"Digital Transformation Is About Talent, Not Technology"
Harvard Business Review

DIGITAL JOB MARKET OUTLOOK 2022

MALAYSIA

CHAPTER 1
Economic Review and Outlook

CHAPTER 2
Digital Economy Review and Outlook

CHAPTER 3
Digital Employment and Salary Trends

REGIONAL

CHAPTER 4
Digital Salary Trends in Selected Economies

In Collaboration with

MDEC™ JobStreet by SEEK ASOCIO Reimagining the Digital Era

Published by

PIKOM


MINISTRY OF COMMUNICATIONS
AND MULTIMEDIA MALAYSIA
MDEC™
THINK
POSSIBLE
FROM CORRIDORS TO THE WORLD
Every time you reach for the stars, you will see the world in a whole new way. Those who think possible, turns visions into reality. Introducing Malaysia Digital, a national strategic initiative.
MD
MALAYSIA DIGITAL
mdec.my/malaysiadigital

Published by:

PIKOM

E1, Empire Damansara,
No. 2, Jalan PJU 8/8a, Damansara Perdana
47820 Petaling Jaya, Selangor

T : +(603) 7622 0079
F : +(603) 7622 4879
E : info@pikom.org.my
W : www.pikom.org.my

In collaboration with:

JobStreet by SEEK

JobStreet.com Sdn Bhd
Level 16, Menara AIA Cap Square,
No. 10, Jalan Munshi Abdullah,
50100 Kuala Lumpur, Malaysia

W : www.jobstreet.com

ISSN No: 2180-267X
Release date: August, 2022

CONNECT YOUR ENTERPRISE WITH A RELIABLE SERVICE PROVIDER

EXPERIENCED ESTABLISHED EXPERTS

- Managed Network Service
- Independent Service Provider
- IoT Enabler
- Next Generation 5G
- SD-WAN

TELTONIKA JUNIPER NETWORKS FORTINET CISCO Teldat

TABLE OF CONTENTS

WE ARE HIRING!

1. Audit
2. Tax
3. Advisory

APPLY NOW

www.bdo.my/careers/career-opportunities

or email your CV to jobs@bdo.my

BDO

Foreword by the Chair of PIKOM

Dr. Sean Seah

On behalf of PIKOM, I am proud and privileged to present the PIKOM Digital Job Market Outlook 2022; which I understand is the most comprehensive of all the editions that PIKOM has produced in the past years.

As in 2021, this year's edition is a combined version of the Digital Economy and Job Market Outlook in Malaysia. The current publication is also released during an eventful year for PIKOM, which will be hosting the World Congress on Innovation & Technology (WCIT) 2022 on 13 – 15 September in Penang.

For more than a decade, the PIKOM Digital Job Market Outlook (previously known as the ICT Job Market Outlook) has been an essential platform and beacon for industry players, policy makers and digital talents to navigate opportunities and challenges in the talent salary market. As in previous editions, the report again will present very informative salary scales offered to digital professionals in Malaysia. In this edition, we have also broadened our scope to include the salary ranges of 21 other economies around the world; also encompassing the most attractive and appealing markets for digital employment in selected economies.

On this score, let me thank JobStreet by SEEK for continuing to provide PIKOM with the job and salary data, critical towards the preparation and development of this report. In addition, I would also like to express our gratitude towards the other salary data sources including the Department of Statistics Malaysia (DOSM), Payscale, SalaryExpert and other agencies in making this year's report a reality.

We are also most appreciative of the support and contributions by our strategic partners; the Asian-Oceanian Computing Industry Organization (ASOCIO) and the Malaysia Digital Economy Corporation (MDEC). Also a Big Thank you to all our advertisers and their participation in this year's publication.

Lastly, let me also take this opportunity to congratulate the PIKOM Research Committee and its Chair Mr Woon Tai Hai for their efforts to produce such a comprehensive PIKOM Digital Job Market Outlook 2022.

Thank you.

Preface by the Chair of ASOCIO

David Wong

On behalf of ASOCIO, I would like to thank the National Tech Association of Malaysia (PIKOM) for inviting us to collaborate in their 14th edition of the Digital Job Market Outlook; which I understand was inaugurated in 2008.

This publication has also evolved over the years and now includes job profiles and salaries from economies worldwide. One of the main objectives is to help the industry in making more informed decisions on hiring including developing talent attraction and retention strategies within its organisation.

This is the first time ASOCIO has been in a job market research initiative and I hope this will continue in the years ahead wherein ASOCIO can conduct such research and produce this report on a yearly basis for our member economies.

Talent is a critical component in our ecosystem, be it the organisations, institutions or the economy. Brain drain has been worrisome for many nations which tend to lose out to the higher paying economies. With such report and benchmarking contents, the respective local digital industries and policy makers can at least understand the issues and gaps; and hopefully can develop conducive action plans and policies to mitigate these risks (where possible).

I look forward to reading this report which I was informed has almost 1,500 data points from different sources.

Thank you.

Message from the CEO of MDEC

Ts. Mahadhir Aziz

On behalf of MDEC I am delighted that we are again participating in PIKOM DIGITAL Job Market Report 2022. Congratulations to PIKOM on an important milestone as this year's edition is the 14th publication of the report since it was inaugurated in 2008.

Talent is a key determinant of the progress and upward path of any industry. The digital economy industry is no different as the fast pace and constant changes of technology makes it a more dynamic ecosystem.

