

Access	The name of a Database program forming part of the Microsoft Office suite of programs
Application	A computer program or a suite of computer programs that performs a particular function for the user, such as a word-processor
Artificial Intelligence (AI)	The ability of a computer to mimic human attributes in finding a solution to a problem.
Backup	Used as a verb, to back up means to copy a File or Folder from your computer to another Storage Device
Compatibility	Pieces of hardware and/or software which are capable of being used together are described as compatible
Copyright	New technologies have raised all kinds of new issues relating to copyright, mainly because it has become so easy to copy materials from a variety of digital sources.
Data	An information in a form which can be processed by a computer. It can be text or sets of figures on which a computer program operates
Database	A structured collection of data that can be used for a variety of purposes. Databases are usually stored on a Hard Disc inside your computer, on a CD-ROM, or at a website
Debug	To test a program and remove all the bugs. Permanent bugs that defy eradication are often referred to ironically as "features".
File	A file in computer jargon can be used to describe many different things. It may be a Computer Program, a document file created with a Word-processor, an image file, an audio file, a video file, etc
Hardware	The physical elements of a computer system - the bits you can see, touch, drop, kick or fall over
Host	Any computer that provides services to other computers that are linked to it, via a local network or via the Internet
Mainframe Computer	Loosely speaking, a very large computer which can serve many users at remote terminals

GLOSSARY

Network	A group of computers connected together, either by physical connections such as cables, or by wireless connections
Operating System (OS)	A suite of programs that starts up when you switch on your computer and manages and runs all the other programs installed on the computer
Platform	Often used as an alternative term for a computer system, including both the hardware and the software. Essentially this term describes something that is used to build something else
Portal	A Web page, website or service that acts as link or entrance to other websites on the Internet. A portal includes an annotated catalogue of websites and may also include a Search Engine, Email facilities, a Forum and other services
Programming Language	A formal, structured, English-like language in which computer programs are written. The instructions, known as code, are converted into binary machine instructions via a compiler or an interpreter
Server	A computer which provides services to other computers, which are known as clients
Software	A generic term describing all kinds of computer programs, applications and operating systems
Streaming	Playing audio or video in real time from a website. In order to play streaming multimedia files, you need a specific Plug-in program that links in with your Browser and plays the file as it is transmitted rather than downloading it to your computer first
Website	An area on the World Wide Web where an organization or individual stores a collection of pages of material; Web pages. The pages are usually interlinked with one another and with other websites

CHAPTER 1: INTRODUCTION

1.1 Introduction

The information and communication is one of the sub sector in the service sector in Malaysia that growth rapidly in past decades. The National Account Gross Domestic Product 2018 shows the growth of economy in Malaysia by 4.7 per cent in 2018¹. The Gross Domestic Product (GDP) in 2018 has recorded RM 1,361.5 billion in Malaysia, where the main contributor comes from services sector with 56.7 per cent. Service sector plays an important role in the growth and development of Malaysian economy. The enhanced growth of services sector in Malaysia is indeed in line with the growth transformation that has taken place in many of the developed economies.

The 1 digits Malaysia Standard Industry Classification 2008 (MSIC 2008), Information and communication it is divided into 5 division based on 2 digits MSIC 2008 which are Publishing activities; Motion picture, video and television programme production, sound recording and music publishing activities; Programming and broadcasting activities; Telecommunications; Computer programming, consultancy and related activities; and Information service activities.

This study is about the information activities activities. This chapter starts with describing the problem statement, objective of study, scope of study and justification for MSIC 2008 section selection of the Occupational Framework (OF) especially for the information activities activities industry.

¹ Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 1

1.2 Problem Statement

The information service activities is one of the sub sector in the service sector in Malaysia that are potentially become one of the largest contributors to the country's economy in the future. However, there are constraints that hinder the growth of this sub-sector especially in the shortage of skilled labour. Therefore, the development of the Occupational Framework (OF) is seen as one of the initiatives to identify the level of job competency in the information activities activities. The current study is conduct to ensure that the OF for this industry is correspond with the development of the National Occupational Skills Standard (NOSS) based on Malaysia Standard Industry Classification 2008 (MSIC 2008) by sections and divisions. These studies are aiming to produce the industry occupational structure, job descriptions, demand for the skills, jobs title, and critical tasks.

1.3 Objectives of Study

The objectives of the study conducted on the information service activities are as below:

- a) To establish the Occupational Structure (OS) of information service activities based on MSIC 2008;
- b) To identify the skills in demand for information service activities based on the current industry needs;
- c) To determine the critical job title in information service activities based on the industry needs;
- d) To identify the relevant jobs title of information service activities that is correspond with Industrial Revolution 4.0 (IR4.0); and
- e) To establish the Occupational Descriptions (OD) for each job title of information service activities based on latest industry OS.

1.4 Scope of Study

The scope for current study is information activities industry. Which the result were the establishment of the Occupational Framework (OF) for the industry. The focus of current study is the respondents who are the industry players in Malaysia. The unit of analysis for this study are the industry representatives. The study commences with exploring the industry present environment through documents analysis. This is followed by referring and interviewing the pertinent industry representatives to get hold of their expert opinions or ideas. This in turn can be employed to establish the industry long term demand.

1.5 Justification for Malaysia Standard Industrial Classification 2008 (MSIC 2008) Section Selection

The study are focused on the 2 digits MSIC 2008 Section: Information and Communication, Division 63: Information service activities. The division are divide into two group which are 631; Data processing, hosting and related activities; web portals and 639: Other information service activities. Group 631 are includes the web hosting, streaming services or application hosting, application service provisioning, general time-share mainframe facilities to clients; complete processing and specialized reports from data supplied by clients or providing automated data processing and data entry services; operation of web sites that use a search engine to generate and maintain extensive databases of Internet addresses and content in an easily searchable format; and operation of other websites that act as portals to the Internet, such as media sites providing periodically updated content.

The other information service activities are include the news syndicate and news agency activities furnishing news, pictures and features to the media (e.g. Bernama); telephone based information services; information search services on a contract or fee basis; and news clipping services, press clipping services, etc. However, this group are not include the activities of independent and photojournalists; activities of independent journalists; activities of libraries and archives; and activities of call centres.

1.6 Structure of Chapter

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

a) Chapter 1

This chapter includes a brief explanation of the objective, scope and justification of the study.

b) Chapter 2

This chapter includes the review of the industry's stakeholders, government policies, market intelligence and relation with Industrial Revolution 4.0 (IR4.0).

c) Chapter 3

This chapter includes the explanation of the methodology implement in this study in order to obtain the results.

d) Chapter 4

This chapter includes the findings of Occupational Structure (OS), Occupational Description (OD), Competencies in Demand, Job in Demand and etc.

e) Chapter 5

This chapter includes the discussion and conclusion of the findings and/or other related information obtained from the industry; and suggest a recommendation based on the finding.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter provides a brief overview of the information service activities in Malaysia, stakeholders, related legislations, key government initiatives and policies for the industry and industry intelligence. Findings in this chapter were obtained primarily through literature review and subsequently confirmed by the development panel members to obtain insight on the matters at hand from a practitioner's perspective.

2.1.1 National Skills Development Act 2006 (Act 652)

National Skills Development Act 2006 (Act 652) came into effect on 1st September 2006 after it was officially gazette 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 therewith. The Act 652 is significant because for the first time in the history of skills training in Malaysia, a national legislation has been enacted solely and exclusively for skills training and development. In addition, the meaning and scope of skills training has 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. The Act 652 also provides for the implementation of a Malaysian Skills Certification System, leading to the award of five (5) levels of national skills qualification, namely Malaysian Skills Certificate Level 1, 2 and 3; Malaysian Skills Diploma; and Malaysian Skills Advanced Diploma².

² National Skills Development Act 652 (2019, September 2) retrieved from <http://www.agc.gov.my/agcportal/index.php>

2.1.2 Malaysia Qualification Framework (MQF)

Malaysia Qualification Framework (MQF) refers to the policy framework that satisfies both the national and international 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 for each qualification title. It will also provide progression routes for all the graduates in the respective occupational fields. The MQF has eight levels of qualifications in three sectors and it is supported by lifelong education pathways as shown in Table 2.1. The Department of Skills Development (DSD) governs the skills sector, in which there are five (5) levels of skills qualification. The definition for each level of skills qualification is specified in the Malaysian Occupational Skills Qualification Framework (MOSQF) can be refer in Annex 1³.

Table 2.1: Malaysian Qualification Framework (MQF) Chart
(Source: Malaysian Qualification Framework 2nd Edition)

MQF Level	Minimum Graduating Credit	Academic Sector	Technical Vocational Education and Training (TVET) Sector	Lifelong Learning/APEL Criteria for APEL(A)
8	No credit rating	PhD by Research		Admission criteria: 35 years old Bachelor's degree in 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

³ Malaysian Qualification Agency. 2018. Malaysian Qualification Framework 2nd Edition

MQF Level	Minimum Graduating Credit	Academic Sector	Technical Vocational Education and Training (TVET) Sector	Lifelong Learning/APEL Criteria for APEL(A)
	40	Master's by Mixed Mode & Coursework		STPM/Diploma/equivalent Relevant work experience Passed APEL assessment
	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	5	
4	90	Diploma	4	Admission criteria: 20 years old Relevant work experience Passed APEL assessment
3	60	Certificate	3	Admission criteria: 19 years old Relevant work experience Passed APEL assessment
2	30	Certificate	2	3R
1	15	Certificate	1	3R

2.1.3 Occupational Framework (OF)

Occupational Framework (OF) was previously known as Occupational Analysis (OA). The OF is an outcome of an occupational analysis and research work carried on a particular industry sector. The contents of an OF shall include occupational structure, occupational definitions, job descriptions, manpower requirements and industry intelligence. The Occupational Structure (OS) is a matrix that will show the occupational areas and career paths for a particular occupation. The information on manpower skills requirements, Occupational Descriptions (OD) and industry intelligence will allow an overall understanding of the industry's occupational areas. Manpower skills requirements are to identify the skills gaps, and shortages in workforce. Industry Intelligence is based on an actual qualitative and quantitative data from the industry to further strengthen and prove the reliability of the data. Therefore, a properly planned development and analysis will enable the OF to be precise and accurate; thus, ensuring that it will be a reliable source of information for further analysis of the industry and the development of NOSS and training requirements⁴.

2.1.4 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 National Skills Development Act 652. Meanwhile, National Competency Standard (NCS) is describe the knowledge, skills and attitudes needed to perform in a particular occupation but also do not directly relate to any particular job classification. Standards are developed by the industry experts based on the needs of the industry and is utilized as the main tool in the implementation of Malaysian Skills Certification System in which the performance of existing industry workers and trainees are assessed based on Standards for awarding of Malaysian Skills Certificate⁵.

⁴ Department of Skills Development (2019, August 27) retrieved from <https://www.dsd.gov.my/jpkv4/index.php/my/perkhidmatan/noss>

⁵ Department of Skills Development (2019, August 27) retrieved from <https://www.dsd.gov.my/jpkv4/index.php/my/>

2.1.5 Competency Based Training (CBT)

Competency Based Training (CBT) is an approach to vocational training which emphasizes what a person can do in a work place as a result of education and training obtained. CBT is based on performance standards which are set by the industry with 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 which allows each individual to develop skills at their own pace for a similar outcome. Thus, training practices can be customized for each individual to achieve a similar outcome. CBT concept is the basis of Malaysian Skills Certification system which is coordinated by DSD⁶.

2.2 Scope of Occupational Framework Based on MSIC 2008

The Malaysia Standard Industrial Classification 2008 (MSIC 2008) provide a standard framework for classifying establishments and other statistical unit in the given industry in all official statistics. It also serves as a standard reference to users of official statistics on the type of economic activities included under the various categories of industries. This section provide the definition of the MSIC 2008 based on Department of Statistics Malaysia (DOSM) and the criteria for the title selection for this study.

2.2.1 Malaysia Standard Industrial Classification 2008 (MSIC 2008) Definition

Malaysia Standard Industrial Classification 2008 (MSIC 2008) is intended to be a standard classification of productive economic activities. Its main purpose is to provide a set of activity categories that can be utilised for the collection and presentation of statistics according to such activities. Therefore, MSIC 2008 aims to present these set of activity categories in such a way that entities can be classified according to the economic activity that they carry out. For 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

⁶ Department of Skills Development (2019, August 31) retrieved from <https://www.dsd.gov.my/jpkv4/index.php/my/>

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 will be similar. The MSIC 2008 is a classification of all types of economic activities and is not a classification of goods and services nor is it a classification of occupations⁷.

2.2.2 Title Selection Criteria

To review the scope of the information service activities is comprehensively covered in this OF research, the definition of Information activities activities has to be spelt out clearly. Based on the 2 digits MSIC 2008, the area falls under the Section and Division listed in Table 2.2.

Table 2.2: Summary of MSIC 2008 by Section, Division and Group
(Source: MSIC 2008)

Section	J	Information and Communication
Division	63	Information Service Activities
Group	631	Data processing, hosting and related activities; web portals
	639	Other information service activities

To further understand the scope of this particular Occupational Framework based on MSIC 2008, Table 2.3 can be referred.

⁷ Department of Statistics Malaysia. (2008). Malaysia Standard Industrial Classification 2008 (MSIC 2008).

Table 2.3: Description of MSIC 2008 by Section, Division, Group, Item and Class

(Source: MSIC 2008)

CLASSIFICATION	CODE	DESCRIPTION
Section	J	Information and Communication
Division	63	Information Service Activities This division includes the activities of web search portals, data processing and hosting activities, as well as other activities that primarily supply information.
Group	631	Information Service Activities This group includes the provision of infrastructure for hosting, data processing services and related activities, as well as the provision of search facilities and other portals for the Internet.
Class	6311	Data processing, hosting and related activities
Class	6312	Web portals
Items	63111	Activities of providing infrastructure for hosting, data processing services and related activities Includes: web hosting, streaming services or application hosting, application service provisioning, general time-share mainframe facilities to clients
Items	63112	Data processing activities Includes:

CLASSIFICATION	CODE	DESCRIPTION
		complete processing and specialized reports from data supplied by clients or providing automated data processing and data entry services
Items	63120	Web portals Includes: operation of web sites that use a search engine to generate and maintain extensive databases of Internet addresses and content in an easily searchable format. Operation of other websites that act as portals to the Internet, such as media sites providing periodically updated content
Group	639	Other information service activities This group includes the activities of news agencies, and all other remaining information service activities.
Class	6391	News agency activities
Class	6399	Other information service activities n.e.c.
Items	63910	News syndicate and news agency activities Includes: news syndicate and news agency activities furnishing news, pictures and features to the media (e.g. Bernama) Excludes: (a) activities of independent and photojournalists, see 74200 (b) activities of independent journalists, see 90005

CLASSIFICATION	CODE	DESCRIPTION
		(c) activities of libraries and archives, see 9101
Items	63990	Other information service activities n.e.c. Includes: (a) telephone-based information services (b) information search services on a contract or fee basis (c) news clipping services, press clipping services, etc. Excludes: activities of call centres, see 82200

2.3 Key Stakeholders

The stakeholder is a group, organization, or society at large that has a stake in the industry. Stakeholders can affect or be affected by the organization's actions, objectives and policies. In Malaysia, the stakeholder for the information activities activities is comprises of government agencies, regulatory bodies, industry associations, professional bodies and training centre of information activities activities industry.

2.3.1 Government Agencies and Regulatory Bodies

Government agencies, is a permanent or semi-permanent organization in the government that is responsible for the oversight and administration of specific functions. While, regulatory bodies is a public authority responsible for exercising autonomous authority over some area of human activity in a regulatory or supervisory capacity. In Malaysia, there many government agencies and regulatory bodies related to the information service

activities industry, for this study 6 bodies selected due to their acts as main regulator in this industry. The list can be referred in Table 2.4.

Table 2.4: List of Government Agencies and Regulatory Bodies for Information Service Activities Industry

NO.	ORGANISATIONS	OVERVIEW, ROLES, FUNCTION AND RESPONSIBILITIES
1.	Malaysian Communications and Multimedia Commission (MCMC)	<ul style="list-style-type: none"> 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 licenced or otherwise authorised under the communications and multimedia industry; and h) Render assistance in any form to, and to promote cooperation and coordination amongst, persons engaged in communications and multimedia activities⁸.
2.	National Cyber Security Agency (NACSA)	<ul style="list-style-type: none"> a) Secure and strengthen Malaysia's resilience in facing the threats of cyberattacks, by coordinating and consolidating the nation's best

⁸ Malaysian Communications and Multimedia Commission (MCMC). (2019, May 29). Retrieved from <https://www.mcmc.gov.my/about-us/our-responsibility>

NO.	ORGANISATIONS	OVERVIEW, ROLES, FUNCTION AND RESPONSIBILITIES
		<p>experts and resources in the field of cyber security;</p> <p>b) Develop and implement national-level cyber security policies and strategies;</p> <p>c) Protect Critical National Information Infrastructures (CNII);</p> <p>d) Undertake strategic measures in countering cyber threats;</p> <p>e) Spearhead cyber security awareness;</p> <p>f) Formulating strategic approach towards combatting cyber-crimes;</p> <p>g) Advise on organizational cyber risk management;</p> <p>h) Develop and optimize shared resources among agencies; and</p> <p>i) Foster constructive regional and global networks among entities with shared interests in cyber security⁹.</p>
3.	Cybersecurity	<p>a) Provide 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; and</p> <p>b) Provides specialised cyber security services such as Cyber Security Responsive Services; Cyber Security Proactive Services; Outreach and Capacity Building; Strategic Study and</p>

⁹ National Cyber Security Agency (NACSA). (2019, May 29). Retrieved from <https://www.nacsa.gov.my>

NO.	ORGANISATIONS	OVERVIEW, ROLES, FUNCTION AND RESPONSIBILITIES
		Engagement; and Industry and Research Development ¹⁰ .
4.	Malaysia Digital Economy Corporation (MDEC)	<p>a) Advise the Malaysian Government on legislation, policies and standards for ICT and multimedia operations; and</p> <p>b) 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 Malaysia¹¹.</p>
5.	MIMOS Berhad	<p>a) Provide critical infrastructure for the advancement of the local electronics industry so that the nation can design, produce and market high-quality electronic products by local capabilities due to the importance of industrial and economic growth; and</p> <p>b) Grow key economic sectors, provide innovation solutions to enhance productivity, support local industries and improve their capacities through technology, and above all position Malaysia in the global markets as an advanced, regional centre of excellence¹².</p>

¹⁰ CyberSecurity Malaysia. (2019, May 29). Retrieved from <https://www.cybersecurity.my/en/index.html>

¹¹ Malaysia Digital Economy Corporation (MDEC). (2019, May 29). Retrieved from <https://mdec.my>

¹² MIMOS Berhad – National Applied R&D Centre. (2019, May 29). Retrieved from <http://www.mimos.my>

NO.	ORGANISATIONS	OVERVIEW, ROLES, FUNCTION AND RESPONSIBILITIES
6.	<i>Persatuan Industri Komputer dan Multimedia Malaysia</i> (PIKOM)	a) Improves the business climate in the interests of all its member companies and to promote industry growth in line with national aspirations; and b) Maintain a balance view between industry and regulatory on ICT-related issues, foremost and largest forum for ICT practitioners, managers, entrepreneurs, researchers, chief information officer and policy maker to share knowledge and experience in the Malaysian ICT sector and keep the members updated on the latest industry trends and government policy ¹³ .

2.3.2 Industry Associations and Professional Bodies

Industry association is the association that supports and protects the rights of a particular industry and the workers in the industry. In Malaysia, there numerous industry associations and professional bodies related to the information service activities industry, for this study 5 industry associations selected due to their acts as main association in this industry. The list can be referred in Table 2.5.

Table 2.5: List of Industry Associations and Professional Bodies for Information Service Activities Industry

NO.	ORGANISATIONS	OVERVIEW, ROLES, FUNCTION AND RESPONSIBILITIES
1.	<i>Pertubuhan Pereka Grafik Kebangsaan</i> (PERGRAKAN)	a) Acts as a working organization for photography, videography, graphics, animation and multimedia; and

¹³ National ICT Association of Malaysia (PIKOM). (2019, May 29). Retrieved from <http://www.pikom.org.my/about-us/corporate-profile/>

NO.	ORGANISATIONS	OVERVIEW, ROLES, FUNCTION AND RESPONSIBILITIES
		b) Keep the welfare of members of the organization, upgrading the designer's position to the higher level, offer Malaysia's skills certification to designers who are in need, helping the designer market through business matching and career pathway and organize activities that educate members of the community.
2.	Malaysia Press Institute (MPI)	<p>a) 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; and</p> <p>b) Offers short and practical courses, workshops, seminars to local journalist, MPI is also offering academic programmes to its members¹⁴.</p>
3.	National Press Club (NPC)	a) NPC regularly organises social events for journalists and other media practitioners. The club also organises talks and workshops on media practices and current events affecting the profession ¹⁵ .

¹⁴ Malaysia Press Institute (MPI). (2019, May 29). Retrieved from <https://mpi.my/>

¹⁵ National Press Club (NPC). (2019, May 29). Retrieved from <https://www.press.org/about>

NO.	ORGANISATIONS	OVERVIEW, ROLES, FUNCTION AND RESPONSIBILITIES
4.	National Union of Journalist (NUJ)	a) 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 ¹⁶ .
5.	Malaysia Professional Press Photographer Association (MPPA)	a) The MPPA was formed to defend the rights of press photographers in their daily work to tell news stories through photographs to the public. Its objectives include guarding the welfare of press photographers, provide training and instilling a code of ethics amongst members of the MPPA.

2.3.3 Training Centre

A training centre is a centre that offer the service that allows companies to build custom training material that documents its best practices and procedures. In Malaysia, many established training centre related to the information service activities industry. However, there are 8 training centres that selected due to their function as main training provider in this industry. The list of training centres can be referred in Table 2.6.

¹⁶ National Union of Journalist (NUJ). (2019, May 29). Retrieved from <http://www.nujm.org/nuj/about.php>

Table 2.6: List of Training Centre for Information Service Activities Industry

NO.	ORGANISATIONS	ROLES, FUNCTION AND RESPONSIBILITIES
1.	Malaysia Co-operative Institute (MCI)	<ul style="list-style-type: none"> a) Provide courses related to information technology and communication (ICT) and the appropriate courses; b) Conducting the research and provide advice to cooperatives; and c) Contributed articles to scientific publications MKM¹⁷.
2.	<i>Institut Penyiaran Dan Penerangan Tun Abdul Razak (IPPTAR)</i>	<ul style="list-style-type: none"> a) Plan and prepare training programmes for staff of ministries, departments and agencies under ICT; b) Implement quality training programmes in line with the current needs of customers; c) Evaluation of training programmes to assess and improve the quality of training; d) Cooperate with other agencies inside and outside the country in the field of broadcasting, filming training and corporate communication; and e) Provide infrastructure and support services in accordance with the requirements of training.
3.	Malaysia Press Institute (MPI)	<ul style="list-style-type: none"> a) MPI offers short and practical courses, workshops, seminars to local journalist, MPI is also offering academic programmes to its members; and

¹⁷ Malaysia Co-operative Institute (MCI). (2019, May 29). Retrieved from <http://www.ikkm.edu.my/en/>

NO.	ORGANISATIONS	ROLES, FUNCTION AND RESPONSIBILITIES
		b) Conduct workshop and seminar involving local and international experts as well as collaborating with agencies, NGO's and field experts.
4.	Malaysia Digital Economy Corporation (MDEC)	a) MDEC provides theoretical and practical training, mentoring, coaching and apprentice support program in the fields of digital economy.
5.	Bernama School of Journalism (BSJ)	a) BSJ offers journalism training programs with over 40 modules including skills training programs, general knowledge and workshops. The learning sessions are fully conducted by senior staff of BERNAMA in various fields.
6.	Malaysia Global Innovation and Creative Centre (MaGIC)	a) MaGIC offers mentorship, upskilling workshop, product management and business development, in creating new digital platform for business entrepreneur.
7.	<i>Pertubuhan Pereka Grafik Kebangsaan</i> (PERGRAKAN)	a) PERGRAKAN offers creative industry apprenticeship program (PIK) with the full support and mandate from Ministry of Education Malaysia (KPM) educate train and provide industry exposure to high school students who aspire to be in the industry.

NO.	ORGANISATIONS	ROLES, FUNCTION AND RESPONSIBILITIES
8.	CISCO Malaysia Networking Academy	a) CISCO Industry Training Program (CiTP), is a joint initiative between Cisco, Universiti Malaya (UM) and MDEC, CiTP is an innovative internship program to provide your company with ICT expertise to stay competitive and to enhance daily business operations.

2.4 Government Legislations, Policies and Initiatives

It is imperative that, this research has to refer to legislation, by-laws and policies that are directly related to Information Service Activities Industry.

2.4.1 Government Legislations

In Malaysia, there are many legislations related to the information service activities industry. There are 7 legislation that selected due to their relevance in this industry. The following Table 2.7 indicates the relevant legislations to the information service activities industry.

Table 2.7: List of Relevant Legislations for Information Service Activities Industry

NO.	LEGISLATIONS	DESCRIPTION
1.	Malaysian Communications and Multimedia Commission Act 1998 [Act 589]	a) Implement and enforce the provisions of the communications and multimedia laws; b) Regulate all matters relating to communications and multimedia activities not provided for in the communications and multimedia laws; c) Supervise and monitor communications and multimedia activities; and

NO.	LEGISLATIONS	DESCRIPTION
		d) Encourage and promote the development of the communications and multimedia industry including in the area of research and training ¹⁸ .
2.	Copyright (Amendment) Act 1987 [Act 332]	a) Check unauthorised transmission of copyright works over the Internet; and b) Ensure adequate protection of intellectual property rights for companies involved in content creation in the ICT and multimedia environment ¹⁹ .
3.	Civil Aviation Authority of Malaysia Act 2017 [Act 788]	a) Regulate the safety and security of the civil aviation including the establishment of standards of their enforcement; b) Safeguard civil aviation against any acts of unlawful interference; c) Regulate the operation of aerodrome and the provision of aerodrome service and facilities in Malaysia; d) Encourage, promote, facilitate and assist in the development and improvement of civil aviation capabilities, skills, and services in Malaysia; e) Provide technical and consultancy services relating to civil aviation; and f) Represent the Government internationally in respect of matters relating to civil aviation ²⁰ .

¹⁸ Malaysian Communications and Multimedia Commission (MCMC). (2019, May 29). Retrieved from <https://www.skmm.gov.my/legal/acts>

¹⁹ National Cyber Security Agency (NACSA). (2019, May 29). Retrieved from <https://www.nacsa.gov.my/legal.php>

²⁰ CIVIL AVIATION AUTHORITY OF MALAYSIA (CAAM). (2019, May 29). Retrieved from <http://www.dca.gov.my/sectors-divisions/legal-advisor/act-2/>

NO.	LEGISLATIONS	DESCRIPTION
4.	Sedition Act 1948 [Act 15]	a) Sedition Act specifies that anyone who does or attempts to do, or makes any preparation to do, or conspires with any person to do an act with seditious tendency, such as uttering seditious words, or printing, publishing or importing seditious literature, is guilty of sedition ²¹ .
5.	Official Secrets Act 1972 [Act 88]	a) The act defines an official secret as any 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 or Chief Minister of a State or such public officer; and b) The Schedule to the Act covers Cabinet documents, records of decisions and deliberations including those of Cabinet committees, as well as similar documents for state executive councils. It also includes documents concerning national security, defence and international relations ²² .

²¹ Sedition Act 1948 - AGC (2019, May 29). Retrieved from <http://www.agc.gov.my/agcportal/uploads/files/Publications/LOM/EN/Act%2015.pdf>

²² Official Secrets Act – AGC (2019, May 29). Retrieved from <http://www.agc.gov.my/agcportal/uploads/files/Publications/LOM/EN/Act%2088.pdf>

NO.	LEGISLATIONS	DESCRIPTION
6.	Child Act 2001 [Act 611]	a) The Act has provided extra protection for a child offender especially with regards to the privacy of the child. The trial for the Court for Children shall be in closed court. Only certain specified persons are allowed to attend the trial. There now a legal duty for the parents of the child to attend the trial. It also contains provisions to protect the child from associating with adult offenders in prison or elsewhere ²³ .
7.	BERNAMA Act 1967 [Act 780]	a) 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 ²⁴ .

2.4.2 Government Policies and Initiatives

The government policies and initiatives is the plan of action adopted or pursued by the government in order to increase the growth of the sector. This policies and initiatives are based on the 11th Malaysia Plan and related strategic plan.

²³ Child Act 2001 – AGC (2019, May 29). Retrieved from <http://www.agc.gov.my/agcportal/uploads/files/Publications/LOM/EN/Act%20611.pdf>

²⁴ LAWS OF MALAYSIA Act 780 BERNAMA ACT 1967 - Federal Gazette (2019, May 29). Retrieved from [http://www.federalgazette.agc.gov.my/outputaktap/aktaBI_20160915_Warta-BERNAMAAct1967\[Act780\].pdf](http://www.federalgazette.agc.gov.my/outputaktap/aktaBI_20160915_Warta-BERNAMAAct1967[Act780].pdf)

a) Public Sector ICT Strategic Plan (PSICTSA)

PSICTSA outlines the strategic direction of Public Sector ICT implementation over the next five years. It emphasizes on efficiency, productivity and ICT innovation for the purpose of optimizing service delivery to the people. PSICTSA 2016-2020 is required for reaching the Government's goal of reaching Vision 2020, align the use of technology with the direction of the Public Sector business, act as the main reference agency in aligning ICT implementation strategies with Public Sector ICT agenda, and earn value from technological exploitation and planned ICT implementation in Public Sector agencies.

b) Eleventh Malaysia Plan (11th MP)

The 11th MP is the final plan in achieving Vision 2020 and is the foundation for the country's future development. 11th MP was launched on May 21, 2015 with the theme 'People-Growing Growth'. People are the most important asset of the nation and the Government is committed to strengthening the prosperity and prosperity of the people. To achieve this goal by the year 2020, the 11th Malaysia Plan a sustainable growth through six strategic thrusts and six change drivers that will realize Malaysia's goal of achieving advanced and inclusive nation status²⁵.

²⁵ Eleventh Malaysia Plan 2016-2020 - TalentCorp Malaysia. (2019, May 29). Retrieved from https://www.talentcorp.com.my/clients/TalentCorp_2016_7A6571AE-D9D0-4175-B35D-99EC514F2D24/contentms/img/publication/RMKe-11%20Book.pdf



Figure 2.1: 6 Strategic Thrust of 11th MP
(Sources: Eleventh Malaysia Plan 2016-2020)

2.5 Industry and Market Intelligence

Industry and market intelligence are the collection and analysis of data of an industry by various sources of data to be utilise by the industry to make business decisions, manpower developments and training requirements. Industry intelligence is critical for developing strategies in the development of the industry, areas of manpower development and the impact of those developments. This section provide information regarding information service activities industry based on the industry growth and employment statistics.

2.5.1 Growth of Information and Communication Industry

Based on National Account Gross Domestic Product 2015-2018, Malaysia's economy grew by 4.7 per cent in 2018 compared to the previous year, 2017 at 5.7 per cent²⁶. Malaysia gross domestic product (GDP) in 2018 recorded RM 1,361.5 billion where the main contributor comes from services and manufacturing sector with 56.7 per cent and 22.4 per cent respectively.

Other than that, this research is focus on information service activities industry in the services sector. Percentage share to Malaysia GDP for service sector in 2018 increases to 56.7 per cent compared to the year 2017 with 55.6 per cent²⁷. As for the percentage share to GDP for computer and information service activities industry for 2018 is 1.3 per cent increasing from 1.2 per cent in 2017.

Moreover, in terms of annual percentage change of communication industry in 2018, it is also increasing compare to previous years, 2017. Annual percentage change of communication industry in 2018 increase to 4.6 per cent compared to the year 2017 with 4.4 per cent²⁸.

2.5.2 Employment Statistics

a) Labour Force in Malaysia

Labour force can be define 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 the production of goods and services taking place in a country through market transactions in exchange for remuneration²⁹. The concept and definition of labour force in Malaysia are stated in Figure 2.2.

²⁶ Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 1

²⁷ Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 46

²⁸ Department of Statistics Malaysia. 2019. National Account Gross Domestic Product 2018. Page 57

²⁹ International Labour Organization. 2018. Labour force (2019, 30 September) Retrieved from https://www.ilo.org/global/statistics-and-databases/statistics-overview-and-topics/WCMS_470304/lang--en/index.htm



Figure 2.2: Concepts and Definitions Relating to Labour Force in Malaysia
(Source: Department of Statistics Malaysia, 2019)

Labour force in Malaysia increased by 2.0 per cent from 15.0 million persons in 2017 to nearly 15.3 million persons in 2018. The increment in labour force was contributed by 299,200 employed persons. Labour Force Participation Rate (LFPR) in 2018 increased by 0.3 percentage points to 68.3 per cent as compared to 2017 with only 68.0 per cent³⁰. Hence, the remaining 31.7 per cent of the working age population was outside the labour force. On the other hand, the unemployment rate improved to 3.3 per cent in 2018 as compared to 3.4 percent in 2017. This shows that the country's economy is still operating with full employment where the unemployment rate is below 4.0 per cent.

³⁰ Department of Statistics Malaysia. 2019. The Labour Force Survey Report 2018. Page 12

b) Overview of Services Sector Labour Demand

Labour demand indicates the total labour that the economy is willing to employ at any given point of time. At the microeconomic level, labour demand by firm refers to positions in the company; and through the process of hires and separations, the information of filled positions and vacancies can be estimated. The concepts and definitions of the statistics on labour demand in this publication are as in Figure 2.3.

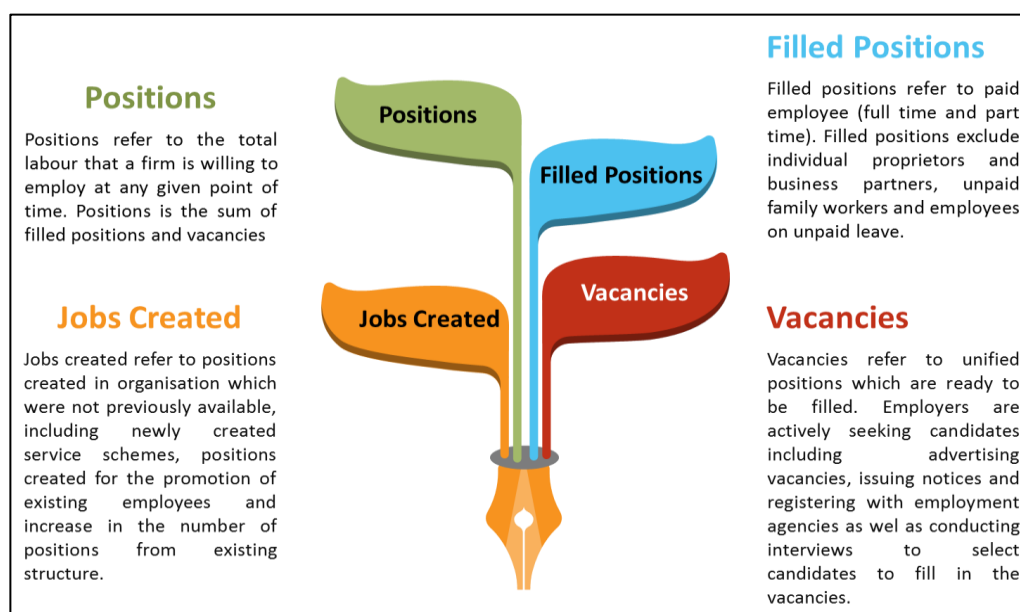


Figure 2.3: Concepts and Definitions Relating to Statistics on Labour Demand
(Source: Department of Statistics Malaysia, 2019)

The number of positions for services sector in 2018 was 4,421 thousand, went up 58 thousand from 4,363 thousand in 2017. The number of filled positions increased to 4,384 thousand from 4,322 thousand in 2017, while vacancies in this sector was 37 thousand. Meanwhile, there are 51 thousand jobs created in 2018 for the services sector³¹. The detailed information can be referred in Figure 2.4.

³¹ Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 22

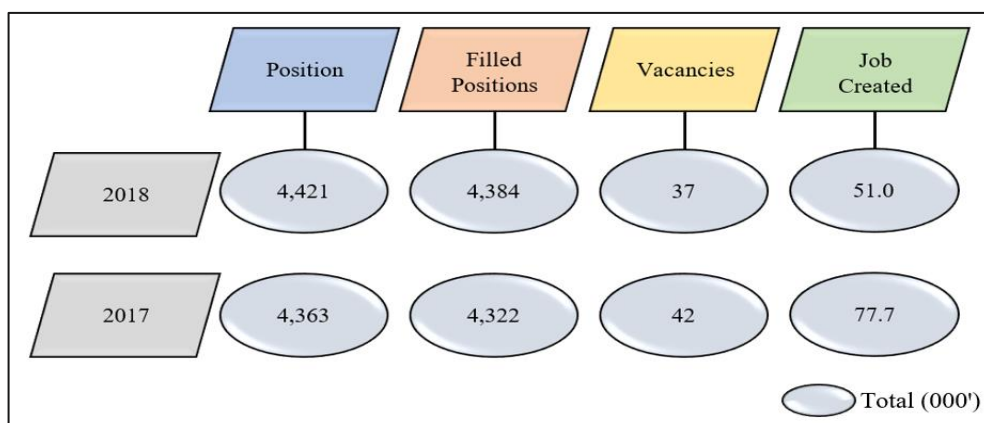


Figure 2.4: Employment Statistics in Services Sector
(Source: Department of Statistics Malaysia, 2019)

Position by skill in 2018 recorded an increase in percentage share for skilled worker to 32.7 per cent and semi-skilled worker to 47.1 per cent compare to in 2017 with 32.6 per cent and 46.8 per cent for skilled worker and semi-skilled worker respectively. For low skilled worker, from year 2017 to 2018, the percentage share for position by skill decrease from 20.6 per cent to 20.2 per cent³². The details of the information can be referred to Figure 2.5.

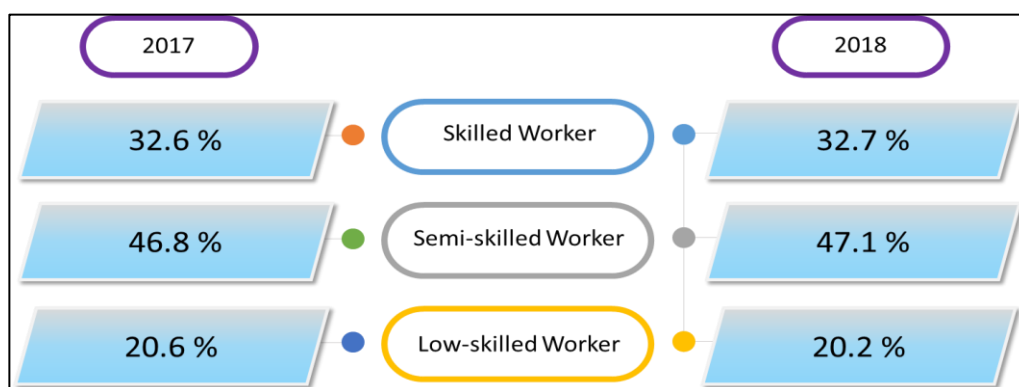


Figure 2.5: Positions by Skill in Services Sector by Percentage Share
(Source: Department of Statistics Malaysia, 2019)

Other than that, the percentage share for filled position by skill in services sector in 2018, 47.1 per cent was recorded for semi-skilled worker, 32.8 per cent

³² Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 32

for skilled worker and 20.1 per cent for low skilled worker³³. The comparison with 2017 can be referred to Figure 2.6.