There is a saying that "changes in technology space is never linear or constant".

The Government of Malaysia and MDEC are fully cognizant of this challenge; and the latest Malaysia DIGITAL (MD) initiative will help spur the digital economy further by addressing these challenges.

Malaysia Digital (MD) is the government's national strategic plan to encourage and attract companies, talents, and investments, while also enabling Malaysian businesses and the Rakyat to play a leading role in the robust, global digital economy.

This year's report covers a broader scope as compared to previous years. Not only does it report on the Malaysia job market outlook across different industry sectors of the market; it also examines specialised jobs in the Cybersecurity, Arificial Intelligence (AI), Data Analytics, Automations, and Machine learning; a set of fast and growing talent requirements in the digital market.

Reskilling and upskilling Malaysia talent will help to future-proof the workforce as we enter a new dawn of technology.

We at MDEC look forward to future collaborations with PIKOM with WCIT2022 in Penang in September 2022 being another one of our current strategic partnerships.

Thank you once again PIKOM for the collaboration to strengthen the industry further, and my heartfelt congratulations on the launch of this report!

Thank you.

TOTAL TALENT SOLUTIONS

Sourcing | Payroll | Employee Engagement | HR Outsourcing | Staffing
Training & Development | People Management | Employment Pass

Creating Excellence For People In Business

Brandt sources and attracts quality talent through our flexible and scalable recruitment solutions, including sourcing and selection to onboarding. Built upon our deep recruiting expertise and our rigorous process, our innovative approach ensures the results you need—greater predictability of cost, a more efficient recruiting process, an improved candidate experience, and improved talent quality.

Transform Your Team
As a specialist in providing recruitment solutions with extensive networks, our recruitment services are able to assist you in attracting, recruiting and retaining the best talents for your organisation.

Industry Specialist
Every consultant in Brandt are trained and honed to work as specialists in their designated field of expertise. This ensures a focus on your business, your sector and your needs.

Strategized Sourcing
Brandt practices some of the most comprehensive and innovative recruitment strategy. Combining that with our wide database of network, it translates into a distinctive strategy that assists us in finding the right candidate for you.

Get it touch with us today. Visit: brandtbiz.com/contact/ or scan the QR.

brandt

Executive Summary From the PIKOM Research Committee Chair

Woon Tai Hai

Background

The National Tech Association of Malaysia (PIKOM) has published the Digital Job Market Outlook over the past 14 years to provide a review of employment and salary trends for different stakeholders including policy makers, industry players, academicians, institutions as well as employers and employees.

Our report on salary trends has always focused on the cash component of remuneration and has excluded other monetary benefits such as bonuses, allowances, commissions and any other financial compensation minus any deductions like taxes.

Given the dynamic nature of the digital industry, it was only natural that the scale and scope of our coverage expanded accordingly. From offering a purely domestic perspective, we have progressively extended our coverage to salary benchmarking against regional and even global economies. And from reviewing salary trends of generic digital jobs, we have introduced dedicated assessments of specialised jobs such as cybersecurity, data analytics, robotic process automation (RPA) and artificial intelligence (AI).

This year's edition covers 1,438 data points, representing a six-fold increase over the previous year. In line with the extensive range of data, we have relied on the greater use of statistical and mathematical models for our calculations. As such, we are more confident in the integrity and accuracy of insights gained from the data.

As always, our primary challenge has been in the sourcing of data. On the local front, we have been fortunate that JobStreet by SEEK has been a generous as well as diligent collaborator in sharing valuable data on the Malaysian job market all this while. This left us with the task of sourcing international data that was consistent, credible and came with similar job profiles as given by JobStreet.

After much research and deliberation, we have settled on two additional sources of raw information. They are Payscale and SalaryExpert, both globally-established platforms with sets of job data that are easily and readily available to the public.

Nevertheless, it is important to bear in mind that our analysis and reporting are derived from different sources and hence, our reporting hinges on the availability and veracity of such salary data.

Approach

Our approach to research, analysis and reporting is a conventional one and incorporates the 10 steps below:

1. Collate, curate and collect data;
2. Review all data points, compare for consistency across different sources and refine them accordingly;
3. Ascertain and agree on the measurement parameters and benchmarking criteria;
4. Develop the respective data worksheets; these represent our first draft;
5. Apply statistical and mathematical models to analyse the numbers;

Sources of data:
JobStreet, Payscale and SalaryExpert

6. Carry out quantitative and qualitative analysis on these numbers and refine them further if necessary;
7. Document the outcomes into a preliminary report: this constitutes the second phase of our draft;
8. Convert this second draft into an easily readable report; insert tables, infographics and other information boxes as required;
9. Review all output via an independent expert for accuracy and quality control; and
10. Review the final report via several readers not involved in the publication to gauge ease of understanding and clarity.

Who Should Use this Report?

- Countries and / or companies to gauge job market and salary trends of the digital industry from a domestic, regional or global perspective;
- Malaysian readers to access historical data over the past 12 years; which include annual average growth rates (AAGR), five levels of digital-related jobs in 22 industries, current scenarios and forecasts for the future;
- Investors to determine the cost of deploying talents for new and existing ventures in a country or market;
- Companies and organisations to gauge if they are competitive in remuneration and to formulate effective budgets and strategies;
- Policy makers to develop plans in mitigating brain drain and retaining talent within the country; and
- Academicians and learning institutions to develop curricula that can meet market requirements.