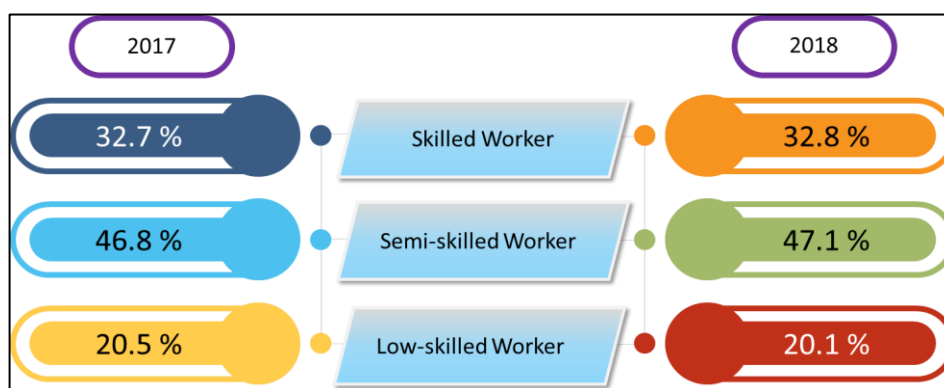


Figure 2.6: Filled Positions by Skill in Services Sector by Percentage Share
(Source: Department of Statistics Malaysia, 2019)

More than that, for vacancies by skill in services sector by percentage share for 2018, 45.0 per cent was recorded for semi-skilled worker, 27.0 per cent for skilled worker and 28.0 per cent for low skilled worker³⁴. The comparison with 2017 can be referred to Figure 2.7.

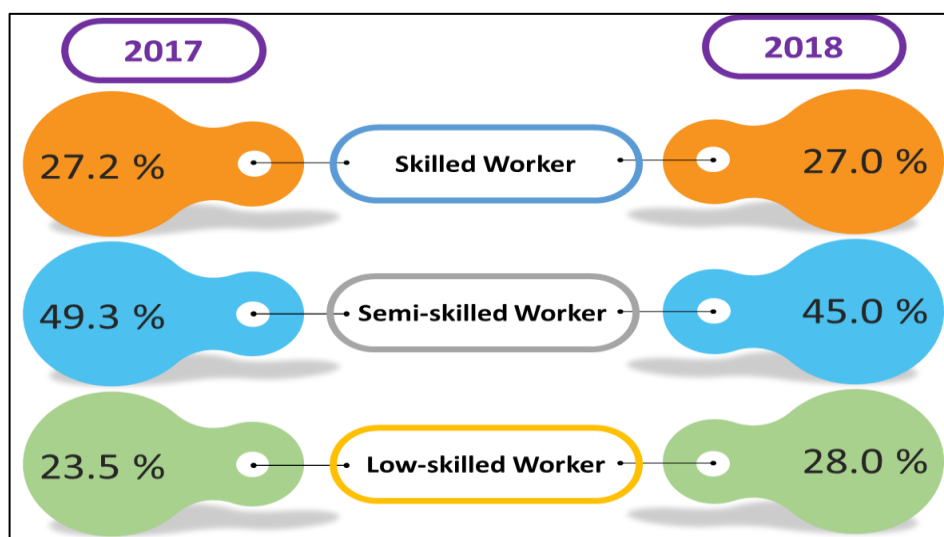


Figure 2.7: Vacancies by Skill in Services Sector by Percentage Share
(Source: Department of Statistics Malaysia, 2019)

³³ Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 38

³⁴ Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 44

Next, the jobs created by skill in services sector by percentage share for 2018, 54.9 per cent was recorded for skilled worker, 38.0 per cent for semi-skilled worker and 7.1 per cent for low skilled worker³⁵. The comparison with 2017 can be referred Figure 2.8.

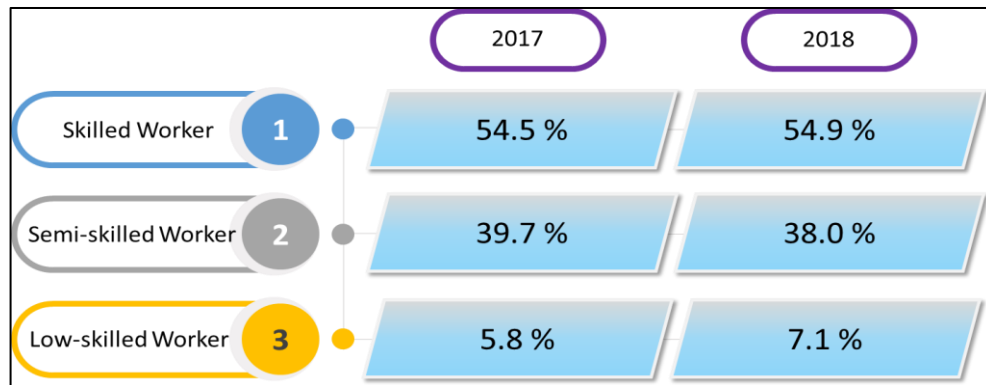


Figure 2.8: Jobs Created by Skill in Services Sector by Percentage Share
(Source: Department of Statistics Malaysia, 2019)

c) Employment growth of information service activities industry

Total number of persons engaged in information service activities industry increases from 16,270 persons in 2015 to 16,287 persons in 2017. Figure 2.9 shows the number of persons engaged in information service activities industry³⁶.

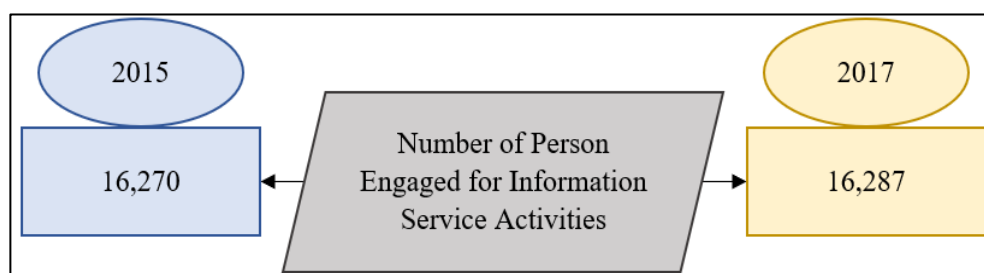


Figure 2.9: Number of Persons Engaged for Information Service Activities
(Source: Department of Statistics Malaysia, 2018)

³⁵ Department of Statistics Malaysia. 2019. Employment Statistics Second Quarter 2019. Page 50

³⁶ Department of Statistic Malaysia (DOSM). (2018). Annual Economic Statistic 2018. Page 14

2.5.3 Conclusion

In conclusion, for information service activities industry, in 2018, the contribution of this industry toward Malaysia GDP are at 1.3 per cent compare to 1.2 per cent in 2017. More than that, for employment statistics, number of persons engaged with information service activities industry increased from 16,287 persons in 2015 to 16,270 persons in 2017. The growth of this industry clearly shows that information service activities industry is one of potential industry to enhance country development in the future.

2.6 Existing NOSS Relevant to MSIC 2008 Section J, Division 63

Currently there are 11 National Occupational Skills Standards (NOSS) developed by Department of Skills Development (DSD) that are relevant to the sub-sectors and areas in the Information service activities industry. The details of the existing NOSS relevant to the Information service activities industry are in the tables below.

Table 2.8: Summary of NOSS Developed under the Group J63
(Source: NOSS Registry January 2019)

MSIC GROUP	CORRESPONDING NOSS/ LEVEL
631 Data processing, hosting & related activities; web portal	1) IT-052-4:2013 Web Developer L4 2) IT-052-5:2013 Web Admin L5 3) IT-082-3:2016 Data Organizer L3 4) IT-082-4:2016 Data Processing Technician L4 5) IT-082-5:2016 Data Analyst L5
639 Other information service activities	1) IT-100-2:2013 Inbound Customer Engagement Operations L2 2) IT-100-3:2013 Inbound Customer Engagement Lead L3 3) IT-101-2:2013 Outbound Customer Engagement Operations L2 4) IT-101-3:2013 Outbound Customer Engagement Lead L3 5) IT-102-2:2013 Support Customer Engagement Operations L2 6) IT-102-3:2013 Support Customer Engagement Lead L3

2.7 Overview of Information and Communication Industry in Developed Countries

This section provides an overview regarding developed countries in information service activities. For this section, there are 3 countries selected to be discussed which are United State, United Kingdom and Singapore. These countries are selected due to the rapid development in the service sector, especially in information service activities sub sector. The detailed comparison were discussed in Chapter 4.

2.8 Relation of Industry and Industrial Revolution 4.0 (IR4.0)

The Fourth Industrial Revolution is used to describe the emergence of the Digital Economy and use of automation and data exchange in industrial technologies. Commonly referred to with the catchphrase Industrial revolution 4.0 it also included the Internet of Things (IoT) and collaboration between networked machines and human beings in decision-making.

Technology experts talk about future industrial revolution as one that has the potential to disrupt every industry in every country due to the exponential pace that is the nature of digital revolution which is at the heart of Industrial revolution 4.0. This is already happening in businesses and industries as robotics and artificial intelligence can take over jobs traditionally manned by human labour, in particular technical processes that can easily be computerized.

IR4.0 is a technological revolution, which starts from the First Industrial Revolution to the Third Industrial Revolution. Briefly, the First Industrial Revolution used water and steam power to mechanise production. The Second revolution used electric power to create mass production. The Third used electronics and information technology to automate production. The Fourth Industrial Revolution is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion and convergence of technologies that cut across the physical, digital, and biological spheres. The progression of the industry revolutions is shown in Figure 2.10.

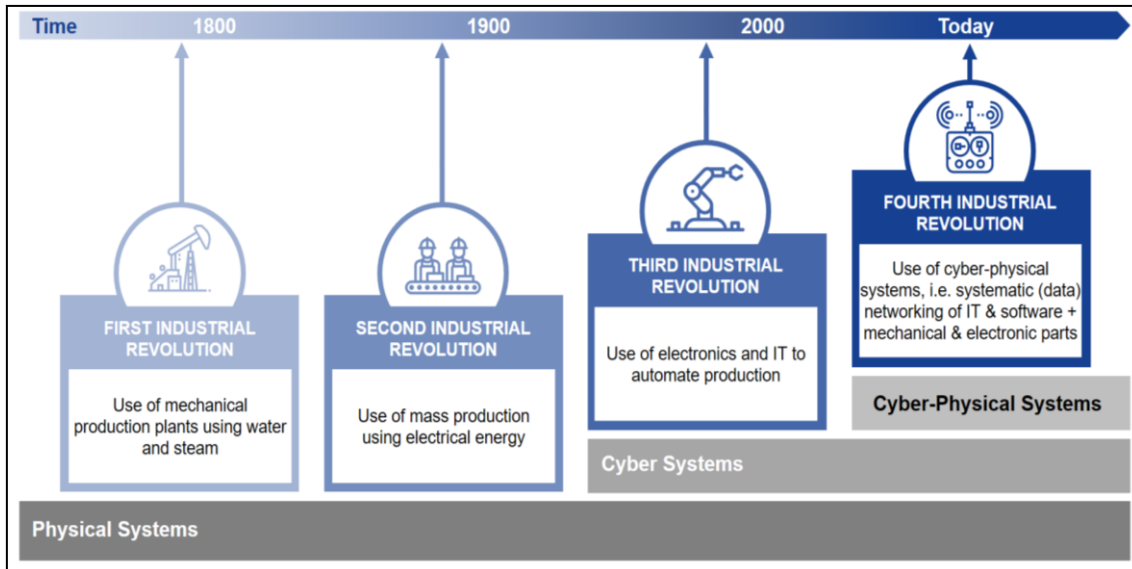


Figure 2.10: Industry Revolution 4.0

(Source: <https://www.fostec.com/en/competences/digitalisation-strategy/industry-4-0>)

According to the Ministry of International Trade and Industry (MITI) the 9 main pillars of Industrial revolution 4.0 which actually reflect more on the different technologies used in an Industrial revolution 4.0 environment, are as shown in Table 2.9.

Table 2.9: 9 Pillars of Industrial Revolution 4.0

(Source: Ministry of International Trade and Industry)

NO.	9 PILLAR OF IR4.0	DESCRIPTION
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.

NO.	9 PILLAR OF IR4.0	DESCRIPTION
4.	Internet of Things	All machines and systems connected to the production plant (as well as other systems) must be able to collect, exchange and save these massive volumes of information, in a completely autonomous way and without the need of human intervention.
5.	Additive Manufacturing	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.
7.	Cybersecurity	The increased connectivity and use of standard communications protocols, the need to protect critical industrial systems and manufacturing lines from cybersecurity threats is increasing.
8.	Augmented Reality	Augmented-reality-based systems support a variety of services, such as selecting parts in a warehouse and sending repair instructions over mobile devices – provide workers with real-time information to improve decision making and work procedures.

NO.	9 PILLAR OF IR4.0	DESCRIPTION
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.

Malaysia aspires to be a developed nation by 2025. The ICT sector has been identified as a conduit in achieving this. During the 2015-2016 period, the key drivers identified to lead the ICT industry were: Big Data, the Internet of Things (IoT) and cloud computing. For 2017-2018, this has transitioned into the Fourth Industrial Revolution (4IR), and Industry 4.0, Fintech and Block Chain. Moving forward, the keys areas identified by IDC Malaysia as best prospects are: Big Data in the Cloud, Enterprise Mobility and Device Deployment, IoT, Cognitive Cybersecurity, Data centre Vision and Fintech Opportunities.

The Government has taken special interest in developing the Internet of Things (IoT) sub-sector, which has resulted in several market partnerships. The commercialization of ‘smart city’ infrastructure, applications and services – such as smart highways, intelligent traffic management systems and advanced energy management systems – is expected to drive IoT adoption across key social and economic sectors.

Over the last five years, the data centre industry has grown rapidly to support 26 data centre service companies and nearly 200 specialized service providers capable of providing affordable, scalable and high-quality remote data storage and retrieval services to the growing numbers of multinational corporations looking to establish regional headquarters in the country.

Cloud computing is experiencing investment in data centres and ICT infrastructure in Malaysia. Multimedia Super Corridor (MSC) Malaysia has named cloud computing as the most important of its top 10 strategic technology priorities. The government hopes that adoption of cloud computing and building on the National Broadband Initiative, could accelerate Malaysia's development into an advanced economy. Software-as-a-Service (SaaS) has the highest adoption in cloud computing followed by Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS). Hybrid Clouds remain the dominant form of deployment by enterprises and this model has been recognized by service providers as a key growth market. While the adoption of cloud computing offers multiple potential benefits, there are also concerns regarding bandwidth consumption, lack of maturity of cloud environments, latency, data security and privacy guarantees from service providers. U.S. industry has expressed concerns increased interest in data localization requirements in Malaysia.

2.9 Conclusion

Based on the literature review findings, the area of Information Service Activities is seen as one of the main contributors to the economic performance and foreign investment. Currently there are several government agencies and industry association (i.e. MCMC, NACSA, MDEC, MPI, NPC, etc.) involved in the development and monitoring of the industry in terms of compliance to the relevant acts and regulations.

In order to increase employment mobility for the workforce, it is imperative that the occupational areas are redefined in the Occupational Structure. This is to allow scalability of skills and to accommodate the emerging skills required in the current Industrial Revolution, which is the 4th Industrial Revolution. Segmentation of the industry based on the Malaysia Standard Industrial Classification (MSIC) is also taken into consideration in order 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 63: Information Service Activities under MSIC.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter provides a detailed description of the research methodology that were used in the occupational analysis process for the purpose of developing the Occupational Framework (OF) for the information service activities industry. The details includes the overall review of the research design, overall research approach and justification of selected research methodology.

In developing a better understanding regarding current development of information service activities industry in Malaysia, the qualitative approach was deployed. Document analysis and Focus Group Discussion (FGD) with industry experts are a key part of the methodology as it facilitates understanding of key factors that would influence the industry. This qualitative approach, therefore, is considered to be an attractive technique to provide descriptions of the research data in natural settings³⁷. Therefore, the semi-structured interviews seem to be a very practical way to reflect the realities of the industry under study.

3.2 Research Approach

In this study, document analysis and focus group discussion were selected as the main method of obtaining and analysing the necessary input in view of the information service activities industry's OF and the types and sources of information required to develop the OF. This method uses inductive reasoning, by which themes and categories emerge from the data through the researcher's careful examination and constant comparison.

³⁷ Miles, M. B., Huberman, A. M., Huberman, M. A., & Huberman, M. (1994). *Qualitative data analysis: An expanded sourcebook*. sage.

This study uses a combination of the document analysis and FGD methods to gather the information. Figure 3.1 shows the operational framework of the research and outcomes.

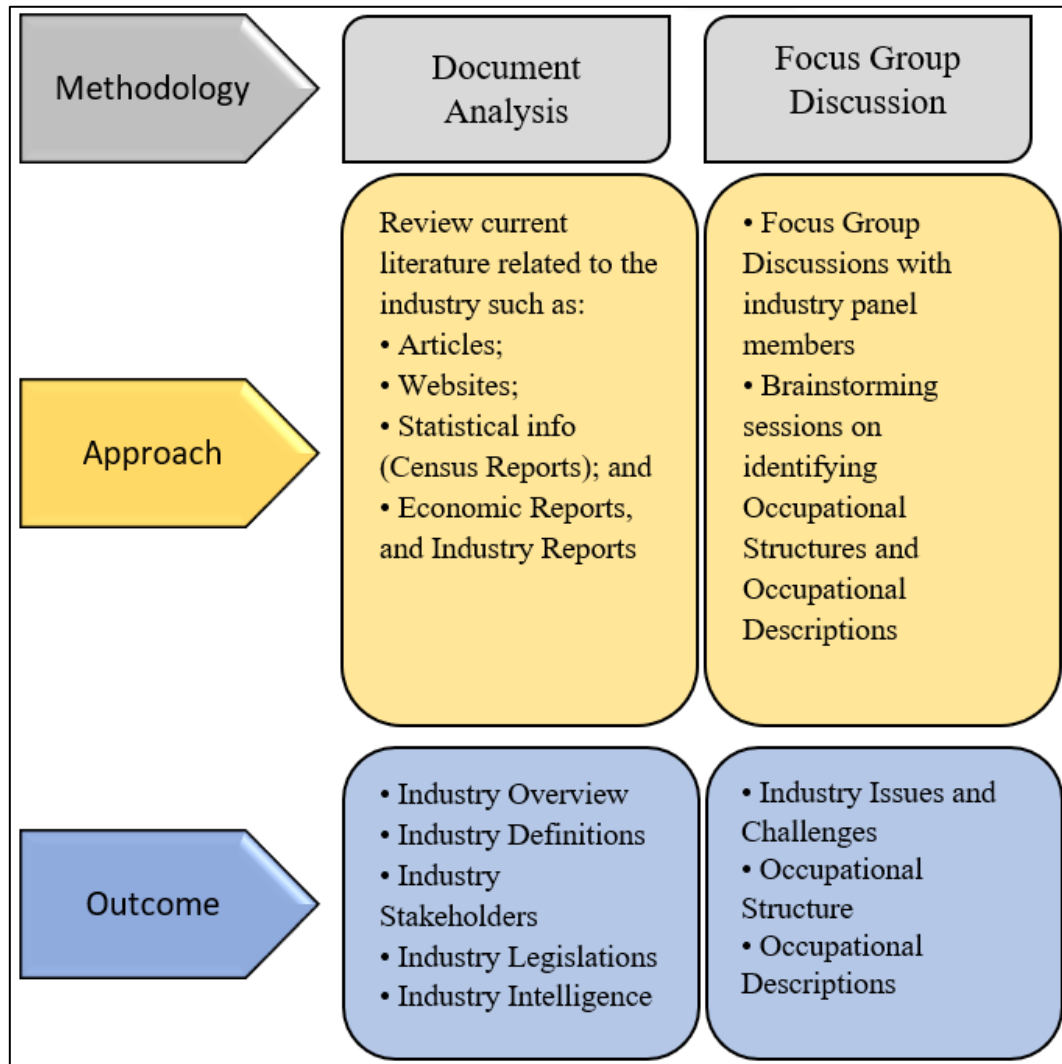


Figure 3.1: Operational Framework of Research

3.2.1 Document Analysis

This approach requires rigorous review of existing documents that addresses a clearly formulated question. The review systematically searches, identifies, selects, appraises, and synthesizes document research evidence found in the trade journal, academic paper and related journals. The review was done to obtain an overview of the industry in terms of Industry Definition, Stakeholders, Acts and Industry Intelligence.