Coverage and Scope

There are three focus areas (refer below) in this report. While each area represents different perspectives and comparisons, ultimately the report endeavours to provide a comprehensive picture and understanding of the digital job market outlook in Malaysia, the region and the world.

1. **Overall job market outlook by industry sectors in Malaysia**
   - Five position levels (Entry Level, Junior Executive, Senior Executive, Manager and Senior Manager);
   - Average salaries, year-on-year comparisons and AAGR for each position level to provide insights on trends and movement of salaries;
   - Salary benchmarking of four position levels against Entry Level to gauge disparity;
   - Top five-paying industries and year-on-year comparisons;
   - Use of the Pearson Product Moment Correlation model to ascertain the correlation of the 22 industry sectors with the software industry: this is important for the relevance and credibility of the data); and
   - How do the digital salaries compare against other economies?

2. **Specific focus on salary trends in cybersecurity and AI / data science jobs in Malaysia**
   - Nine and eight job positions in cybersecurity and AI / data science segments were selected respectively;
   - Three salary levels - entry, top 10% and overall average;
   - Benchmarking of salaries to measure disparities between job profiles; and
   - Benchmarking of the theses specialised jobs against traditional digital jobs.

3. **Global job market outlook by specific job profiles and economies**
   - 61 digital jobs in 21 economies were selected;
   - Three job categories of technical, manager and C-level;
   - Salaries calculated in Atlas currency, USD equivalent and PPP values;
   - Benchmarking of average salaries in different job categories against national averages of digital salaries; and
   - Benchmarking of top 10% salaries in different job categories against national averages of digital salaries.

Essence of the Report

From the review of the national economy, PIKOM expects gross domestic product (GDP) to grow by 5.5% in 2022 before moderating to 4.5% the following year. In the case of the digital economy, it is expected to grow faster than the national economy from a 22.6% share of GDP in 2020 (the 2021 figure will only be released by the Department of Statistics Malaysia – DOSM in October) to PIKOM's estimates of 23.7% in 2021, 24.4% in 2022 and 25.4% in 2023.

Sources of data:
JobStreet, Payscale and SalaryExpert

Moving on to the digital job market, the number of digital professionals in Malaysia will continue to grow at low single digit percentages from 1.16 million in 2020. Meanwhile, salaries of digital professionals have been projected by PIKOM to rise from an average of RM10,064 in 2021 by 2.55% this year and a much higher 4.45% in 2023 with the digital economy expected to sustain national economic growth.

In 2021, the salary gaps between all higher positions and entry level in the digital job market declined, most likely as a result of cost control by employers during the pandemic while the top-paying industries for digital talents are now software, consulting and oil & gas.

Digital professionals in cybersecurity continue to enjoy relatively high remuneration, with annual salaries ranging from RM110,000 to RM230,000. On the other hand, jobs in AI and data science are still offering salaries in the moderate range since the talent market for these fields is still maturing.

At the global level, middle eastern economies such as Qatar, Kuwait and Saudi Arabia are the highest-paying for digital talents out of the 21 selected economies after taking into account purchasing power parity (PPP) considerations. If based on US currency equivalent, then the top paying economies are the US, followed by Australia and Hong Kong.

Publication Team Profiles

Woon Tai Hai

A newly-retired management consultant, Woon has been a long-time advisor on the PIKOM Council and is the chairperson of both the PIKOM Research Committee and PIKOM Oversight Committee. He also sits on the Board of Takaful Ikhlas Family Berhad and Takaful Ikhlas General Berhad as an independent non-executive director. In addition, Woon is an ex-officio of the Malaysia Australia Business Council (MABC) and member of the Grant Recommendation Committee of the Malaysia Digital Economy Corporation (MDEC). Before retirement, he had held the posts of executive director at two global accounting, tax and advisory firms, KPMG and BDO. Woon holds a BSc from the University of NSW (UNSW), a post-graduate Diploma (Accounting and Finance) as well as an MBA from University Technology Sydney (UTS).

R. Ramachandran

Ramachandran is a freelance consultant with four decades of working experience in various capacities in the public and private sectors. He specialises in the area of statistical collation, socioeconomic and demographic research, information communication technology for development (ICT4D) modelling and process and quality improvement (Six Sigma Black Belt), among many others. He holds a Bachelor of Science (London) degree majoring in Physics – Mathematics in 1979 followed by a Master of Philosophy from Multimedia University in 2008. To his credit, he has published numerous research papers in peer-reviewed international journals and conference papers.

Ong Kian Yew

Kian Yew is the CEO of PIKOM, the National Tech Association of Malaysia, an industry association representing 1,000 member companies that command 80% of the total ICT trade in Malaysia. As CEO, he is responsible for the operations of the association and its wholly-owned events arm, PIKOM Services Sdn Bhd. Kian Yew actively represents PIKOM at international fora including the World IT and Services Alliance (WITSA) and the Asian Oceanian Computing Industry Organisation (ASOCIO). Kian Yew is also responsible for government engagement in PIKOM. He sits on various committees representing the digital industry and plays a key role in digital industry advocacy to the government. A graduate of the University of Strathclyde in Scotland, Kian Yew has 25 years experience in the digital industry.

Nor Azlina Ishak

Azlina is the General Manager of PIKOM. Her work includes elevating PIKOM's portfolio as the leading tech industry association representing over 1,000 members. She heads the Strategic Communications and Media Relations department responsible for content development, copyrighting, proof reading, research articles, speeches, press releases and corporate presentations. She also looks into industry affairs for the tech industry and works closely with policy makers and government agencies in advocating industry issues, such as tax-related matters, budget and digitalisation. She has 26 years of work experience in strategic communications, government affairs, project management, corporate events and media relations across various industries.

Raymond Devadass

Founder & CEO of Daythree Business Services. Raymond specialises in providing strategic management direction, particularly in the field of digital transformation strategy and management. He holds a Master of Business Administration majoring in Strategy & Planning, and is a Chartered Accountant, registered with CPA Australia and Malaysian Institute of Accountants. Raymond is the author of several articles and research papers. He was twice selected by peers in the industry as 'Best Thought Leader' in 2017 and once again in 2019 – an award reserved for recognizing leadership aimed at external positioning of the individual's competencies in delivering value.

Michael Lai

Michael is the sole proprietor of Mjlaikc Infoworks, a provider of content and consultancy in business, industry, technology, corporate sustainability and related areas. He has over 25 years of experience in a wide range of disciplines including journalism, publication, advertising, public relations and event management. Mjlaikc Infoworks has produced PIKOM's job market reports and digital economy reviews for the past 10 years.

Hawarudin Rasani

Rudin is a publication designer with almost 20 years of experience. He is an associate of Mjlaikc Infoworks apart from having his own portfolio of clients. He was instrumental in revamping both PIKOM's job market outlook and digital economy review into the aesthetic and professional publications they are today.

exabytes

eEnterprise

Cloud-First Digital Transformation Services

Everything-as-a-Service

Pay as you grow business model

Cloud-centric solutions and managed services

Lowest cost of IT expenditure

SLA-driven modular services offerings

Flexible and reliable solutions & services

We are a one-stop cloud solutions & managed service provider supporting your digital transformation journey

- eCloud
- eSecure
- eiPaas
- eData
- eBackup
- eDRaas
- eCloudApp
- eCommerce

www.exabytes.my/enterprise

Get in touch with our consultants for a **1-to-1 session** to kickstart your cloud-first digital transformation journey! Scan Now! →

Acronis · aegis · aws · freshworks · Google Workspace · HUAWEI CLOUD · Microsoft 365 · vmware CLOUD VERIFIED

CHAPTER 1

Economic Review and Outlook in Malaysia

FUSIONEX®
experience.excellence

Elevate Your Customer Experience

Leverage breakthrough AI-powered technologies to stay connected and engaged with your customers. Create enduring loyalty by listening to their needs and responding with unparalleled experiences that defy expectations and surpass limits.

FEATURED ON

Forbes FORRESTER Bloomberg EDISON HUFFPOST Gartner IDC FROST & SULLIVAN BFM TV

Microsoft Partner Network | WINNER Business Intelligence GLOBAL PARTNER OF THE YEAR
Google Cloud Strategic Partner
aws | Winner Technology Partner Innovation Partner
Alibaba Cloud | Top Technology Partner Award
WTEC 世界旅游经济大会 Most Innovative Award
BIGDATA Data Analytics & Innovation Award
ASOCIO | WINNER OUTSTANDING ICT COMPANY

CHANNEL ASIA INNOVATION AWARDS 2021 | Tech Innovation
APICTA | WINNER Best of Applications Tools / Platform
ASIA Recruitment Awards Most Innovative & Sustainable Office
SME | Outstanding Achievers Award
PIKOM ICT LEADERSHIP AWARDS EXCELLENCE AWARD
MRCA CROWN AWARDS | Outstanding Excellence Award
MSC MALAYSIA
CMMI
ISO 9001 QUALITY ASSURANCE
ISO 27001 INFORMATION SECURITY

www.fusionexgroup.com • info@fusionexgroup.com

Table 1: GDP Growth (Year-on-Year) by Expenditure Components (%) Q1 2021 – Q2 2022

	Share 2021	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Year	Q1 2022	Q2 2022
Aggregate Domestic Demand*	92.7	-1.0	12.3	-4.2	1.9	1.7	4.4	NA***
Private Sector	74.4	-0.9	13.0	-4.4	2.5	2.0	4.4	NA***
Consumption	58.8	-1.5	11.7	-4.2	3.7	1.9	5.5	18.3
Investment	15.6	1.3	17.3	-4.9	-2.8	2.6	0.4	6.3
Public Sector	18.3	-1.7	9.0	-3.5	0.1	0.6	4.8	NA***
Consumption	13.8	5.6	8.2	7.1	1.6	5.3	6.7	2.6
Investment	4.5	-18.5	12.0	-28.9	-3.4	-11.3	-0.9	3.2
Net Exports	6.0	6.6	57.6	-39.9	0.8	-4.1	-26.5	-28.7
Exports	69.1	11.7	37.1	4.2	13.0	15.4	8.0	10.4
Imports	63.1	12.2	35.5	11.4	14.5	17.7	11.1	14.0
Real GDP	**100.0**	**-0.5**	**15.9**	**-4.5**	**3.6**	**3.1**	**5.0**	**8.9**
GDP , q-to-q growth**	**-**	**2.4**	**-0.8**	**-2.7**	**4.6**	**-**	**3.9**	**3.5**

* Excluding stocks ** Seasonally adjusted ***Not available

Sources: **DOSM, BNM**

Malaysia is on the path towards recovery following the progressive reopening of the economy during the second half of 2021 in tandem with rising inoculation rates and diminishing threat of Covid-19.