In this process, pertinent and relevant information published by the government, regulatory and professional bodies, news agencies, research agencies and any other sources relevant to the background information of the information service activities industry were reviewed and analysed. Most information obtained was mainly on the larger industry, which was either information service activities. The collected data from this approach address the overview of the industry relevant to the requirement of IR4.0 and industrial need.

Generally the documents referred during the document analysis phase were as follows:

- 1) Department of Statistics Malaysia (DOSM), Reports and Economic Census (EC)
- 2) NOSS Registry January 2019
- 3) Malaysia Standard Industrial Classification 2008 (MSIC 2008)
- 4) Online newspaper/magazine articles
- 5) Official websites of industry stakeholders and legislations
- 6) Other sources (as listed in the references section of report)

a) Data Collection Strategy

Basically, document analysis involves two main sources of data or information:

i) Economic Database

The information related to Malaysia's labour markets or demand is highly relevant to this study. Thus, the information from the DOSM – MSIC 2008 and Occupation categories at 1-digit Malaysia Standard Classification of Occupations (MASCO) 2013, 11th Malaysia Plan, National Budget and Talent Corporation must be gathered, analyse and reported.

ii) Official Reports and Databases from Relevant Public and Private Agencies

In addition to the Economic Database reports, database from other government agencies (local and international agencies) that are relevant to Information service activities industry were gathered and analysed. Based on initial observation, the following databases contain relevant information for the industry:

- Local database – Department of Skills Development (DSD), Ministry of International Trade and Industry (MITI) and Malaysian Investment Development Authority (MIDA).
- International database – Organization for Economic Co-operation and Development (OECD), World Bank and European Union (EU).

b) Data Analysis Procedure

Based on the two sources of data and information, the following data analysis procedures were carried out;

- i) Examined the economic performances of the industry by looking at several macroeconomic indicators.
- ii) Analysed the industry outlook in relation to regional and global perspectives.
- iii) Determined the profile of the current and future workforce.
- iv) Reviewed technological development in the industry.

3.2.2 Focus Group Discussion

A series of industry engagement based on FGD were conducted to enable in-depth discussions on the issues of the industry workforce status. The FGD involves the discussion on the Occupational Structure (OS), Occupational Description (OD), demand for the skills, jobs title, and critical tasks; assessment of curriculum and training programs; accreditation and qualification based on NOSS and Malaysian Qualifications Agency (MQA) framework; potential workforce challenges; future outlook and strategic recommendations to be proposed.

The member of the FGD were selected and appointed among the experts industry player in information service activities industry. The FGD were conducted by an experience facilitator to encourage dialogue among the panels and at the same time controlling the discussion. Facilitators commissioned by the DSD to elicit and gather information and develop occupational standards in accordance with the guidelines, format and formulas prescribed by the DSD. While the industry experts must be a person who had at least 7 years' industry experience and working with a company registered with *Suruhanjaya Syarikat Malaysia (SSM)*.

The semi structured questions developed for FGD was based on occupational structure, job description, demand for the skills, jobs title, critical tasks, and other related issues. Sample of FGD semi structured interview questions;

- 1) What will be the industry Occupational Structure (OS) looks like?
- 2) What will be the job descriptions for each job title?
- 3) How to determine the demand for the industry skills?
- 4) How to determine the relevant jobs title that is in line with IR4.0?

a) Data Collection Strategy

In the process of gathering the input, brainstorming technique was adopted and attended by development panel members who discussed the different sub-sectors and areas. Facts obtained during the documents analysis were also discussed and presented to the development panel members. The information gathered was then used as input to the OF of the said sub-sector. Workshops and interviews were conducted during the development of the information service activities industry OF. Follow up discussions with the expert panel members were done in smaller groups to verify the findings of the OF.

b) Data Analysis Procedure

The following analyses were carried-out for FGD sessions;

- i) Assess the potential workforce challenges faced by the industry.
- ii) Highlight any important sub-sectors of the industry.
- iii) Examine the demand and supply of talent in the information service activities industry according to NOSS and MQA standards.
- iv) Review the curriculum and training program relevant for the Information service activities workforce occupations in coordination with accreditation (MQA and DSD) and training providers, comprising local academic institutions (universities or colleges), vocational and other training entities.
- v) Analysis of future trend of the occupational demand by various skill categories including Technical and Vocational Education and Training (TVET) related occupations.

3.3 Conclusion

In this study, there are several selected research methodologies that were utilised which are document analysis and focus group discussion. The document analysis is chosen due to it efficient and effective way of gathering data because documents are manageable and practical resources. Documents are common and come in a variety of forms, making documents a very accessible and reliable source of data. Obtaining and analysing documents is often far more cost efficient and time efficient than conducting the research and experiment. Document analysis is suitable method for this research because of this research required more information such as current statistics for related industry and the growth of the industry.

Lastly, the focus group discussion is deployed in this research due to free and open discussion among the respondents results in generation of new ideas that can be very useful for decision-making. It is also a fast way to gain the needed information regarding job title in the related industry. This approach is time saving and effective way to gather information from many sources.

CHAPTER 4: FINDINGS

4.1 Introduction

This chapter elaborates the findings from the research works. The findings revolve around the objectives set for the study namely; to produce Occupational Structure (OS) from data analysis, and focus group discussion; to determine job descriptions of each job title from the OS; and to investigate the skills in demand in the sector.

4.2 Findings Analysis

This section provide the summarises of the data collected. It involves the interpretation of data gathered through the questionnaires and response from the related industry. The questionnaires data are eventually be correlated with the findings from the focus group discussion and document analysis to determine patterns, relationships or trends.

4.2.1 Discussion of Results

The findings of this research were obtained by document analysis and the focus group discussion with the industry representative during the development workshops, the (OS) and Occupational Description (OD) of the industry is produced. The discussions also have identified the jobs and skills in demand, and skills gaps that is needed by the industry. These analyses were discussed based on the main groups in Division 63 which is information serice activities.

Research instruments used were focus group discussions and document analysis. The initial information is gathered by using document analysis and used as the basis for the focus group discussion workshop.

During the focus group discussion workshops, the information service activities was analysed and grouped into two group based on 3 digits MSIC 2008 Group which are data processing, hosting and related activities, and web portals; and Other information service activities.

4.2.2 Jobs in Demand

Job in demand by industry definition are the job that required more worker in certain area, however the supply of the workforce for the industry is low. The job in demand are different for each worker skills. The worker skills are divided into 3 categories which are skilled worker, semi-skilled worker and low skilled worker. The jobs in demand as stated below were obtained from discussion in development workshops.

Table 4.1: Jobs in Demand for Information Service Activities

NO.	JOB TITLES	FACTOR(S) CONTRIBUTING TO THE DEMAND	SPECIFIC REQUIREMENTS AND SKILLS
1.	Service Desk, IT Support, Junior Reporter (Low skilled workers)	a) Difficulties in recruiting local workers due to terms and condition of the job being offer (salary scheme, working hour); b) Work pressure; and c) Lack of social skills.	a) Demand for permanent job; b) Normal working hours; c) Able to adapt with work pressure; d) Able to interpret instructions and simple diagrams; and e) Communication skills.
2.	Technician, Application Support, Photographer, Junior Photo Journalist (Semi-Skilled Worker)	a) Mismatch of qualification, knowledge and required skills to perform the job function; b) High salary expectation; and c) Limited requirement for personnel in the sector.	a) Qualification which is relevant to the job function; b) Knowledge which is required to perform the job function; and c) Skills which is required to execute the task.

3.	Director, Manager, Specialist, Admin, Chief in Editor, Editor (Skilled Workers)	a) Mismatch of qualification, knowledge and required skills to perform the job function; b) High salary expectation; and c) Limited requirement for personnel in the sector.	a) Qualification which is relevant to the job function; b) Knowledge which is required to perform the job function; c) Skills which is required to execute the task; d) Operation and management skills; e) Knowledge on current or latest technology; f) Team work, leadership skills and communication skills; and g) Analytical skills.
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4.2.3 Competencies in Demand

The competency are ability to do something successfully or efficiently. In this industry, the competency in demand are not limited at the graduates or trainee, but it is include the current workers which are known as the skills gap. The current workers employed require other training programs such as management, supervisory and social skills beside the skills that they possess in order to enhance their knowledge and skills. Table 4.2 are explaining the skill in demand for the information service activities.

Table 4.2: Competencies in Demand for Information Service Activities

NO.	COMPETENCIES IN DEMAND	FACTOR(S) CONTRIBUTING TO THE DEMAND	SPECIFIC REQUIREMENTS AND SKILLS
1.	a) Managerial skills b) Social skills (interpersonal, communication, language, etc)	a) No structured system to transfer skill to new successor b) Lack of exposure on process c) Lack of hands on experience on process	a) Training on related or similar areas b) Review of training syllabus at training centre/ provider c) Joint venture with industry player to

			provide facilities and exposure d) Invite industry player to jointly carry out R&D programs
2.	a) Troubleshooting / problem solving skills b) Competent in using latest technology c) Programming language competency	a) No established written procedure on handling such product b) No established written material on latest technology for reference c) Expensive Equipment and software licenses	a) Training on related or similar areas b) Review of training syllabus at training centre/ provider c) Joint venture with industry player to provide facilities and exposure d) Invite industry player to jointly carry out R&D programs.

4.2.4 Emerging Skills

The emerging skills are the skills that relevant to the industrial revolution 4.0 (IR4.0). This section are discussing the job area that are implementing the 11 pillar of IR4.0. From the focus group discussion, the all the job title identified in Information service activities are relevant to the IR4.0. The following are emerging skills as highlighted by the industry.

Table 4.3: Emerging Skills for Information Service Activities

EMERGING SKILLS	JOB AREA	REASON OF REQUIRED
a) Additive Manufacturing b) Artificial Intelligence c) Autonomous Robot d) Big Data Analytics e) Cloud f) Cybersecurity	a) Web Portal (Designing) b) Web Portal (Programmming) c) Hosting d) Data Processing e) Streaming Services f) Time Share Mainframe	a) Increase productivity, reduce cost and improve efficiency b) Minimize human error c) Fast decision making

g) Horizontal & Vertical System Integration h) Internet of Things (IoT) i) New Business Model j) Simulation & Augmented Reality k) Supply Chain	g) Application Service Provider (ASP) h) News (Coverage) i) News (Editing) j) Images (Photography) k) Images (Caption Writing) l) Images (Photo Journalism) m) Images (Drone Photography)	d) Increase process effectiveness
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4.3 Comparative Study Analysis

The comparative study analysis is comparing between United State, United Kingdom and Singapore. The comparison include the overview of ICT industry in the countries and the factor contributing to the growth ICT sector.

a) United State

Within and outside information technology (IT), the U.S. has delivered slow and steady economic growth since emerging from the financial crisis. U.S. GDP growth averaged 2.3 percent between 2010 and 2018, according to BEA figures. Diving below aggregate GDP statistics reveals a diverging growth story within which the services-producing sector headlines as a growth protagonist. Services-producing industries, which account for more than 80 percent of total output, have anchored much of U.S. economic performance and post-crisis recovery.

The ICT sector is a growth powerhouse, despite its diminutive stature. Over the last four years, the industry has driven remarkable gains, powering real economic growth and employment. The proliferation of digital technologies continue to bring unprecedented structural changes to the U.S. economy, cementing the IT industry's position as a leading source of growth and employment. Yet exactly how the IT industry shape various aspects of the economy remains difficult to predict.

What is clear, is that the IT industry has expanded since the Great Recession, outpacing the value-add contributions of goods-producing industries to gross domestic output. Declining prominence in goods-producing sectors is not exclusive to the U.S., in fact this trajectory is consistent with similar trends in OECD peer countries and other advanced economies.

More broadly, the IT industry is an important contributor to the burgeoning digital economy and feeds the domestic economy through two primary channels: the production of cutting-edge technologies and the distribution of scale of innovation across other economic sectors. The IT services sector distributes innovative technologies from consulting services to downstream business organizations seeking to improve efficiency, generating significant multiplier effects across the industry value chain.

In 2017 alone, the IT industry's contribution to real economic output exceeded that of the professional and business services, finance and insurance, and manufacturing sectors, according to BEA figures on industry contributions to GDP. Although the industry has inspired sweeping business model changes and produced considerable business value across the value chain, the effects of mounting IT investment spending likely be dampened by rapidly decreasing costs of technological solutions, driven largely by automation. Despite the changing cost structure of the technological distribution channel, growing IT spending should continue to have a net positive impact on the industry and on aggregate real economic output.

b) United Kingdom

United Kingdom (UK) is one of the world's largest information and communication technology (ICT) markets, with the country being in 2nd place in the ranking of ICT spending per head. The UK ICT sector covers digital goods and services including audio-visual (AV); e-commerce; telecommunications; IT, software and computer and cloud services; artificial intelligence (AI); augmented and virtual reality (AR/VR); financial technology (FinTech); the internet of things (IOT)/smart cities and cyber security. Due to the importance of this industry segment, the UK market for cyber security is dealt in a separate best prospect.

The UK ICT sector contributed \$160 billion to the UK economy in 2016, increasing by over 20 % from 2011. The sector also accounts for 5% of all UK jobs. Imports of services by the UK ICT sector were almost \$25 billion in 2016, accounting for 14% of total UK service imports³⁸. The growth of UK ICT sector was mainly contribute by 5 sub-sectors. These sub-sectors is among the leading industry in ICT. The sub-sectors are:

i) IT, Software and Computer and Cloud Services

This subsector contributed over \$45 billion to the UK economy in 2016. About 100,000 software companies operate in the UK including major U.S. firms such as Microsoft, IBM and HP. Also, the UK data centre market is the largest in Europe generating new sources of demand for ICT providers.

ii) Artificial Intelligence (AI)

In April 2018, the UK Government unveiled an artificial intelligence deal worth over \$1.3 billion, which is backed by 50 leading tech firms and nearly \$400 million of private investment.

iii) Augmented Reality and Virtual Reality (AR/VR)

The UK Government has announced an investment of up to \$47 million in areas including virtual reality, augmented reality and mixed reality. The announcement forms part of the Government's Industrial Strategy, which includes plan to grow artificial intelligence and data-driven economy. The UK is currently the largest market for VR/AR in Europe.

iv) FinTech

London is one of the world's leading financial centres and a global hub for fintech innovation, advancement, and disruption. The market benefits from a major presence of financial firms from around the world and consistently attracts a high quality, diverse pool of financial services talent. The UK's regulatory bodies, including the Financial Conduct Authority (FCA) and Bank of England are praised by industry for their open, welcoming policies that foster innovation and support cutting edge, disruptive technologies.

³⁸ United Kingdom – Information Communication Technology (ICT)
<https://www.export.gov/article?id=United-Kingdom-Information-Communication-Technology-ICT>

v) Internet of Things (IoT)/Smart Cities

The Internet of Things (IoT)/smart cities technology and services in the UK are growing rapidly specifically in applications within the healthcare, energy, transport, public sector and manufacturing industries. IoT/smart city projects are exceptionally well supported in the United Kingdom. The potential of London's smart city market alone could reach \$13.4 billion by 2020. The UK government is pushing for rapid and sustainable partnerships to realize its vision for future cities. The immense growth in this initiative is creating many opportunities for U.S. companies.

c) Singapore

In Singapore, the Information and Communication Technology (ICT) sector is a key enabler for almost every industry sector, and has enhanced Singapore's competitiveness by raising productivity and transforming business processes in industries like finance, services and manufacturing. The ICT sector in Singapore is regulated by the Info-communications Media Development Authority (IMDA), the country's information industry master-planned focused on information and media policy and regulation, industry and talent development and Personal Data Protection Commission³⁹.

The information and technology hub in the Asia Pacific, Singapore is a regional base for most of the world's top information multinationals including Microsoft, Oracle, Amazon Web Services, Google, as well as international technology start-up companies. It is also a global data management hub connected to 15 active submarine cable systems, with a total submarine cable capacity of 114 Tbps and more than 50 per cent of the commercial carrier and carrier neutral data centre space in South East Asia. Based on a manpower survey in 2015, the ICT industry revenue saw a Compound Annual Growth Rate (CAGR) of 15.7 per cent for the period 2009 to 2014, reaching \$167.1 billion in 2014. Currently, there are more than 150,000 ICT professionals in Singapore. The number is set to grow as Singapore progresses in its Smart Nation initiative (Smart Nation), launched 2014 by the Singapore government.

³⁹ ICT to Singapore - Trends and opportunities. <https://www.austrade.gov.au/Australian/Export/Export-markets/Countries/Singapore/Industries>

4.4 Occupational Structure (OS)

Occupational Structure (OS) is defined as the job classification, whereby similar or related occupations are group together according to specific criteria such as skills, functions, and employment based on MSIC 2008 group. The OS for information service activities comprise of job area from 2 MSIC 2008 group, which are Group 631: Data processing, hosting and related activities; web portals and Group 639: Other information service activities.

The focus group discussion has identified 7 job area for Group 631 which are Web Portal (Designing); Web Portal (Programming); Hosting; Data Processing; Streaming Service; Time Share Mainframe; and Application Service Provider (ASP). For Group 639, there are 6 job area identified which are News (Coverage); News (Editing); Images (Photography); Images (Caption Writing); Images (Photo Journalism); and Images (Drone Photography).

Based on the findings from the focus group discussion, there are 26 job titles identified as critical job titles for Information service activities industry. From the total number of the critical job titles, 20 job title are for skilled worker. For the semi-skilled worker and low skilled worker, the job titles identified as critical are 5 and 1 respectively. Based on the focus group discussion, it is conclude that all the job title identified are relavent to IR4.0.

Table 4.4: Group 631 Occupational Structure (1 of 2)

SECTION	(J) INFORMATION AND COMMUNICATION			
DIVISION	(63) INFORMATION SERVICE ACTIVITIES			
GROUP	(631) DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS			
AREA	WEB PORTAL (DESIGNING)	WEB PORTAL (PROGRAMMING)	HOSTING	DATA PROCESSING
LEVEL 8	Not Available	Not Available	Not Available	Not Available
LEVEL 7	Web Director**	Web Director**	IT Director**	IT Director**
LEVEL 6	Project Manager**	Project Manager**	Technical Manager**	Data Processing Manager**
LEVEL 5	Web Admin***	Web Admin***	Hosting Specialist***	Data Analyst***
LEVEL 4	Web Developer***	Web Developer***	Application Support***	Data Processing Technician**
LEVEL 3	Web Designer**	Web Programmer**	Technical Support***	Data Organiser**
LEVEL 2	No Level	No Level	Service Desk***	Data Entry**
LEVEL 1	No Level	No Level	No Level	No Level

Note: **Jobs relevant to IR 4.0

*** Critical Job Titles and Jobs relevant to IR 4.0

Table 4.5: Group 631 Occupational Structure (2 of 2)

SECTION	(J) INFORMATION AND COMMUNICATION		
DIVISION	(63) INFORMATION SERVICE ACTIVITIES		
GROUP	(631) DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS		
AREA	STREAMING SERVICES	TIME SHARE MAINFRAME	APPLICATION SERVICE PROVIDER (ASP)
LEVEL 8	Not Available	Not Available	Not Available
LEVEL 7	IT Director**	IT Director**	IT Director**
LEVEL 6	Broadcast Manager**	Mainframe Manager**	ASP Manager**
LEVEL 5	Streaming Specialist***	Mainframe System Specialist ***	Application Specialist***
LEVEL 4	Broadcast Producer***	Mainframe Technician***	Application Developer***
LEVEL 3	Content Support***	Technical Support**	ASP Support**
LEVEL 2	No Level	No Level	No Level
LEVEL 1	No Level	No Level	No Level

Note: **Jobs relevant to IR 4.0

*** Critical Job Titles and Jobs relevant to IR 4.0

Table 4.6: Group 639 Occupational Structure (1 of 1)

SECTION	(J) INFORMATION AND COMMUNICATION					
DIVISION	(63) INFORMATION SERVICE ACTIVITIES					
GROUP	(639) OTHER INFORMATION SERVICE ACTIVITIES					
AREA	NEWS (COVERAGE)	NEWS (EDITING)	IMAGES (PHOTOGRAPHY)	IMAGES (CAPTION WRITING)	IMAGES (PHOTO JOURNALISM)	IMAGES (DRONE PHOTOGRAPHY)
LEVEL 8	Editor in Chief**	Editor in Chief**	Editor in Chief**	Editor in Chief**	Editor in Chief**	Editor in Chief**
LEVEL 7	Deputy Editor in Chief**	Deputy Editor in Chief**	Deputy Editor in Chief**	Deputy Editor in Chief**	Deputy Editor in Chief**	Deputy Editor in Chief**
LEVEL 6	Executive Editor**	Executive Editor**	Executive Editor**	Executive Editor**	Executive Editor**	Executive Editor**
LEVEL 5	Editor***	Chief Sub- Editor***	Photo Editor**	Photo Editor**	Photo Editor**	Photo Editor**
LEVEL 4	Assistant Editor**	Assistant Chief Sub-Editor**	Chief Photographer***	Chief Photographer***	Chief Photographer***	Chief Photographer***
LEVEL 3	Senior Journalist**	Sub-Editor***	Deputy Chief Photographer**	Chief Caption Writer**	Photo Journalist***	Drone Photographer**
LEVEL 2	Journalist***	No Level	Senior Photographer**	Caption Writer**	Assistant Photo Journalist**	Assistant Drone Photographer**
LEVEL 1	Junior Reporter**	No Level	Photographer***	No Level	Junior Photo Journalist**	No Level

Note: **Jobs relevant to IR 4.0

*** Critical Job Titles and Jobs relevant to IR 4.0

Table 4.7: Summary of Job Titles

No	Job Area	Level								Total Identified Job Titles	Total of Critical Job Title	Total Job Title Relevant to IR4.0
		1	2	3	4	5	6	7	8			
631 – Data Processing, Hosting and Related Activities; Web Portals												
1	Web Portal (Designing)	NL	NL	1	1	1	1	1	NA	5	2	5
2	Web Portal (Programming)	NL	NL	1	1	1	1	1	NA	5	2	5
3	Hosting	NL	1	1	1	1	1	1	NA	6	4	6
4	Data Processing	NL	1	1	1	1	1	1	NA	6	1	6
5	Streaming Services	NL	NL	1	1	1	1	1	NA	5	3	5
6	Time Share Mainframe	NL	NL	1	1	1	1	1	NA	5	2	5
7	Application Service Provider	NL	NL	1	1	1	1	1	NA	5	2	5
639 – Other Information Service Activities												
1	News (Coverage)	1	1	1	1	1	1	1	1	8	2	8
2	News (Editing)	NL	NL	1	1	1	1	1	1	6	2	6
3	Images (Photography)	1	1	1	1	1	1	1	1	8	2	8
4	Images (Caption Writing)	NL	1	1	1	1	1	1	1	7	1	7
5	Images (Photo Journalism)	1	1	1	1	1	1	1	1	8	2	8
6	Images (Drone Photography)	NL	1	1	1	1	1	1	1	7	1	7
Overall Total										81	26	81

Note: NL – No Level

NA – Not Available

4.5 Occupational Responsibilities

The Occupational responsibility is the general tasks, or other related duties, and responsibilities of a position. Job responsibility are usually narrative, but some may comprise a simple list of competencies; for instance, strategic human resource planning methodologies may be used to develop a competency architecture for an organization, from which job responsibility are built as a shortlist of competencies.

Division: 63 – Information and Communication

Group : 631 – Data Processing, Hosting and Related Activities; Web Portals

Table 4.8: List of Occupational Responsibilities for Group 631 according to Table 4.4 (1 of 3)

Area	Web Portal (Designing)	Web Portal (Programming)	Hosting
LEVEL 8	Not Available	Not Available	Not Available
LEVEL 7	<u>Web Director</u> <ol style="list-style-type: none"> 1) Enforce web management strategies. 2) Develop project objectives. 3) Oversee senior management staff. 4) Coordinate job task with department heads. 5) Report to the board of directors or members. 6) Facilitate financial audits. 7) Provide financial reports. 8) Prepare project budgets. 	<u>Web Director</u> <ol style="list-style-type: none"> 1) Enforce web management strategies. 2) Develop project objectives. 3) Oversee senior management staff. 4) Coordinate job task with department heads. 5) Report to the board of directors or members. 6) Facilitate financial audits. 7) Provide financial reports. 8) Prepare project budgets. 	<u>IT Director</u> <ol style="list-style-type: none"> 1) Enforce IT management strategies. 2) Oversee all technology operations. 3) Evaluate technology operation. 4) Establish IT policies. 5) Manage team of technical managers. 6) Manage technology operations. 7) Implement new IT systems and policies. 8) Purchase efficient and cost-effective technological equipment and software.

Area	Web Portal (Designing)	Web Portal (Programming)	Hosting
	9) Safeguard web project is compliant with industry regulations. 10) Improve productivity levels. 11) Manage web resources for organisations across many industries. 12) Oversee web portal is continuously available and secure.	9) Safeguard web project is compliant with industry regulations. 10) Improve productivity levels. 11) Manage web resources for organisations across many industries. 12) Oversee web portal is continuously available and secure.	9) Identify the need for upgrades, configurations or new systems. 10) Manage project expenses. 11) Develop project objectives. 12) Prepare project report to the board of directors or members. 13) Safeguard hosting is compliant with industry regulations.
LEVEL 6	<u>Project Manager</u> 1) Establish project scope. 2) Design and delivering solutions. 3) Lead team members. 4) Validate business and technical requirements and parameters. 5) Plan project life-cycle deliverables and resource availability. 6) Prepare installation and modification specifications. 7) Monitor project progress. 8) Assure quality Web solution by developing and completing test plans. 9) Maintain project and technical documentation. 10) Accomplish work requirements.	<u>Project Manager</u> 1) Establish project scope. 2) Design and delivering solutions. 3) Lead team members. 4) Validate business and technical requirements and parameters. 5) Plan project life-cycle deliverables and resource availability. 6) Prepare installation and modification specifications. 7) Monitor project progress. 8) Assure quality Web solution by developing and completing test plans. 9) Maintain project and technical documentation. 10) Accomplish work requirements.	<u>Technical Manager</u> 1) Perform troubleshooting on technical issues. 2) Oversee the development and implementation of all system. 3) Responsible for making key decisions for technical issues. 4) Provide guidance and supervising team members. 5) Evaluate application and networks systems. 6) Document technical procedures (SOP). 7) Communicate source between clients and management. 8) Conduct employee reviews.

Area	Web Portal (Designing)	Web Portal (Programming)	Hosting
	11) Follow production, productivity, quality, and customer-service standards. 12) Identify work process improvements.	11) Follow production, productivity, quality, and customer-service standards. 12) Identify work process improvements.	
LEVEL 5	<u>Web Admin</u> 1) Establish web system specifications. 2) Design system infrastructure. 3) Define system and operational policies and procedures. 4) Develop site navigation. 5) Maintain web system performance. 6) Troubleshoot web system. 7) Perform web content back-ups. 8) Web content maintenance document. 9) Upgrade web system.	<u>Web Admin</u> 1) Establish web system specifications. 2) Design system infrastructure. 3) Define system and operational policies and procedures. 4) Develop site navigation. 5) Maintain web system performance. 6) Troubleshoot web system. 7) Perform web content back-ups. 8) Web content maintenance document. 9) Upgrade web system.	<u>Hosting specialist</u> 1) Perform website migration. 2) Perform web-hosting support. 3) Provide web-hosting solutions. 4) Install web-hosting tools. 5) Manage systems application. 6) Manage web-hosting requirements. 7) Manage client requirement. 8) Manage security. 9) Manage domain registration.
LEVEL 4	<u>Web Developer</u> 1) Map website navigation. 2) Design website structure. 3) Modify website structure. 4) Perform website coding. 5) Design layout to meet requirement. 6) Create visually appealing sites. 7) Design user-friendly experience. 8) Install and configure server software.	<u>Web Developer</u> 1) Map website navigation. 2) Design website structure. 3) Modify website structure. 4) Perform website coding. 5) Design layout to meet requirement. 6) Create visually appealing sites. 7) Design user-friendly experience. 8) Install and configure server software.	<u>Application Support</u> 1) Prepare web-hosting application. 2) Install web-hosting application. 3) Conduct systems analysis. 4) Recommend changes in scope and procedure of work. 5) Perform test web-hosting application . 6) Validate web-hosting application.

Area	Web Portal (Designing)	Web Portal (Programming)	Hosting
	9) Install programming language.	9) Install programming language.	7) Protect operations by keeping information confidential. 8) Provide application support information. 9) Accomplish engineering and organisation mission. 10) Develop software solutions. 11) Follow the software development lifecycle.
LEVEL 3	<u>Web Designer</u> 1) Develop site content and graphics interface (UI). 2) Create layout design & frames. 3) Establish designed links. 4) Update website content. 5) Create Prototyping.	<u>Web Programmer</u> 1) Funnel traffic through content (UX). 2) Check cross-platform compatibility. 3) Establish programmed links. 4) Update website content. 5) Develop web sites. 6) Write or contribute to instructions or manuals to guide end users.	<u>Technical Support</u> 1) Evaluate system potential. 2) Evaluate expansions or enhancements. 3) Achieve computer system objectives. 4) Recommend a course of action. 5) Perform test software compatibility. 6) Maintain system capability. 7) Maintain historical records. 8) Maintain technical knowledge.
LEVEL 2	No Level	No Level	<u>Service Desk</u> 1) Resolve issues with computer hardware or software. 2) Respond to user inquiries. 3) Assess problems and issues with IT equipment and applications.

Area	Web Portal (Designing)	Web Portal (Programming)	Hosting
			4) Provide assistance on tasks. 5) Access web hosting software and tools. 6) Utilize web hosting software and tools.
LEVEL 1	No Level	No Level	No Level

Table 4.9: List of Occupational Responsibilities for Group 631 according to Table 4.4 and Table 4.5 (2 of 3)

Area	Data Processing	Streaming Services
LEVEL 8	Not Available	Not Available
LEVEL 7	<u>IT Director</u> <ol style="list-style-type: none"> 1) Enforce IT management strategies. 2) Oversee all technology operations. 3) Evaluate technology operation. 4) Establish IT policies. 5) Manage team of data processing managers. 6) Manage technology operations. 7) Implement new IT systems and policies. 8) Purchase efficient and cost-effective technological equipment and software. 9) Identify the need for upgrades, configurations or new systems 10) Manage project expenses. 11) Develop project objectives. 12) Prepare project report to the board of directors or members. 13) Safeguard data processing is compliant with industry regulations. 	<u>IT Director</u> <ol style="list-style-type: none"> 1) Enforce IT management strategies. 2) Oversee all technology operations. 3) Evaluate technology operation. 4) Establish IT policies. 5) Manage team of IT managers. 6) Manage technology operations. 7) Implement new IT systems and policies. 8) Purchase efficient and cost-effective technological equipment and software. 9) Identify the need for upgrades, configurations or new systems. 10) Manage project expenses. 11) Develop project objectives. 12) Prepare project report to the board of directors or members. 13) Safeguard hosting is compliant with industry regulations.
LEVEL 6	<u>Data Processing Manager</u> <ol style="list-style-type: none"> 1) Assign workflow for data processing requirement. 2) Manage project schedule. 3) Monitor job task of team members. 4) Evaluate performance of data processing result. 	<u>Broadcast Manager</u> <ol style="list-style-type: none"> 1) Oversee the whole operation and budgetary aspects of shows. 2) Oversee the creation of a show from inception to broadcast. 3) Conduct meetings with staff to discuss production progress and to ensure production objectives are attained.

Area	Data Processing	Streaming Services
	5) Develop standard operating procedures for data processing operations. 6) Schedule and monitor task aligned with deadline. 7) Document data processing operations. 8) Provide appropriate system solution. 9) Manage in-house training for team members. 10) Communicate source between clients and team. 11) Build strong and positive relationships with customers and associates.	4) Determine production size, content, and budget. 5) Arrange financing for productions. 6) Perform management activities, such as budgeting, scheduling, planning, and marketing. 7) Develop marketing plans for finished products, collaborating with sales associates to supervise product distribution.
LEVEL 5	<u>Data Analyst</u> 1) Collect and interpreting data. 2) Analyse data processing results. 3) Report the results back to the relevant members of the business. 4) Identify patterns and trends in data sets. 5) Define new data collection and analysis processes.	<u>Streaming Specialist</u> 1) Establish connection for webcasts. 2) Support encoding for streamed media. 3) Deliver “buffering free” experience over various browsers, networks and devices. 4) Monitor and assess video player engagement with end user. 5) Establish quality of experience (QoE) metrics. 6) Improve media platform for content delivery continuously. 7) Analyse interrupt streaming issues. 8) Endorse solution for problem experience. 9) Provide recommendations for new technology. 10) Support post-production efforts.
LEVEL 4	<u>Data Processing Technician</u> 1) Perform website database migration. 2) Transform or transferring data upon request.	<u>Broadcast Producer</u> 1) Maintain equipment for broadcast transmission. 2) Set up audio-video links between units.

Area	Data Processing	Streaming Services
	<ul style="list-style-type: none"> 3) Translate data into different languages. 4) Maintain data on storage devices such as servers or other external devices. 5) Troubleshoot problems relative to computer operations or data processing results. 6) Maintain data integrity and security. 7) Establish the proper sorting and organizing of databases. 8) Implement extra security precautions when handling personally identifiable data. 9) Perform data requests in a timely manner. 10) Communicate data reports to clients. 11) Perform data back-ups. 12) Assist staff with data entry methods. 	<ul style="list-style-type: none"> 3) Monitor audio-video links between units. 4) Set up custom audio-video switcher. 5) Set up software and equipment. 6) Set up broadcast production facilities. 7) Perform test equipment and systems. 8) Develop and using awareness of best practice in health and safety for the workplace. 9) Broadcast audio-video streaming.
LEVEL 3	<p><u>Data Organiser</u></p> <ul style="list-style-type: none"> 1) Compile the set of data. 2) Verify accuracy of data. 3) Manage information to prepare source data for computer entry. 4) Review data for deficiencies or errors. 5) Apply data program techniques and procedures. 6) Research further information for incomplete documents/ 7) Generate reports, store completed work in designated locations and perform backup operations. 8) Update information on database. 	<p><u>Content Support</u></p> <ul style="list-style-type: none"> 1) Obtain content to meet streaming requirement. 2) Arrange project requirements in programming sequence. 3) Oversee contents meet job requirement. 4) Collaborate with teams to plan and develop site content. 5) Optimize content according to SEO. 6) Encode project requirements by converting work flow information into computer language and distribution to online channels. 7) Confirm program operation by conducting tests. 8) Prepare and revise document of program development.

Area	Data Processing	Streaming Services
LEVEL 2	<p><u>Data Entry</u></p> <ol style="list-style-type: none"> 1) Key-in customer and account data from source documents within time limits. 2) Collect and key-in data in databases and maintain accurate records of valuable company information. 3) Perform fast typing with an eye for detail and familiarity with spreadsheets and online forms. 4) Key-in text based and numerical information from source documents within time limits. 5) Scan documents and print files, when needed. 6) Implement proper usage of office equipment. 	No Level
LEVEL 1	No Level	No Level

Table 4.10: List of Occupational Responsibilities for Group 631 according to Table 4.5 (3 of 3)

Area	Time Share Mainframe	Application Service Provider
LEVEL 8	Not Available	Not Available
LEVEL 7	<u>IT Director</u> <ol style="list-style-type: none"> 1) Enforce IT management strategies. 2) Oversee all technology operations. 3) Evaluate technology operation. 4) Establish IT policies. 5) Manage team of IT managers. 6) Manage technology operations. 7) Implement new IT systems and policies. 8) Purchase efficient and cost-effective technological equipment and software. 9) Identify the need for upgrades, configurations or new systems. 10)Manage project expenses. 11)Develop project objectives. 12)Prepare project report to the board of directors or members. 13)Safeguard hosting is compliant with industry regulations. 	<u>IT Director</u> <ol style="list-style-type: none"> 1) Enforce IT management strategies. 2) Oversee all technology operations. 3) Evaluate technology operation. 4) Establish IT policies. 5) Manage team of IT managers. 6) Manage technology operations. 7) Implement new IT systems and policies. 8) Purchase efficient and cost-effective technological equipment and software. 9) Identify the need for upgrades, configurations or new systems. 10)Manage project expenses. 11)Develop project objectives. 12)Prepare project report to the board of directors or members. 13)Safeguard hosting is compliant with industry regulations.
LEVEL 6	<u>Mainframe Manager</u> <ol style="list-style-type: none"> 1) Influence future strategy for the platform. 2) Endorse platform availability is maintained. 3) Manage mainframe performance. 4) Maintain strategic external partnerships. 	<u>ASP Manager</u> <ol style="list-style-type: none"> 1) Manage business post-sales support infrastructure 2) Manage the service performance to customer 3) Manage periodic review of existing systems and processes 4) Identify the root cause of issue arises 5) Identify the milestones that has passed deadline

Area	Time Share Mainframe	Application Service Provider
	5) Consult with customers or other departments on project status or technical issues.	
LEVEL 5	<u>Mainframe System Specialist</u> <ol style="list-style-type: none"> 1) Set operating system. 2) Perform storage management task. 3) Manage support personnel in the use of storage management and operating system utilities for all mainframe operations. 4) Maximize the utilization of online storage hardware. 5) Monitor system performance and storage capacity. 6) Perform troubleshooting on technical issues. 7) Oversee the development and implementation of all system. 8) Suggest solution for technical issues. 9) Evaluate application and networks systems. 10) Prepare document technical procedures (SOP). 	<u>Application Specialist</u> <ol style="list-style-type: none"> 1) Set up ASP based on application requirements. 2) Implement ASP program to support the portfolio management process. 3) Establish testing procedures. 4) Perform project status report. 5) Perform maintenance of existing systems. 6) Coordinate big data management system.
LEVEL 4	<u>Mainframe Technician</u> <ol style="list-style-type: none"> 1) Set networking operating system. 2) Perform coding major software features. 3) Provide software enhancements. 4) Prepare document maintenance procedure. 5) Implement functional programs. 6) Perform mainframe network maintenance. 7) Perform disaster recovery operations and data backups. 8) Implement network security measures. 9) Monitor virus protection software. 	<u>Application Developer</u> <ol style="list-style-type: none"> 1) Analyse application framework requirements. 2) Develop final software application output. 3) Develop the web-based software. 4) Perform extensive software testing. 5) Create and maintaining the ASP based websites. 6) Confirm a standard user experience across all platforms. 7) Train the end user on the final product. 8) Establish the compatibility of websites with newer software or operating system version.