The national economy rebounded in 2021 from the pandemic-induced contraction the year before and is projected to maintain this uptrend in the next two years on the back of robust exports, rising domestic demand supported by increased public expenditure and return of private consumption, as well as a significant jump in foreign direct investment (FDI).

Export revenue is being boosted by the surge in commodity prices with crude oil breaching the US$100 per barrel mark for much of the current year and crude palm oil continuing to post record highs throughout 2021 and 2022. In addition, employment has been trending upwards with higher disposable income among Malaysians shoring up private consumption.

The outlook, however, remains uncertain given Russia's invasion of Ukraine early this year, worsening geopolitical tensions between the United States and China, and an increasing fallout from climate change.

This combination of combustible events is continuing to disrupt the global supply chain and threaten food security, heightening risks particularly for emerging economies reliant on exports and vulnerable to currency fluctuations.

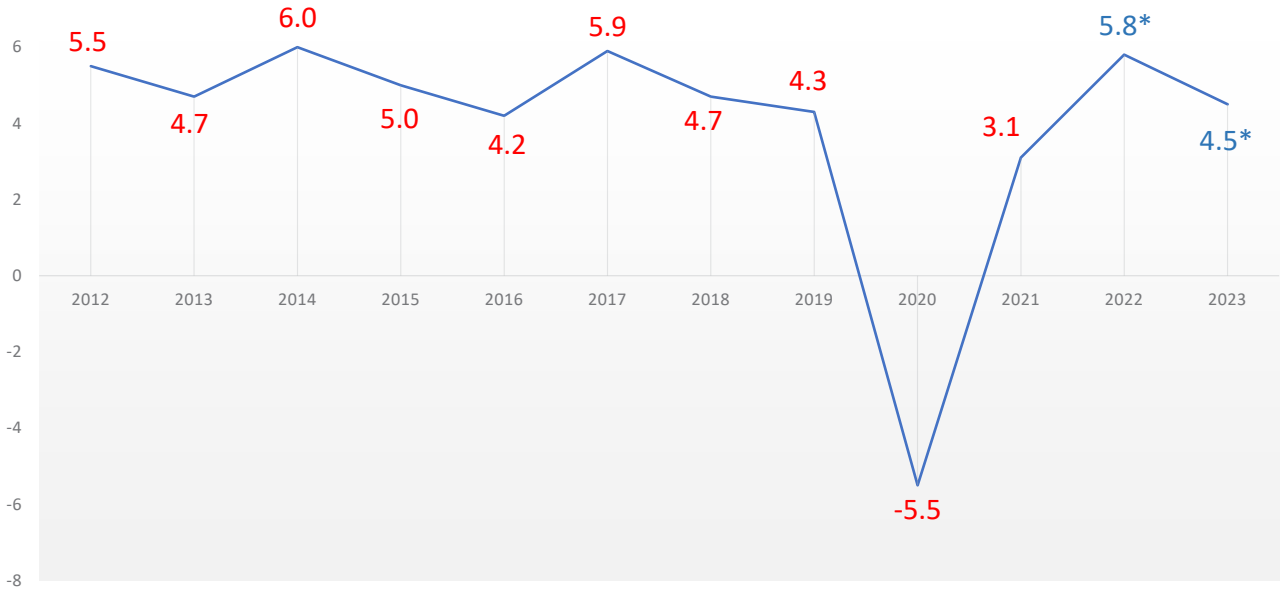
An immediate concern for Malaysia is inflation, which could be adversely impacted by higher prices for imports due to supply issues and the weakening Ringgit against the US Dollar. Another pressing matter is the shortage of foreign labour for critical industries in manufacturing and palm oil, as this could affect production output in 2022 and beyond.

Nevertheless, the nation is well placed to sustain its growth momentum in the short to intermediate terms as Malaysia pivots towards a digital economy with the potential to transform industries and talent while at the same time address many of the issues afflicting the economy today.

Bank Negara Malaysia (BNM) Governor Tan Sri Nor Shamsiah Mohd Yunus has shared a similar prognosis, having been quoted as saying: "The domestic economy is expected to improve further this year … This is underpinned by stronger domestic demand, continued expansion in external demand, and further improvement in the labour market."

TABLE 1 offers a snapshot of the expenditure contributions to gross domestic product (GDP) for 2021 and the first and second quarters of 2022. The performance of components featured in this table is individually reviewed in this Chapter.

Chart 1: Malaysia's GDP Growth Rate (%) 2012 - 2023



* **Forecast** – The 2022 forecast represents the average between BNM's projection of 5.3 – 6.3%

SOURCES: DOSM, BNM, WB

THE ECONOMY IN 2021

The Malaysian economy grew by 3.1% in 2021, returning to positive after contracting by -5.5% the previous year (See **CHART 1**) when pandemic restrictions severely curtailed economic and social activities.

Although the Movement Control Order (MCO) was reintroduced twice in 2021, a higher proportion of industries including export-oriented businesses was allowed to operate. In addition, Malaysians increasingly leveraged on digital tools and platforms to continue working and contributing to the economy throughout these periods.

This perspective is echoed by BNM in its review of economic developments during the fourth quarter of 2021: "The rebound in economic activity was aided by recovery in the labour market as well as continued policy support. In addition, strong external demand amid the continued upcycle in global technology provided a further lift to growth."

Economic performance throughout the year contrasted sharply quarter to quarter, reflecting the periods when pandemic restrictions were in force and at their most stringent. As shown by **CHART 2**, the curbs on activities and movement in Q1 2021 and Q3 2021 resulted in negative year-on-year GDP growth of -0.5% and -4.5% respectively.

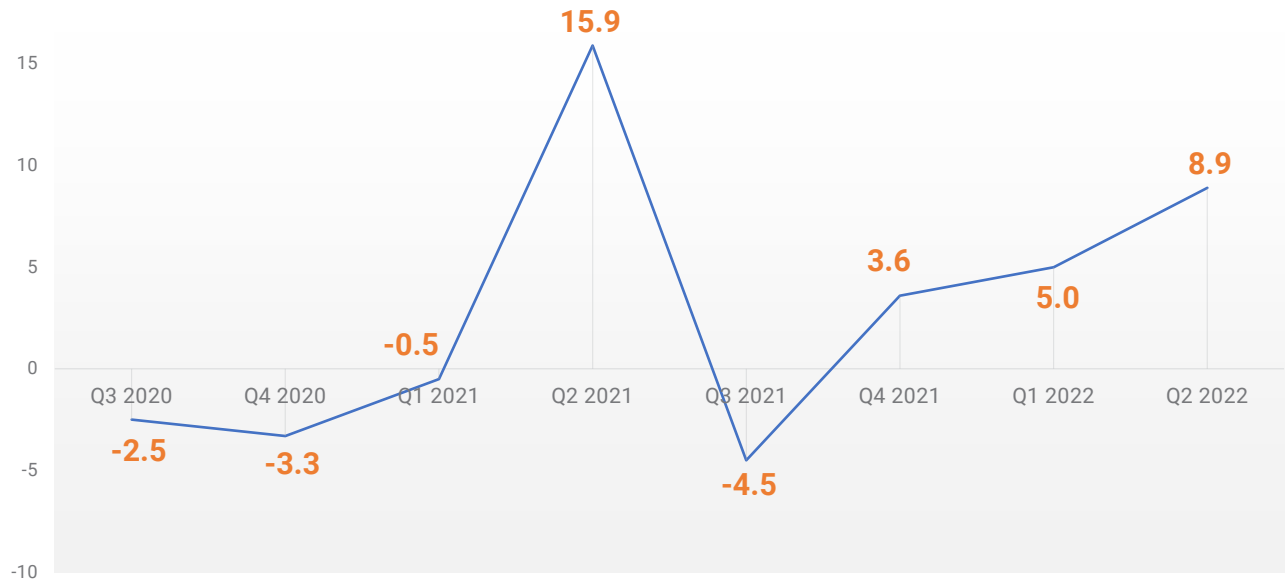
On the other hand, the economy expanded by a tremendous 15.9% in Q2 2021 and a more sedate 3.6% in Q4 2021 when shackles were less prohibitive during these two quarters. This upward trajectory has continued into Q1 2022 with growth at 5.0% and a buoyant 8.9% in Q2 2022 according to DOSM. However, most economic analysts expect that GDP growth in the second half of 2022 could moderate to between 4.0% and 5.0% given the volatile conditions.

CHART 1 also projects the GDP growth rates for 2022 and 2023. BNM has forecast growth of between 5.3% and 6.3% this year while the World Bank (WB) expects the Malaysian economy to expand by 4.5% the following year.

Such forecasts are likely to be subject to adjustments over the next few months owing to the prevailing volatility of the global economy, which continues to be buffeted by fluid geopolitical events in almost every continent.

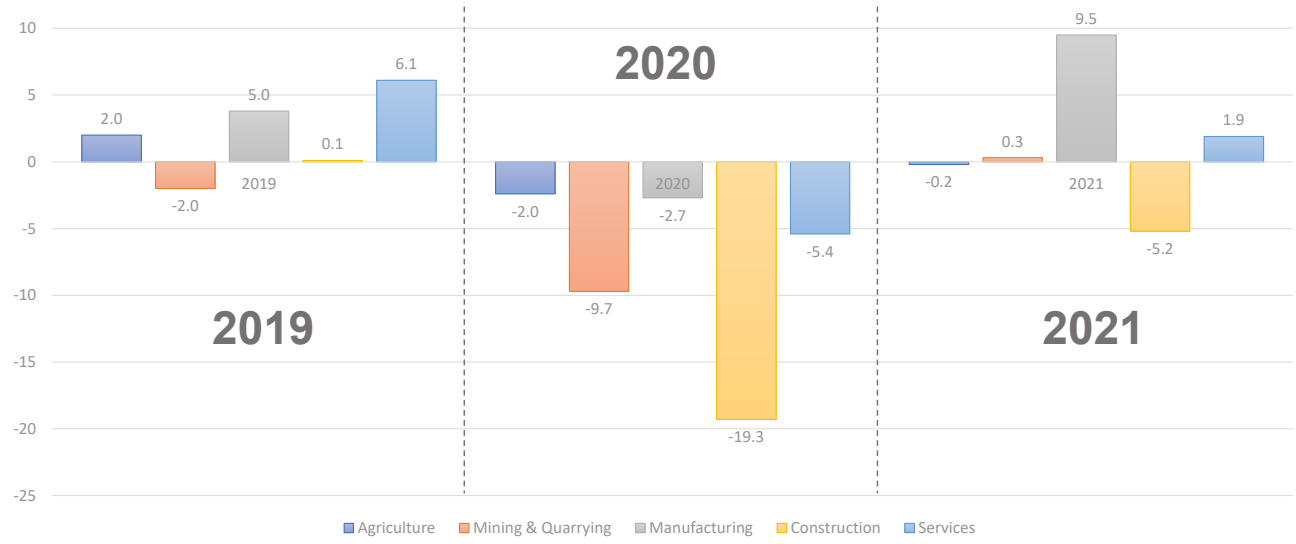
Indeed, the latest World Economic Outlook (July 2022) released by the International Monetary Fund (IMF) outlined that: "A tentative recovery in 2021 has been followed by increasingly gloomy developments in 2022 as risks began to materialize. Several shocks have hit a world economy already weakened by the pandemic: higher-than-expected inflation worldwide… triggering tighter financial conditions; a worse-than-anticipated slowdown in China, reflecting Covid-19 outbreaks and lockdowns; and further negative spillovers from the war in Ukraine."