Area	Time Share Mainframe	Application Service Provider
	10) Monitor network performance. 11) Configure computer network access.	9) Monitor the life cycle of software.
LEVEL 3	<u>Technical Support</u> 1) Perform preventative maintenance. 2) Repair server. 3) Monitor system processes. 4) Perform cross-collaboration to protect data. 5) Inspect equipment and read order sheets to prepare for delivery to users.	<u>ASP Support</u> 1) Provide application support to teams. 2) Assist with systems integrations. 3) Manage ticketed query system. 4) Identify application issues. 5) Acquire application issues solution. 6) Document application maintenance procedures. 7) Conduct in-house training to teams. 8) Produce application issues reports.
LEVEL 2	No Level	No Level
LEVEL 1	No Level	No Level

Division: 63 – Information and Communication

Group : 639 – Other Information Service Activities

Table 4.11: List of Occupational Responsibilities for Group 639 according to Table 4.6 (1 of 2)

Area	News (Coverage)	News (Editing)	Images (Photography)
LEVEL 8	<p><u>Editor in Chief</u></p> <ol style="list-style-type: none"> 1) Manage news agency operation. 2) Create guideline for editorial department. 3) Determine on the policies of news coverage. 4) Evaluate performance of related subordinate. 5) Manage news operation processes. 6) Plan marketing for news products. 7) Evaluate performance of news desk. 8) Evaluate performance of editors. 9) Attend inquiries from higher authority. 10) Conduct meeting within the organisation. 11) Approve assignment for news coverage. 	<p><u>Editor in Chief</u></p> <ol style="list-style-type: none"> 1) Manage news agency operation. 2) Create guideline for editorial department. 3) Determine on the policies of news coverage. 4) Evaluate performance of related subordinate. 5) Manage news operation processes. 6) Plan marketing for news products. 7) Evaluate performance of news desk. 8) Evaluate performance of editors. 9) Attend inquiries from higher authority. 10) Conduct meeting within the organisation. 11) Approve assignment for news coverage. 	<p><u>Editor in Chief</u></p> <ol style="list-style-type: none"> 1) Manage news agency operation. 2) Create guideline for editorial department. 3) Determine on the policies of news coverage. 4) Evaluate performance of related subordinate. 5) Manage news operation processes. 6) Plan marketing for news products. 7) Evaluate performance of news desk. 8) Evaluate performance of editors. 9) Attend inquiries from higher authority. 10) Conduct meeting within the organisation. 11) Approve assignment for news coverage.

Area	News (Coverage)	News (Editing)	Images (Photography)
LEVEL 7	<u>Deputy Editor in Chief</u> <ol style="list-style-type: none"> 1) Assist editor in chief to decide policies of the usage of news and articles. 2) Transmit breaking news. 3) Plan angles of news coverage. 4) Assist in planning of marketing of news products. 5) Attend to inquiry. 6) Conduct meeting with news desk editors. 7) Approve assignment for news coverage. 	<u>Deputy Editor in Chief</u> <ol style="list-style-type: none"> 1) Assist editor in chief to decides policies of the usage of news and articles. 2) Transmit breaking news. 3) Plan angles of news coverage. 4) Assist in planning of marketing of news products. 5) Attend to inquiry. 6) Conduct meeting with news desk editors. 7) Approve assignment for news coverage. 	<u>Deputy Editor in Chief</u> <ol style="list-style-type: none"> 1) Assist editor in chief to decide policies of the usage of news and articles. 2) Transmit breaking news. 3) Plan angles of news coverage. 4) Assist in planning of marketing of news products. 5) Attend to inquiry. 6) Conduct meeting with news desk editors. 7) Approve assignment for news coverage.
LEVEL 6	<u>Executive Editor</u> <ol style="list-style-type: none"> 1) Execute instructions from top management. 2) Disseminate information to respective news desk editors. 3) Coordinate meeting with news desk editors. 4) Edit high profile news articles/features. 5) Transmit high profile breaking news. 6) Evaluate the performance of journalists, 7) Attend to inquiry. 	<u>Executive Editor</u> <ol style="list-style-type: none"> 1) Execute instructions from top management. 2) Disseminate information to respective news desk editors. 3) Coordinate meeting with news desk editors. 4) Edit high profile news articles/features. 5) Transmit high profile breaking news. 6) Evaluate the performance of journalists. 7) Attend to inquiry. 	<u>Executive Editor</u> <ol style="list-style-type: none"> 1) Execute instructions from top management. 2) Disseminate information to respective news desk editors. 3) Coordinate meeting with news desk editors. 4) Edit high profile news articles/features. 5) Transmit high profile breaking news. 6) Evaluate the performance of journalists. 7) Attend to inquiry.

Area	News (Coverage)	News (Editing)	Images (Photography)
LEVEL 5	<u>Editor</u> <ol style="list-style-type: none"> 1) Gatekeeper for the usage of articles. 2) Edit news articles. 3) Transmit breaking news. 4) Oversee manpower movement at respective news desk. 5) Evaluate the junior reporters. 6) Coordinate news coverage. 7) Attend to inquiry. 	<u>Chief Sub-Editor</u> <ol style="list-style-type: none"> 1) Edit important news articles. 2) Transmit important news articles. 3) Determine the usage of news articles. 4) Determine on lead and top stories. 5) Gatekeeper of news articles. 6) Translate important news articles. 7) Verify fact with journalist/various sources. 	<u>Photo Editor</u> <ol style="list-style-type: none"> 1) Manage the photo operation unit. 2) Manage the incoming photo/video. 3) Control the circulation for photo/video. 4) Transmit photo/video to subscribers. 5) Prepare procurement documentation. 6) Plan training activities. 7) Evaluate photo/video images.
LEVEL 4	<u>Assistant Editor</u> <ol style="list-style-type: none"> 1) Assist editor at respective news desk. 2) Assist in planning and coordinating news coverage. 3) Assist in overseeing manpower movement at respective news desk. 4) Assist in transmitting breaking news. 5) Gatekeeper for news articles. 6) Attend to inquiry. 	<u>Assistant Chief Sub-Editor</u> <ol style="list-style-type: none"> 1) Edit news articles. 2) Translate news articles. 3) Verify fact with journalist/various sources. 4) Detect plagiarism. 5) Assist in transmitting news articles. 6) Gatekeeper for news articles. 	<u>Chief Photographer</u> <ol style="list-style-type: none"> 1) Plan the team of photographer. 2) Manage the use of photo/video equipment. 3) Evaluate photo/video images. 4) Evaluate the capability of the photographer. 5) Gatekeeper for photo/video quality for images captured. 6) Edit photo/video images. 7) Verify caption writing. 8) Conduct in-house training.

Area	News (Coverage)	News (Editing)	Images (Photography)
LEVEL 3	<u>Senior Journalist</u> <ol style="list-style-type: none"> 1) Cover special and important assignments. 2) Interview high profile personalities. 3) Lead desk upon appointment. 4) Interview news sources. 5) Write news/feature articles/analysis. 6) Process media statements. 7) Verify authenticity of fact. 8) Conduct research on related information. 9) Capture photos and videos. 	<u>Sub-Editor</u> <ol style="list-style-type: none"> 1) Assist in editing news articles. 2) Assist in translating news articles. 3) Verify fact with journalist/ various sources. 4) Detect plagiarism. 5) Assist in transmitting news articles. 6) Gatekeeper for news articles. 	<u>Deputy Chief Photographer</u> <ol style="list-style-type: none"> 1) Plan photo/video coverage. 2) Prepare duty roster for the team of photography. 3) Determine the assignment for coverage. 4) Edit photo/video images. 5) Verify caption writing. 6) Verify the photo/video quality for images captured. 7) Transmit photo/video to subscribers.
LEVEL 2	<u>Journalist</u> <ol style="list-style-type: none"> 1) Cover daily and special assignments. 2) Interview news sources. 3) Write news/feature articles. 4) Process media statements. 5) Verify authenticity of fact. 6) Conduct research on related information. 7) Capture photos and videos. 	No Level	<u>Senior Photographer</u> <ol style="list-style-type: none"> 1) Manage incoming and outgoing photo/video. 2) Guide photographers on daily task. 3) Perform the search for human interest images. 4) Capture images for major events. 5) Edit photo/video images. 6) Write caption for images taken from major events.

Area	News (Coverage)	News (Editing)	Images (Photography)
LEVEL 1	<u>Junior Reporter</u> <ol style="list-style-type: none"> 1) Cover daily assignments. 2) Interview news sources. 3) Produce news/article. 4) Process media statements. 5) Verify authenticity of fact. 6) Capture photos and videos. 	No Level	<u>Photographer</u> <ol style="list-style-type: none"> 1) Check functionality of equipment. 2) Perform the search for human interest images. 3) Capture images for events. 4) Write caption for images taken from events. 5) Transmit photo/video.

Table 4.12: List of Occupational Responsibilities for Group 639 according to Table 4.6 (2 of 2)

Area	Images (Caption Writing)	Images (Photo Journalism)	Images (Drone Photography)
LEVEL 8	<u>Editor in Chief</u> <ol style="list-style-type: none"> 1) Manage news agency operation. 2) Create guideline for editorial department. 3) Determine on the policies of news coverage. 4) Evaluate performance of related subordinate. 5) Manage news operation processes. 6) Plan marketing for news products. 7) Evaluate performance of news desk. 8) Evaluate performance of editors. 9) Attend inquiries from higher authority. 10) Conduct meeting within the organisation. 11) Approve assignment for news coverage. 	<u>Editor in Chief</u> <ol style="list-style-type: none"> 1) Manage news agency operation. 2) Create guideline for editorial department. 3) Determine on the policies of news coverage. 4) Evaluate performance of related subordinate. 5) Manage news operation processes. 6) Plan marketing for news products. 7) Evaluate performance of news desk. 8) Evaluate performance of editors. 9) Attend inquiries from higher authority 10) Conduct meeting within the organisation. 11) Approve assignment for news coverage. 	<u>Editor in Chief</u> <ol style="list-style-type: none"> 1) Manage news agency operation. 2) Create guideline for editorial department. 3) Determine on the policies of news coverage. 4) Evaluate performance of related subordinate. 5) Manage news operation processes. 6) Plan marketing for news products. 7) Evaluate performance of news desk. 8) Evaluate performance of editors. 9) Attend inquiries from higher authority. 10) Conduct meeting within the organisation. 11) Approve assignment for news coverage.
LEVEL 7	<u>Deputy Editor in Chief</u> <ol style="list-style-type: none"> 1) Assist editor in chief to decide policies of the usage of news and articles. 2) Transmit breaking news. 3) Plan angles of news coverage. 	<u>Deputy Editor in Chief</u> <ol style="list-style-type: none"> 1) Assist editor in chief to decides policies of the usage of news and articles. 2) Transmit breaking news. 3) Plan angles of news coverage. 	<u>Deputy Editor in Chief</u> <ol style="list-style-type: none"> 1) Assist editor in chief to decide policies of the usage of news and articles. 2) Transmit breaking news. 3) Plan angles of news coverage.

Area	Images (Caption Writing)	Images (Photo Journalism)	Images (Drone Photography)
	4) Assist in planning of marketing of news products. 5) Attend to inquiry. 6) Conduct meeting with news desk editors. 7) Approve assignment for news coverage.	4) Assist in planning of marketing of news products. 5) Attend to inquiry. 6) Conduct meeting with news desk editors. 7) Approve assignment for news coverage.	4) Assist in planning of marketing of news products. 5) Attend to inquiry. 6) Conduct meeting with news desk editors. 7) Approve assignment for news coverage.
LEVEL 6	<u>Executive Editor</u> 1) Execute instructions from top management. 2) Disseminate information to respective news desk editors. 3) Coordinate meeting with news desk editors. 4) Edit high profile news articles/features. 5) Transmit high profile breaking news. 6) Evaluate the performance of journalists. 7) Attend to inquiry.	<u>Executive Editor</u> 1) Execute instructions from top management. 2) Disseminate information to respective news desk editors. 3) Coordinate meeting with news desk editors. 4) Edit high profile news articles/features. 5) Transmit high profile breaking news. 6) Evaluate the performance of journalists. 7) Attend to inquiry.	<u>Executive Editor</u> 1) Execute instructions from top management. 2) Disseminate information to respective news desk editors. 3) Coordinate meeting with news desk editors. 4) Edit high profile news articles/features. 5) Transmit high profile breaking news. 6) Evaluate the performance of journalists. 7) Attend to inquiry.
LEVEL 5	<u>Photo Editor</u> 1) Manage the photo operation unit 2) Manage the incoming photo/video 3) Control the circulation for photo/video 4) Transmit photo/video to subscribers	<u>Photo Editor</u> 1) Manage the photo operation unit. 2) Manage the incoming photo/video. 3) Control the circulation for photo/video. 4) Transmit photo/video to subscribers.	<u>Photo Editor</u> 1) Manage the photo operation unit. 2) Manage the incoming photo/video. 3) Control the circulation for photo/video. 4) Transmit photo/video to subscribers.

Area	Images (Caption Writing)	Images (Photo Journalism)	Images (Drone Photography)
	5) Prepare procurement documentation 6) Plan training activities. 7) Evaluate photo/video images.	5) Prepare procurement documentation. 6) Plan training activities. 7) Evaluate photo/video images.	5) Prepare procurement documentation. 6) Plan training activities. 7) Evaluate photo/video images.
LEVEL 4	<u>Chief Photographer</u> 1) Plan the team of photographer. 2) Manage the use of photo/video equipment. 3) Evaluate photo/video images. 4) Evaluate the capability of the photographer. 5) Gatekeeper for photo/video quality for images captured. 6) Edit photo/video images. 7) Verify caption writing. 8) Conduct in-house training.	<u>Chief Photographer</u> 1) Plan the team of photographer. 2) Manage the use of photo/video equipment. 3) Evaluate photo/video images. 4) Evaluate the capability of the photographer. 5) Gatekeeper for photo/video quality for images captured. 6) Edit photo/video images. 7) Verify caption writing. 8) Conduct in-house training.	<u>Chief Photographer</u> 1) Plan the team of photographer. 2) Manage the use of photo/video equipment. 3) Evaluate photo/video images. 4) Evaluate the capability of the photographer. 5) Gatekeeper for photo/video quality for images captured. 6) Edit photo/video images. 7) Verify caption writing. 8) Conduct in-house training.
LEVEL 3	<u>Chief Caption Writer</u> 1) Prepare duty roster for the team of caption writer. 2) Edit photo caption. 3) Verify edited photo caption. 4) Translate caption. 5) Verify fact with photographer/journalist/various sources. 6) Detect plagiarism.	<u>Photo Journalist</u> 1) Carry out research activities. 2) Prepare duty roster for the team of photojournalist. 3) Assist in preparing procurement documentation. 4) Visualise workflow and write article. 5) Manage photo/video equipment. 6) Supply visual for multimedia uses.	<u>Drone Photographer</u> 1) Assist in planning for duty task. 2) Write news article. 3) Cover event using drone. 4) Capture aerial photography. 5) Archive visual. 6) Edit visual. 7) Manage drone equipment.

Area	Images (Caption Writing)	Images (Photo Journalism)	Images (Drone Photography)
	7) Gatekeeper for caption.	7) Cover event and write article. 8) Collect photo/video. 9) Edit photo/video. 10) Cover photo/video for special task. 11) Check functionality of equipment. 12) Produce articles on special task. 13) Produce documentary video on special task.	8) Produce news and documentary on special event.
LEVEL 2	<u>Caption Writer</u> 1) Edit photo caption. 2) Verify edited photo caption. 3) Translate caption. 4) Verify fact with photographer/journalist/various sources. 5) Detect plagiarism.	<u>Assistant Photo Journalist</u> 1) Cover event and write article. 2) Check functionality of equipment. 3) Produce articles. 4) Produce documentary video. 5) Collect photo/video. 6) Edit photo/video.	<u>Assistant Drone Photographer</u> 1) Assist to cover event using drone. 2) Write news article. 3) Assist in checking the functionality of drone equipment. 4) Capture aerial photography. 5) Process visual for documentary and news. 6) Assist in archiving visual. 7) Assist in visual editing.
LEVEL 1	No Level	<u>Junior Photo Journalist</u> 1) Prepare storyboard. 2) Edit news footage. 3) Prepare suitable editing software. 4) Gatekeeper for visual.	No Level

4.6 Mapping OS vs Available NOSS

This section provides a mapping of occupational structure and available NOSS. A total of 6 available NOSS are identified and mapping over with the occupational structure in this division. The remaining 5 available NOSS cannot be mapping with current occupational structure because the NOSS are not included in this MSIC Section J, Division 63; and not competable with the current OS developed from the Focus Group Discussion.

Table 4.13: Group 631 Occupational Structure VS Available NOSS

SECTION	(J) INFORMATION AND COMMUNICATION			
DIVISION	(63) INFORMATION SERVICE ACTIVITIES			
GROUP	(631) DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS			
AREA	WEB PORTAL (DESIGNING)	WEB PORTAL (PROGRAMMING)	HOSTING	DATA PROCESSING
LEVEL 8	Not Available	Not Available	Not Available	Not Available
LEVEL 7	Web Director	Web Director	IT Director	IT Director
LEVEL 6	Project Manager	Project Manager	Technical Manager	Data Processing Manager
LEVEL 5	IT-052-5:2013	IT-052-5:2013	IT-052-5:2013	IT-082-5:2016
LEVEL 4	IT-052-4:2013	IT-052-4:2013	Application Support	IT-082-4:2016
LEVEL 3	Web Designer	Web Programmer	Technical Support	IT-082-3:2016
LEVEL 2	No Level	No Level	Service Desk	Data Entry
LEVEL 1	No Level	No Level	No Level	No Level

4.7 Occupational Description

Occupational Description (OD) is a broad, general, and written statement of a specific job, based on the findings of a job analysis. It generally includes duties, purpose, responsibilities, scope, and working conditions of a job along with the job's title, and the name or designation of the person to whom the employee reports. The OD provided in Annex 5 are the job titles that have been identified as critical by industry representatives from focus group discussion.

4.8 Conclusion

Based on the discussions with panel members during the development workshops, the OS of the industry is produced in this chapter. The OS would provide information of the competency or job areas applicable to the industry, and the skill level of the different job titles, according to the MOSQF Level Descriptors, and the available career paths.

The jobs and skills in demand, and the specific steps proposed to be taken by various parties to bridge the skills gaps are elaborated so that the parties concerned could take the necessary steps to overcome such challenges.

CHAPTER 5: DISCUSSION, RECOMMENDATION AND CONCLUSION

5.1 Discussion

Based on the findings obtained throughout the Occupational Analysis on the industry, sub sectors have been identified and confirmed to be in tandem with MSIC. There are total of 13 job areas identified for the 2 digits MSIC 2008 Division 63: Information service activities. The job title for MSIC Group 631 and Group 639 are 7 job areas and 6 job areas respectively. Based on focus group discussion with the industry player, it is conclude that 81 job title identified for this MSIC Division, with the concession of all the job titles are relevant to the industrial revolution 4.0. There are 5 NOSS that have been developed for information service activities.

The total number of critical job title identified are 26 which includes the low skilled worker, semi-skilled worker and skilled worker. It require a holistic view in development of standard, skills training and also certification for recognition. If the competency requirements documented in NOSS format, the personnel in these areas obtained more structured skills training and also enable personnel who are experienced and skilled to be certified.

5.2 Recommendation

It is hoped that the result of this Occupational Framework will be used as reference to fulfil the future plans of developing skilled personnel and certifying Malaysians in this sector towards improving the quality of the local 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 or departments, or educational institutions to increase external talent pools and also through the training of existing staff in line with new skills requirements.

Based on the above comments, specific recommendations are listed below:

- a) To continue and streamline efforts in NOSS development for areas under the sector 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.
- b) To have more industry players to be accredited as training provider for National Dual Training System (NDTS) for the related sub sector and job area.
- c) Promote certification of existing and experienced personnel in the sector through Recognition Prior Achievement.
- d) Collaboration with learning institution to develop syllabus that matches the industry requirement.
- e) Both government and private sector should give concerted and continuous effort in providing more benefits to attract local workers. Workers need to have good training and learning record continuously to meet their competency in industry
- f) Government Initiatives and intervention would be helpful to support the training facilities to in order to develop low skilled or low trained worker.

5.3 Conclusion

The conclusion is based on the specified objectives of the Occupational Framework as elaborated below:

Objective 1: To establish the Occupational Structure (OS) of information service activities based on MSIC 2008

As result of the FGD conducted together with expert panel members from various organizations, a total of 13 areas and 81 job titles have been identified. By planning and conducting the training and certification of this sector personnel in the near future, it is hoped that there are steady flow of local skilled and certified workers.

Objective 2: To identify the skills in demand for information service activities based on the current industry needs

Based on the FGD and document analysis, the skills in demand for information service activities are the communication skills, general attitude towards work, diagnostic skills, troubleshooting/ problem solving skills, competent in using latest technology, language competency and programming language competency.