Chart 2: Malaysia's Quarterly Growth Rate (%) Q3 2020 – Q2 2022



Sources: **DOSM, BNM**

Chart 3: Growth Rates of Economic Sectors (%) 2019 – 2021



Sources: **DOSM**

Sectorial Performance

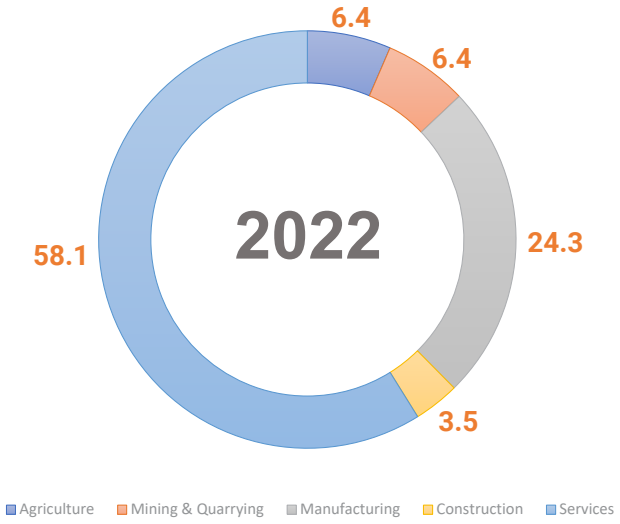
Recovery in 2021 was driven by the key economic sectors of Services and Manufacturing, which recorded gains of 1.9% and 9.5% respectively as compared against the corresponding figures in the previous year of -5.4% and -2.7% (See **CHART 3**).

The Services sector includes the retail and tourism industries, both of which made resounding comebacks following the lifting of restrictions governing retail outlets as well as travel (domestic followed by international) and hospitality. In the case of Manufacturing, the sector contributes the bulk of Malaysian exports to regional and global markets.

Together, the Services and Manufacturing sectors constitute more than 80% of the national economy, as shown in **CHART 4**. These economic sectors maintained this positive trend into 2022, recording robust growth rates of 6.5% (Q1) and 12.0% (Q2), and 6.6% (Q1) and 9.2% (Q2) respectively.

In contrast, the Construction sector continued to lag after nosediving by -19.3% in 2020 (**CHART 3**). This sector posted negative growth of -5.2% in 2021 and -6.2% in the first quarter of this year, a consequence of delays or postponements of mega infrastructure projects under a public sector affected by fiscal constraints. However, the sector staged a mini-recovery by growing 2.4% in Q2 2022.