Objective 3: To determine the critical job title in information service activities based on the industry needs Skills in Demand

The findings from the FGD has conclude that there are 26 job titles identified as the critical job titles for information service activities. From the total number of the critical job titles, 20 job title are for skilled skilled worker. For the semi-skilled worker and low skilled worker, the job titles identified as critical are 5 and 1 respectively.

Objective 4: To identify the relevant jobs title of information service activities that is correspond with Industrial Revolution 4.0 (IR4.0)

Based on the focus group discussion, it is conclude that all the job title identified are relavent to IR4.0. From the 11 pillars of the IR4.0, the pillar that play the crucial role to Information service activities are Big Data Analytics, Cybersecurity, Horizontal & Vertical System Integration and Internet of Things (IoT).

Objective 5: To establish the Occupational Descriptions (OD) for each job title of information service activities based on latest industry OS

The OD for all the different job titles were obtained during the workshops and further confirmed by the members of FGD. These OD also serve as reference of job scope and the required competencies for NOSS development.

In order to ensure that the critical occupation needs by industry are addressed, government jointly by industry association, training/academic institutions and the relevant accreditations authorities need to come out with the action plan to fulfil the job demand by the information service activities industry.

The broad direction for achieving this is through identify and assess the qualification, National Occupation Skills Standard (NOSS), and competencies associated with the identified critical job titles; align and evaluate the existing training curriculum and training packages; and coordination among stakeholder to revise or develop required curriculum and training packages, expend or create new apprenticeship/ internship/ attachments schemes and joint technology and knowledge transfer between instructor/ training entities with industry experts.

The result of this Occupational Framework research and development work shall be used as references on how to fulfil the future plans of developing skilled personnel and certifying Malaysians in the Information and Communication Sector towards enhancing services provided by the sector players.

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ANNEX 1: MOSQF LEVEL DESCRIPTORS

**MALAYSIAN OCCUPATIONAL SKILLS QUALIFICATION FRAMEWORK
(MOSQF) LEVEL DESCRIPTOR**

(Source: Department of Skills Development)

LEVEL	LEVEL DESCRIPTION
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 complexes, 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.

LEVEL	LEVEL DESCRIPTION
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 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 understanding of different perspective 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 task 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 parameter. It also reflects awareness of different perspectives or approaches within a sub-area of study or work.
2	Achievement at this level reflects the ability to select and use relevant knowledge, ideas, skills and procedures to complete well-defined tasks and address straightforward 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 SECTOR PANEL MEMBERS FOR THE INFORMATION AND
COMMUNICATION FRAMEWORK DEVELOPMENT**

NO	NAME	EXPERTISE	POSITION	ORGANISATION
1	PENDI BIN SAID	Journalism/ Communication	Managing Director	RAMA RESOURCES CORPORATION (M) SDN BHD
2	HASNITA BINTI IBRAHIM	Information Management	Information Manager	BERNAMA
3	KHALIL BIN ZULKIFFLEE	Multimedia Production	Managing Director	CPROFILES
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11	AHMAD FUAD YAHYA	Journalism	Deputy Editor In-Chief	BERNAMA
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3	SALWA BINTI HAMZAH	NS CREATIVE & MARKETING
4	SYED AGIL BIN SYED JAAFAR	FORMER UTUSAN MALAYSIA

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7	ZAINAL BIN ABDUL JALIL	DSD

LIST OF RESEARCH TEAM AND SECRETARIAT

NO	NAME	POSITION/ ORGANISATION
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2	MUHAMMAD AMIRUL NAZHIF BIN MOHD NOHAN	Researcher/ PFH

ANNEX 3: LIST OF CRITICAL JOB TITLES

List of Critical Job Titles for Information Service Activities

NO	CRITICAL JOB TITLE	AREA	LEVEL	LS	SS	S
1	Web Developer	Web Portal (Designing)	4	X	X	√
2	Web Admin	Web Portal (Designing)	5	X	X	√
3	Web Developer	Web Portal (Programming)	4	X	X	√
4	Web Admin	Web Portal (Programming)	5	X	X	√
5	Service Desk	Hosting	2	X	√	X
6	Technical Support	Hosting	3	X	√	X
7	Application Support	Hosting	4	X	X	√
8	Hosting Specialist	Hosting	5	X	X	√
9	Data Analyst	Data Processing	5	X	X	√
10	Content Support	Streaming Service	3	X	√	X
11	Broadcast Producer	Streaming Service	4	X	X	√
12	Streaming Specialist	Streaming Service	5	X	X	√
13	Mainframe Technician	Time Share Mainframe	4	X	X	√
14	Mainframe System Specialist	Time Share Mainframe	5	X	X	√
15	Application Developer	Application Service Provider	4	X	X	√
16	Application Specialist	Application Service Provider	5	X	X	√
17	Journalist	News (Coverage)	2	X	√	X
18	Editor	News (Coverage)	5	X	X	√
19	Sub-Editor	News (Editing)	4	X	X	√
20	Chief Sub-Editor	News (Editing)	5	X	X	√
21	Photographer	Images (Photography)	1	√	X	X
22	Chief Photographer	Images (Photography)	4	X	X	√
23	Chief Photographer	Images (Caption Writing)	4	X	X	√
24	Photo Journalist	Images (Photo Journalism)	3	X	√	X
25	Chief Photographer	Images (Photo Journalism)	4	X	X	√

NO	CRITICAL JOB TITLE	AREA	LEVEL	LS	SS	S
26	Chief Photographer	Images (Drone Photography)	4	X	X	√

LS – Low Skilled Worker

SS – Semi-skilled Worker

S – Skilled Worker

List of Critical Job Titles VS e-MASCO VS COL

NO	CRITICAL JOB TITLE	AREA	LEVEL	OS	e-MASCO	COL
1	Web Developer	Web Portal (Designing)	4	√	√	√
2	Web Admin	Web Portal (Designing)	5	√	√	√
3	Web Developer	Web Portal (Programming)	4	√	√	√
4	Web Admin	Web Portal (Programming)	5	√	√	√
5	Service Desk	Hosting	2	√	X	X
6	Technical Support	Hosting	3	√	√	X
7	Application Support	Hosting	4	√	X	X
8	Hosting Specialist	Hosting	5	√	X	X
9	Data Analyst	Data Processing	5	√	√	√
10	Content Support	Streaming Service	3	√	X	X
11	Broadcast Producer	Streaming Service	4	√	X	X
12	Streaming Specialist	Streaming Service	5	√	X	X
13	Mainframe Technician	Time Share Mainframe	4	√	√	X
14	Mainframe System Specialist	Time Share Mainframe	5	√	√	X
15	Application Developer	Application Service Provider	4	√	√	√
16	Application Specialist	Application Service Provider	5	√	√	√
17	Journalist	News (Coverage)	2	√	√	X
18	Editor	News (Coverage)	5	√	√	√
19	Sub-Editor	News (Editing)	4	√	√	X
20	Chief Sub-Editor	News (Editing)	5	√	X	X
21	Photographer	Images (Photography)	1	√	√	X
22	Chief Photographer	Images (Photography)	4	√	X	X

NO	CRITICAL JOB TITLE	AREA	LEVEL	OS	e-MASCO	COL
23	Chief Photographer	Images (Caption Writing)	4	√	X	X
24	Photo Journalist	Images (Photo Journalism)	3	√	√	X
25	Chief Photographer	Images (Photo Journalism)	4	√	X	X
26	Chief Photographer	Images (Drone Photography)	4	√	X	X

ANNEX 4: LIST OF JOB RELEVANT TO IR 4.0

List of Job Relevant to IR 4.0 for Information Service Activities

NO	CRITICAL JOB TITLE	AREA	LEVEL	LS	SS	S
1	Web Director	Web Portal (Designing)	7	X	X	√
2	Project Manager	Web Portal (Designing)	6	X	X	√
3	Web Admin	Web Portal (Designing)	5	X	X	√
4	Web Developer	Web Portal (Designing)	4	X	X	√
5	Web Designer	Web Portal (Designing)	3	X	√	X
6	Web Director	Web Portal (Programmming)	7	X	√	X
7	Project Manager	Web Portal (Programmming)	6	X	X	√
8	Web Admin	Web Portal (Programmming)	5	X	X	√
9	Web Developer	Web Portal (Programmming)	4	X	X	√
10	Web Programmer	Web Portal (Programmming)	3	X	√	X
11	IT Director	Hosting	7	X	X	√
12	Technical Manager	Hosting	6	X	X	√
13	Hosting Specialist	Hosting	5	X	X	√
14	Application Support	Hosting	4	X	X	√
15	Technical Support	Hosting	3	X	√	X
16	Service Desk	Hosting	2	X	√	X
17	IT Director	Data Processing	7	X	X	√
18	Data Processing Manager	Data Processing	6	X	X	√
19	Data Analyst	Data Processing	5	X	X	√
20	Data Processing Technician	Data Processing	4	X	X	√
21	Data Organiser	Data Processing	3	X	√	X
22	Data Entry	Data Processing	2	X	√	X

NO	CRITICAL JOB TITLE	AREA	LEVEL	LS	SS	S
23	IT Director	Streaming Services	7	X	X	√
24	Broadcast Manager	Streaming Services	6	X	X	√
25	Streaming Specialist	Streaming Services	5	X	X	√
26	Broadcast Producer	Streaming Services	4	X	X	√
27	Content Support	Streaming Services	3	X	√	X
28	IT Director	Time Share Mainframe	7	X	X	√
29	Mainframe Manager	Time Share Mainframe	6	X	X	√
30	Mainframe System Specialist	Time Share Mainframe	5	X	X	√
31	Mainframe Technician	Time Share Mainframe	4	X	X	√
32	Technical Support	Time Share Mainframe	3	X	√	X
33	IT Director	Application Service Provider	7	X	X	√
34	ASP Manager	Application Service Provider	6	X	X	√
35	Application Specialist	Application Service Provider	5	X	X	√
36	Application Developer	Application Service Provider	4	X	X	√
37	ASP Support	Application Service Provider	3	X	√	X
38	Editor in Chief	News (Coverage)	8	X	X	√
39	Deputy Editor in Chief	News (Coverage)	7	X	X	√
40	Executive Editor	News (Coverage)	6	X	X	√
41	Editor	News (Coverage)	5	X	X	√
42	Assistant Editor	News (Coverage)	4	X	X	√
43	Senior Journalist	News (Coverage)	3	X	√	X
44	Journalist	News (Coverage)	2	X	√	X
45	Junior Reporter	News (Coverage)	1	√	X	X
46	Editor in Chief	News (Editing)	8	X	X	√
47	Deputy Editor in Chief	News (Editing)	7	X	X	√

NO	CRITICAL JOB TITLE	AREA	LEVEL	LS	SS	S
48	Executive Editor	News (Editing)	6	X	X	√
49	Chief Sub-Editor	News (Editing)	5	X	X	√
50	Assistant Chief Sub-Editor	News (Editing)	4	X	X	√
51	Sub-Editor	News (Editing)	3	X	√	X
52	Editor in Chief	Images (Photography)	8	X	X	√
53	Deputy Editor in Chief	Images (Photography)	7	X	X	√
54	Executive Editor	Images (Photography)	6	X	X	√
55	Photo Editor	Images (Photography)	5	X	X	√
56	Chief Photographer	Images (Photography)	4	X	X	√
57	Deputy Chief Photographer	Images (Photography)	3	X	√	X
58	Senior Photographer	Images (Photography)	2	X	√	X
59	Photographer	Images (Photography)	1	√	X	X
60	Editor in Chief	Images (Caption Writing)	8	X	X	√
61	Deputy Editor in Chief	Images (Caption Writing)	7	X	X	√
62	Executive Editor	Images (Caption Writing)	6	X	X	√
63	Photo Editor	Images (Caption Writing)	5	X	X	√
64	Chief Photographer	Images (Caption Writing)	4	X	X	√
65	Chief Caption Writer	Images (Caption Writing)	3	X	√	X
66	Caption Writer	Images (Caption Writing)	2	X	√	X
67	Editor in Chief	Images (Photo Journalism)	8	X	X	√

NO	CRITICAL JOB TITLE	AREA	LEVEL	LS	SS	S
68	Deputy Editor in Chief	Images (Photo Journalism)	7	X	X	√
69	Executive Editor	Images (Photo Journalism)	6	X	X	√
70	Photo Editor	Images (Photo Journalism)	5	X	X	√
71	Chief Photographer	Images (Photo Journalism)	4	X	X	√
72	Photo Journalist	Images (Photo Journalism)	3	X	√	X
73	Assistant Photo Journalist	Images (Photo Journalism)	2	X	√	X
74	Junior Photo Journalist	Images (Photo Journalism)	1	√	X	X
75	Editor in Chief	Images (Drone Photography)	8	X	X	√
76	Deputy Editor in Chief	Images (Drone Photography)	7	X	X	√
77	Executive Editor	Images (Drone Photography)	6	X	X	√
78	Photo Editor	Images (Drone Photography)	5	X	X	√
79	Chief Photographer	Images (Drone Photography)	4	X	X	√
80	Drone Photographer	Images (Drone Photography)	3	X	√	X
81	Assistant Drone Photographer	Images (Drone Photography)	2	X	√	X

LS – Low Skilled Worker

SS – Semi-skilled Worker

S – Skilled Worker

ANNEX 5: OCCUPATIONAL DESCRIPTIONS (OD)

SECTION : (J) INFORMATION AND COMMUNICATION
DIVISION : (63) INFORMATION SERVICE ACTIVITIES
GROUP : (631) DATA PROCESSING, HOSTING & RELATED
ACTIVITIES; WEB PORTAL

MSIC GROUP : 631

AREA : Web Portal (Designing)

JOB TITLE : Web Developer

LEVEL : 4

Responsibilities

The Web Developer is responsible to map website navigation; design and modify website structure; perform website coding; design layout to meet requirement; create visually appealing sites; design user-friendly experience; install and configure server software; and install programming language.

Knowledge:

- Content Management Systems 'CMS' and e-Commerce Platforms
- Web coding skills
- Multi-web programming language skills
- Cross-Browser Development skills
- Web analysis skills

Skills:

- Map website navigation
- Design and modify website structure
- Perform website coding
- Design layout to meet requirement
- Create visually appealing sites
- Design user-friendly experience
- Install and configure server software
- Install programming language.

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Good communication with subordinates
- Strong interpersonal skills with good attention to details
- High level of commitment and strong team player
- Knowledgeable and professionalism in work

MSIC GROUP : 631

AREA : Web Portal (Designing)

JOB TITLE : Web Admin

LEVEL : 5

Responsibilities

The Web Admin is responsible to establish Web system specifications; design system infrastructure; define system and operational policies and procedures; develops site navigation; maintains web system performance; troubleshoot web system; perform web content back-ups; web content maintenance document; and upgrades web system.

Knowledge:

- Business and management principles
- Design techniques, tools, and principals
- Latest web portal technologies
- Complex Problem Solving
- Systems analysis and evaluation

Skills:

- Establish Web system specifications
- Design system infrastructure
- Define system and operational policies and procedures
- Develops site navigation; maintains web system performance
- Troubleshoot web system
- Perform web content back-ups
- Web content maintenance document
- Upgrades web system

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Ability to adapt with workplace environment
- Firm in decision making
- Good communication with subordinates
- High level of commitment and strong team player
- Knowledgeable and professionalism in work

MSIC GROUP : 631

AREA : Web Portal (Programming)

JOB TITLE : Web Developer

LEVEL : 4

Responsibilities

The Web Developer is responsible to map website navigation; design and modify website structure; perform website coding; design layout to meet requirement; create visually appealing sites; design user-friendly experience; install and configure server software; and install programming language.

Knowledge:

- Content Management Systems 'CMS' and e-Commerce Platforms
- Web coding skills
- Multi-web programming language skills
- Cross-Browser Development skills
- Web analysis skills

Skills:

- Map website navigation
- Design and modify website structure
- Perform website coding
- Design layout to meet requirement
- Create visually appealing sites
- Design user-friendly experience
- Install and configure server software
- Install programming language.

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Firm in decision making
- Good communication with subordinates
- High level of commitment and strong team player
- Knowledgeable and professionalism in work

MSIC GROUP : 631

AREA : Web Portal (Programming)

JOB TITLE : Web Admin

LEVEL : 5

Responsibilities

The Web Admin is responsible to establish Web system specifications; design system infrastructure; define system and operational policies and procedures; develops site navigation; maintains web system performance; troubleshoot web system; perform web content back-ups; web content maintenance document; and upgrades web system.

Knowledge:

- Business and management principles
- Design techniques, tools, and principals
- Latest web portal technologies
- Complex Problem Solving
- Systems analysis and evaluation

Skills:

- Establish Web system specifications
- Design system infrastructure
- Define system and operational policies and procedures
- Develops site navigation; maintains web system performance
- Troubleshoot web system
- Perform web content back-ups
- Web content maintenance document
- Upgrades web system

Attributes (Attitude/Safety/Environmental):

- Ability to adapt with workplace environment
- Firm in decision making
- Strong interpersonal skills with good attention to details
- Good communication with subordinates
- High level of commitment and strong team player
- Knowledgeable and professionalism in work

MSIC GROUP : 631

AREA : Hosting

JOB TITLE : Service Desk

LEVEL : 2

Responsibilities

The Service Desk is responsible to resolve issues with computer hardware or software; respond to user inquiries; assess problems and issues with IT equipment and applications; provide assistance on tasks; and access and utilize web hosting software and tools.

Knowledge:

- IT Hardware and Software
- Web hosting cycle process
- Support experience
- Troubleshooting/problem-solving skills
- Teamwork skills

Skills:

- Resolve issues with computer hardware or software
- Respond to user inquiries
- Assess problems and issues with IT equipment and applications
- Provide assistance on tasks
- Access and utilize web hosting software and tools

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Ability to adapt with workplace environment
- Good communication with subordinates
- Strong interpersonal skills with good attention to details
- High level of commitment and strong team player
- Knowledgeable and professionalism in work

MSIC GROUP : 631

AREA : Hosting

JOB TITLE : Technical Support

LEVEL : 3

Responsibilities

The Technical Support is responsible to evaluates system potential; evaluates expansions or enhancementsq; achieves computer system objectives; recommend a course of action; perform test software compatibility; and maintains system capability, historical records; and technical knowledge.

Knowledge:

- Programming language
- Hardware and software
- Latest IT and software trends
- Logic Analysis IT Hardware and Software

Skills:

- Evaluates system potential
- Evaluates expansions or enhancementsq
- Achieves computer system objectives
- Recommend a course of action
- Perform test software compatibility
- Maintains system capability
- Maintains historical records
- Maintains technical knowledge

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Ability to adapt with workplace environment
- Firm in decision making
- Good communication with subordinates
- Strong interpersonal skills with good attention to details
- High level of commitment and strong team player
- Knowledgeable and professionalism in work

MSIC GROUP : 631

AREA : Hosting

JOB TITLE : Application Support

LEVEL : 4

Responsibilities

The Application Support is responsible to prepare and install hosting application; conduct systems analysis; recommend changes in scope and procedure of work; perform test web-hosting application; validate web-hosting application; protect operations by keeping information confidential; provide application support information; accomplish engineering and organisation mission; develop software solutions; and follow the software development lifecycle.

Knowledge:

- Programming language
- Learn and master employer-specific software
- Diagnose & address application issues
- IT Hardware and Software
- Latest web portal technologies

Skills:

- Prepare and install hosting application
- Conduct systems analysis
- Recommend changes in scope and procedure of work
- Perform and validate test web-hosting application
- Protect operations by keeping information confidential
- Provide application support information
- Develop software solutions

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Ability to adapt with workplace environment
- Good communication with subordinates
- Strong interpersonal skills with good attention to details
- High level of commitment and strong team player

MSIC GROUP : 631

AREA : Hosting

JOB TITLE : Hosting Specialist

LEVEL : 5

Responsibilities

The Hosting Specialist is responsible to perform website migration and web-hosting support; provide web-hosting solutions; install web-hosting tools; and manage systems application, web-hosting requirements, client requirement, security and domain registration.

Knowledge:

- Multi-web application languages
- Hosting software
- IT Hardware and Software
- Web application programming
- Web hosting application
- Maintain and implement a backup/disaster plan within a hosting environment
- Excellent understanding of network technologies architecture

Skills:

- Perform website migration and web-hosting support
- Provide web-hosting solutions
- Install web-hosting tools
- Manage systems application and web-hosting requirements
- Manage client requirement, security and domain registration

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Ability to adapt with workplace environment
- Firm in decision making
- Good communication with subordinates
- Strong interpersonal skills with good attention to details
- High level of commitment and strong team player
- Knowledgeable and professionalism in work

MSIC GROUP : 631

AREA : Data Processing

JOB TITLE : Data Analyst

LEVEL : 5

Responsibilities

The Data Analyst is responsible to collect and interpreting data; analyse data processing results; report the results back to the relevant members of the business; identify patterns and trends in data sets; and define new data collection and analysis processes.

Knowledge:

- Customer service and business
- Development and maintenance of information technology (IT)
- Measurements involved in survey processes
- Database applications, analytical tools and new data tools
- Software & hardware for IT project
- Advanced computer and analytical tools skills
- Operate database systems
- Latest IT software development

Skills:

- Collect and interpreting data
- Analyse data processing results
- Report the results back to the relevant members of the business
- Identify patterns and trends in data sets
- Define new data collection and analysis processes

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Ability to adapt with workplace environment
- Firm in decision making
- Good communication with subordinates
- Strong interpersonal skills with good attention to details
- High level of commitment and strong team player
- Knowledgeable and professionalism in work

MSIC GROUP : 631

AREA : Streaming Services

JOB TITLE : Content Support

LEVEL : 3

Responsibilities

The Content Support is responsible to obtain content to meet streaming requirement; arranges project requirements in programming sequence; oversee contents meet job requirement; collaborate with teams to plan and develop site content; optimize content according to SEO; encodes project requirements by converting work flow information into computer language and distribution to online channels; confirms program operation by conducting tests; and prepare and revise document of program development.

Knowledge:

- Audio and video production and editing processes
- Software installation, maintainance and application
- Macintosh and Windows operating systems
- Various programming language for multimedia presentation
- Data Entry Skills

Skills:

- Obtain and oversee content to meet streaming requirement
- Arranges project requirements in programming sequence
- Collaborate with teams to plan and develop site content
- Optimize content according to SEO
- Convert work flow information into computer language and distribution to online channels
- Confirms program operation by conducting tests
- Prepare and revise document of program development

Attributes (Attitude/Safety/Environmental):

- Ability to adapt with workplace environment
- Strong interpersonal skills with good attention to details
- Good communication with subordinates
- High level of commitment and strong team player

MSIC GROUP : 631

AREA : Streaming Services

JOB TITLE : Broadcast Producer

LEVEL : 4

Responsibilities

The Broadcast Producer is responsible to maintain equipment for broadcast transmission; set up and monitor audio-video links between units; set up custom audio-visual circuits, software, equipment and broadcast production facilities; perform test equipment and systems; develop and using awareness of best practice in health and safety for the workplace; and broadcast audio-video streaming.

Knowledge:

- Lighting and camera technique and video production processes
- Experience in Internet connection, IP Networking, engineering studio and using multicamera recording systems
- Various of operating system (Windows, Linux, iOS)
- Installation and maintenance of streaming equipment
- Electronic Circuits, streaming application and multi-camera production
- IP addressing and network routing skill

Skills:

- Maintain equipment for broadcast transmission
- Set up and monitor audio-video links between units
- Set up custom audio-visual circuits, software, equipment and broadcast production facilities
- Perform test equipment and systems
- Develop and using awareness of best practice in health and safety for the workplace
- Broadcast audio-video streaming

Attributes (Attitude/Safety/Environmental):

- Ability to adapt with workplace environment
- Strong interpersonal skills with good attention to details
- Good communication with subordinates
- Knowledgeable and professionalism in work

MSIC GROUP : 631

AREA : Streaming Services

JOB TITLE : Streaming Specialist

LEVEL : 5

Responsibilities

The Streaming Specialist is responsible to establish connection for webcasts; support encoding for streamed media; deliver “buffering free” experience over various browsers, networks and devices; monitor and assess video player engagement with end user; establish quality of experience (QoE) metrics; improve media platform for content delivery continuously; analyse interrupt streaming issues; endorse solution for problem experience; make recommendations for new technology; and supports post-production efforts.

Knowledge:

- Audio and video production processes
- Multi-camera recording systems and production techniques
- ENG/EFP and DSLR cameras and other professional production equipment
- Internet connection, IP addressing and network routing
- Operating systems, streaming server and streaming application

Skills:

- Establish connection for webcasts and quality of experience (QoE) metrics
- Support encoding for streamed media and post-production efforts
- Deliver “buffering free” experience over various browsers networks and devices
- Monitor and assess video player engagement with end user
- Improve media platform for content delivery continuously
- Analyse interrupt streaming issues and endorse solution for problem experience
- Make recommendations for new technology

Attributes (Attitude/Safety/Environmental):

- Ability to adapt with workplace environment
- Strong interpersonal skills with good attention to details
- Good communication with subordinates
- High level of commitment and strong team player

MSIC GROUP : 631

AREA : Time Share Mainframe

JOB TITLE : Mainframe Technician

LEVEL : 4

Responsibilities

The Mainframe Technician is responsible to set networking operating system; perform coding major software features; provide software enhancements; prepare document maintenance procedure; implement functional programs and network security measures; perform mainframe network maintenance, disaster recovery operations and data backups; monitor virus protection software and network performance; and configure computer network access.

Knowledge:

- Expertise in current computer hardware and software
- Programming languages, network performance tools, software coding in mainframe and analyze networking
- Analytics skills in development of applications in mainframe
- Troubleshoot mainframe networks, backup strategy and recovery
- Design, configure and test network operating systems

Skills:

- Set networking operating system and provide software enhancements
- Perform coding software features, mainframe network maintenance, disaster recovery operations and data backups
- Prepare document maintenance procedure
- Implement functional programs and network security measures.
- Monitor virus protection software and network performance
- Configure computer network access

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Detail in preparing plan
- Firm in decision making
- Good communication with subordinates

MSIC GROUP : 631

AREA : Time Share Mainframe

JOB TITLE : Mainframe System Specialist

LEVEL : 5

Responsibilities

The Mainframe System Specialist is responsible to set up operating system, perform storage management task and troubleshooting on technical issues, manage support personnel in the use of storage management and operating system utilities for all mainframe operations, maximize the utilization of online storage hardware; monitor system performance and storage capacity; and oversee the development and implementation of all system; suggest solution for technical issues; evaluate application and networks systems; and prepare document technical procedures (SOP).

Knowledge:

- Expertise in current computer hardware and software
- Programming Languages
- Master various mainframe OS and other mainframe software apps
- Understand storage and subsystem technology implementation and optimization
- Analyse logs, dump and any third-party monitors and traces and create capacity planning

Skills:

- Set up operating system and prepare document technical procedures (SOP)
- Perform storage management task and troubleshooting on technical issues
- Manage support personnel in use of storage management and operating system utilities
- Monitor system performance and maximize the utilization of online storage hardware
- Oversee, evaluate and suggest solution for development and implementation of mainframe system

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Firm in decision making
- Good communication with subordinates
- Strong interpersonal skills with good attention to details

MSIC GROUP : 631

AREA : Application Service Provider

JOB TITLE : Application Developer

LEVEL : 4

Responsibilities

The Application Developer is responsible to analyse application framework requirements; develop final software application output; develop the web-based software; perform extensive software testing; create and maintaining the ASP based websites; confirm a standard user experience across all platforms; train the end user on the final product; establish the compatibility of websites with newer software or operating system version; and monitor the life cycle of software.

Knowledge:

- Understand the process, life cycle and creation software
- Computer task, program, languages and computer analysts and engineering
- Testing applications, and designing prototype applications
- Developing innovative applications
- Well versed in programming languages
- Proficient in structuring and developing software code

Skills:

- Develop final software application output and web-based software
- Analyse application framework requirements and perform extensive software testing
- Create and maintaining the ASP based websites
- Confirm a standard user experience across all platforms
- Train the end user on the final product
- Establish the compatibility of websites with new software or operating system version
- Monitor the life cycle of software

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Firm in decision making
- Good communication with subordinates
- Strong interpersonal skills with good attention to details

MSIC GROUP : 631

AREA : Application Service Provider

JOB TITLE : Application Specialist

LEVEL : 5

Responsibilities

The Application Specialist is responsible to set ASP based on application requirements; implement ASP program to support the portfolio management process; establish testing procedures; perform project status report; perform maintenance of existing systems; and coordinate big data management system.

Knowledge:

- Analyse customer needs & solutions.
- Innovative problems solving
- Perform prototyping, application tests and code reviews
- Products optimisation
- Generate ideas for software products innovation
- Software coding and development skill
- Connecting customers and engineering teams
- Translate customer input and sales information to develop complex software applications.
- Provide technical support and expertise to customers

Skills:

- Set ASP based on application requirements
- Implement ASP program to support the portfolio management process
- Establish testing procedures
- Perform maintenance of existing systems and project status report
- Coordinate big data management system

Attributes (Attitude/Safety/Environmental):

- Ability to work under pressure and independently
- Good communication with subordinates
- Strong interpersonal skills with good attention to details
- High level of commitment and strong team player

SECTION : (J) INFORMATION AND COMMUNICATION
DIVISION : (63) INFORMATION SERVICE ACTIVITIES
GROUP : (639) OTHER INFORMATION SERVICE ACTIVITIES

MSIC GROUP : 639

AREA : News (Coverage)

JOB TITLE : Journalist

LEVEL : 2

Responsibilities

The Journalist is responsible to cover daily and special assignments, interview news sources, write news/feature articles, process statements, verify fact, conduct research and capture photos and videos.

Knowledge:

- Essential knowledge in various field (eg. Politics, economy, education, sports, etc.)
- Language competency in English and Bahasa Malaysia
- Using equipment, gadgets, and related software in editing for reporting purposes
- Editorial system used in the agency
- News house style of the agency

Skills:

- Write news article accurately
- Communicate with the sources
- Conduct fact checking activity using multiple platforms
- Asking good and relevant question
- Utilise the editorial system of the agency represented
- Utilise the news house style for the agency represented

Attributes (Attitude/Safety/Environmental):

- Ability to work independently and adapt with environment
- Adhere to act and regulations
- Good communication
- Informative in preparing report
- Strong interpersonal skills with good attention to details
- High level of commitment
- Sincere in approval quality data
- Knowledgeable and professionalism in work

MSIC GROUP : 639

AREA : News (Coverage)

JOB TITLE : Editor

LEVEL : 5

Responsibilities

The Editor is responsible to gatekeeping the usage of articles at respective news desk, edit news articles, transmit breaking news, oversee manpower movement at respective news desk, evaluate the capability of junior reporters' performance, plan and coordinate news coverage and attend to inquiry.

Knowledge:

- Essential knowledge in various field (eg. Politics, economy, education, sports, etc.)
- Language competency in English and Bahasa Malaysia
- Using equipment, gadgets, and related software in editing for reporting purposes
- Editorial system used in the agency
- News house style of the agency
- Administration and management

Skills:

- Write news article accurately
- Acquire analytical and critical thinking skills
- Understand the editorial system of the agency represented
- Understand the news house style for the agency represented

Attributes (Attitude/Safety/Environmental):

- Adhere to act and regulations
- Good communication
- Informative in verifying report
- Strong interpersonal skills with good attention to details
- High level of commitment
- Sincere in approval quality data
- Knowledgeable and professionalism in work

MSIC GROUP : 639

AREA : News (Editing)

JOB TITLE : Sub-editor

LEVEL : 3

Responsibilities

The Sub-editor is responsible to assist in editing news articles, assist in translating news articles, check fact with journalist/various sources, check to detect plagiarism, assist in transmitting news articles and gatekeeping news articles.

Knowledge:

- Editing and translating news article
- Essential knowledge in various field (eg. Politics, economy, education, sports, etc.)
- Language competency in English and Bahasa Malaysia
- Using equipment, gadgets, and related software in editing for reporting purposes
- Editorial system used in the agency
- News house style of the agency
- Administration and management

Skills:

- Write and translate news articles accurately
- Edit according to news format
- Communicate with the sources
- Utilise the editorial system of the agency represented
- Utilise the news house style of the agency represented

Attributes (Attitude/Safety/Environmental):

- Adhere to act and regulations
- Informative in preparing report
- Strong interpersonal skills with good attention to details
- High level of commitment
- Sincere in approval quality data
- Knowledgeable and professionalism in work

MSIC GROUP : 639

AREA : News (Editing)

JOB TITLE : Chief Sub-editor

LEVEL : 5

Responsibilities

The Chief Sub-editor is responsible to edit important news articles, transmit important news articles, determine the usage of news articles, determine on lead and top stories, gatekeeper of news articles, translate important news articles and verify fact with journalist/various sources.

Knowledge:

- Essential knowledge in various field (eg. Politics, economy, education, sports, etc.)
- Language competency in English and Bahasa Malaysia
- Using equipment, gadgets, and related software in editing for reporting purposes
- Utilise equipment and gadgets for reporting purposes
- Editorial system used in the agency
- News house style of the agency
- Administration and management

Skills:

- Write and translate news article accurately
- Communicate with the sources
- Understand the editorial system of the agency represented
- Understand the news house style for the agency represented

Attributes (Attitude/Safety/Environmental):

- Adhere to act and regulations
- Informative in verifying report
- Strong interpersonal skills with good attention to details
- High level of commitment
- Sincere in approval quality data
- Knowledgeable and professionalism in work

MSIC GROUP : 639

AREA : Images (Photography)

JOB TITLE : Photographer

LEVEL : 1

Responsibilities

The Photographer is responsible to check functionality of equipment, perform the search for human interest images, capture images for events, write caption for images taken from events and transmit photo/video to officer in charge from the location.

Knowledge:

- Photo theories
- Using high technology equipment and gadgets
- Capturing photos and videos
- Latest technology in photography
- Editorial system used in the agency
- News house style of the agency

Skills:

- Handle high specification camera (eg. DSLR)
- Use editing software (eg. Photoshop, FotoStation Pro)
- Compose images from suitable angle
- Write caption based on images captured

Attributes (Attitude/Safety/Environmental):

- Adhere to act and regulations
- Informative in preparing report
- Strong interpersonal skills with good attention to details
- High level of commitment
- Sincere in approval quality data
- Knowledgeable and professionalism in work

MSIC GROUP : 639

AREA : Images (Photography)

JOB TITLE : Chief Photographer

LEVEL : 4

Responsibilities

The Chief Photographer is responsible to manage and plan the team of photographer, manage/determine the use of photo/video equipment, evaluate photo/video images, evaluate the capability of the team of photographer, gatekeeper for photo/video quality for images captured, edit photo/video images, verify caption writing and conduct training.

Knowledge:

- Photo theories
- Using high technology equipment and gadgets
- Capturing photos and videos
- Latest technology in photography
- Editorial system used in the agency
- News house style of the agency
- Administration and management

Skills:

- Use editing software (eg. Photoshop, FotoStation Pro)
- Communicate with the sources
- Evaluate incoming and outgoing images on the photos captured (size and quality)
- Advice on the right technique to capture images and videos
- Handle all functions of high specification camera (eg. DSLR)
- Compose images from suitable angle
- Write caption based on images captured

Attributes (Attitude/Safety/Environmental):

- Adhere to act and regulations
- Informative in preparing report
- Strong interpersonal skills with good attention to details
- Sincere in approval quality data

MSIC GROUP : 639

AREA : Images (Caption Writing)

JOB TITLE : Chief Photographer

LEVEL : 4

Responsibilities

The Chief Photographer is responsible to manage and plan the team of photographer, manage/determine the use of photo/video equipment, evaluate photo/video images, evaluate the capability of the team of photographer, gatekeeper for photo/video quality for images captured, edit photo/video images, verify caption writing and conduct training.

Knowledge:

- Photo theories
- Using high technology equipment and gadgets
- Capturing photos and videos
- Latest technology in photography
- Editorial system used in the agency
- News house style of the agency
- Administration and management

Skills:

- Use editing software (eg. Photoshop, FotoStation Pro)
- Communicate with the sources
- Evaluate incoming and outgoing images on the photos captured (size and quality)
- Advice on the right technique to capture images and videos
- Handle all functions of high specification camera (eg. DSLR)
- Compose images from suitable angle
- Write caption based on images captured

Attributes (Attitude/Safety/Environmental):

- Adhere to act and regulations
- Informative in preparing report
- Strong interpersonal skills with good attention to details
- Sincere in approval quality data

MSIC GROUP : 639

AREA : Images (Photo Journalism)

JOB TITLE : Photo Journalist

LEVEL : 3

Responsibilities

The Photo Journalist is responsible to carry out research activities, assign task, prepare duty roster for the team of photojournalist, assist in preparing procurement documentation, visualize workflow and write article, manage photo/video equipment, supply visual for multimedia uses, conduct team meeting, cover event and write article, collect photo/video, edit photo/video, cover photo/video for special task, check functionality of equipment, produce articles on special task and produce documentary video on special task.

Knowledge:

- Essential knowledge in various field (eg. Politics, economy, education, sports, etc.)
- Language competency
- Photo theories
- Using high technology equipment and gadgets
- Editorial system used in the agency
- News house style of the agency

Skills:

- Conceptualise news article
- Evaluate incoming and outgoing images on the photos captured (size and quality)
- Advice on the right technique to capture images and videos
- Write caption based on images captured
- Understand the editorial system and news house style

Attributes (Attitude/Safety/Environmental):

- Adhere to act and regulations
- Informative in preparing report
- Strong interpersonal skills with good attention to details
- Sincere in approval quality data

MSIC GROUP : 639

AREA : Images (Photo Journalism)

JOB TITLE : Chief Photographer

LEVEL : 4

Responsibilities

The Chief Photographer is responsible to manage and plan the team of photographer, manage/determine the use of photo/video equipment, evaluate photo/video images, evaluate the capability of the team of photographer, gatekeeper for photo/video quality for images captured, edit photo/video images, verify caption writing and conduct training.

Knowledge:

- Photo theories
- Using high technology equipment and gadgets
- Capturing photos and videos
- Latest technology in photography
- Editorial system used in the agency
- News house style of the agency
- Administration and management

Skills:

- Use editing software (eg. Photoshop, FotoStation Pro)
- Communicate with the sources
- Evaluate incoming and outgoing images on the photos captured (size and quality)
- Advice on the right technique to capture images and videos
- Handle all functions of high specification camera (eg. DSLR)
- Compose images from suitable angle
- Write caption based on images captured

Attributes (Attitude/Safety/Environmental):

- Adhere to act and regulations
- Informative in preparing report
- Strong interpersonal skills with good attention to details
- Sincere in approval quality data

MSIC GROUP : 639

AREA : Images (Drone Photography)

JOB TITLE : Chief Photographer

LEVEL : 4

Responsibilities

The Chief Photographer is responsible to manage and plan the team of photographer, manage/determine the use of photo/video equipment, evaluate photo/video images, evaluate the capability of the team of photographer, gatekeeper for photo/video quality for images captured, edit photo/video images, verify caption writing and conduct training.

Knowledge:

- Photo theories
- Using high technology equipment and gadgets
- Capturing photos and videos
- Latest technology in photography
- Editorial system used in the agency
- News house style of the agency
- Administration and management

Skills:

- Use editing software (eg. Photoshop, FotoStation Pro)
- Communicate with the sources
- Evaluate incoming and outgoing images on the photos captured (size and quality)
- Advice on the right technique to capture images and videos
- Handle all functions of high specification camera (eg. DSLR)
- Compose images from suitable angle
- Write caption based on images captured

Attributes (Attitude/Safety/Environmental):

- Adhere to act and regulations
- Informative in preparing report
- Strong interpersonal skills with good attention to details
- Sincere in approval quality data