Chart 4: Share of Economic Sectors (%) Q2 2022

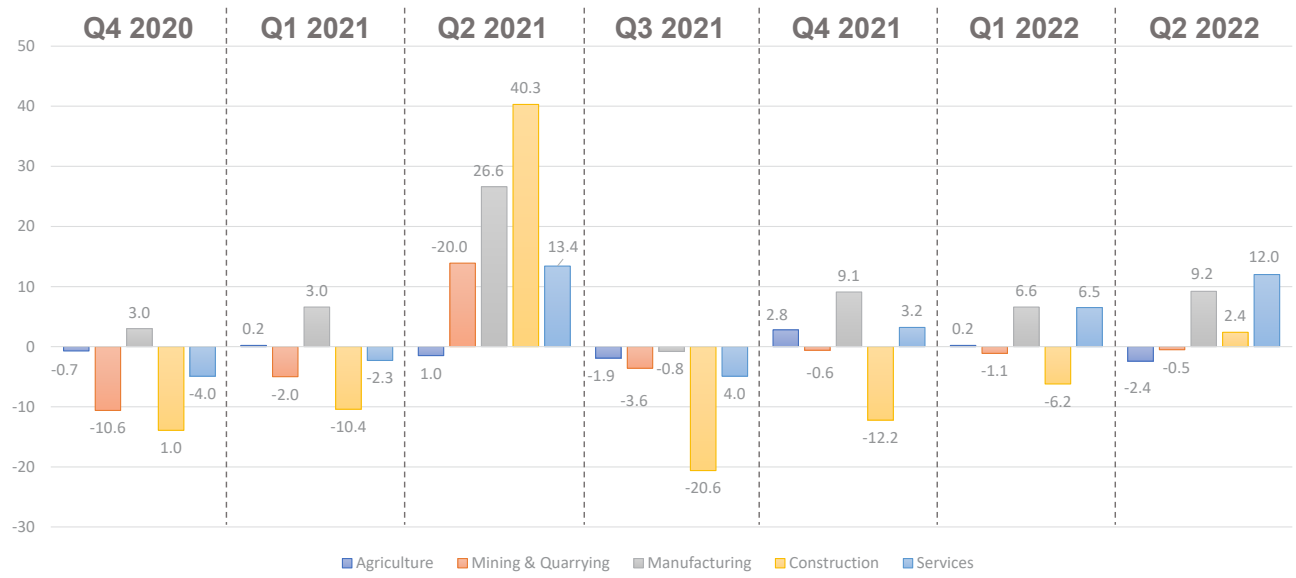


Sources: **DOSM**

Infographic 1: Economic Performance of MSMEs 2021

Sources: **SMECorp, DOSM**

Chart 5: Quarterly Growth Rates of Economic Sectors (%) Q4 2020 – Q2 2022



Sources: **DOSM**

The other two sectors of Agriculture and Mining & Quarrying have remained flat throughout 2021 and early part of 2022, although it should be noted that they have rebounded from negative growth in 2020 of -2.0% and -9.7% respectively.

As shown by **CHART 5**, the quarterly performance of the economic sectors in 2021 mirrored the quarterly returns of the national economy. After a tepid first quarter, all economic sectors except for Agriculture made significant gains in Q2 2021 with the Construction sector the most impressive with a growth rate of 40.3%.

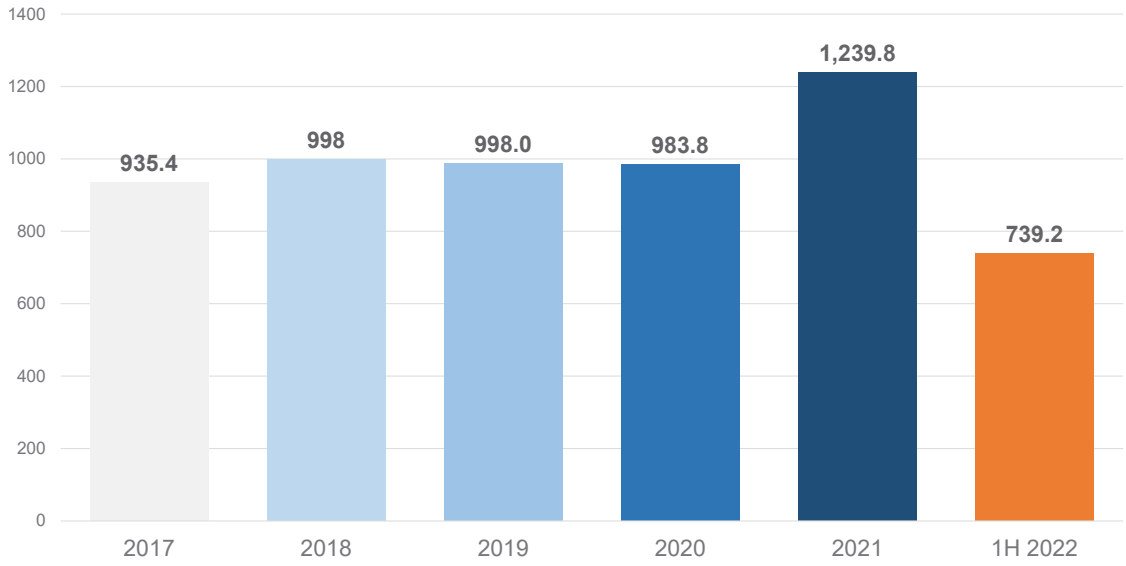
The return of pandemic-related curbs in Q3 2021 resulted in a negative performance by all economic sectors before Services and Manufacturing staged recoveries from Q4 2021 into Q2 2022.

Socioeconomic Performance

An important metric to take into consideration is the performance of micro, small and medium enterprises (MSME) since they constitute 97.4% of all business establishments in Malaysia and account for 47.8% of employment (See **INFOGRAPHIC 1**). MSMEs play an essential role in the socioeconomic wellbeing of a large proportion of Malaysians.

In addition, the development of MSMEs in the country is critical to Malaysia's aspiration to becoming a fully-

Chart 6: Annual Exports (RM billion) 2017 – 1H 2022



Sources: **DOSM, MITI, MATRADE**

developed high-income nation. It is worth noting that most developed economies have a robust MSME base that contributes more than half their respective GDPs.

For this reason, the Malaysian Government is prioritising the development of MSMEs and has introduced various initiatives such as the National Entrepreneurship Policy 2030 to achieve GDP and export contributions by MSMEs of 50% and 30% respectively by 2030.

According to the Department of Statistics Malaysia (DOSM), an estimated three quarters of the 1.15 million registered businesses are micro enterprises belonging primarily to the B50* (bottom 50% of household income) and M30* (middle 30%) groups.

**The pandemic of the last two years has pushed 10% of the previously M40 group into the previously B40 category.*

In 2021, estimates by DOSM and SME Corporation Malaysia (SMECorp) show that the share of national GDP by MSMEs has increased to 37.4% against 36.6% in 2018 while the quantum of exports has fallen to 11.7% from 18.6% within the same timeframe.

In all likelihood, the dwindling share of exports among MSMEs is a direct result of the temporary and permanent closure of businesses throughout 2020 and 2021. According to the Ministry of Entrepreneur Development and Cooperatives, almost half of MSMEs were at risk of shuttering in the second half of 2021.

Exports

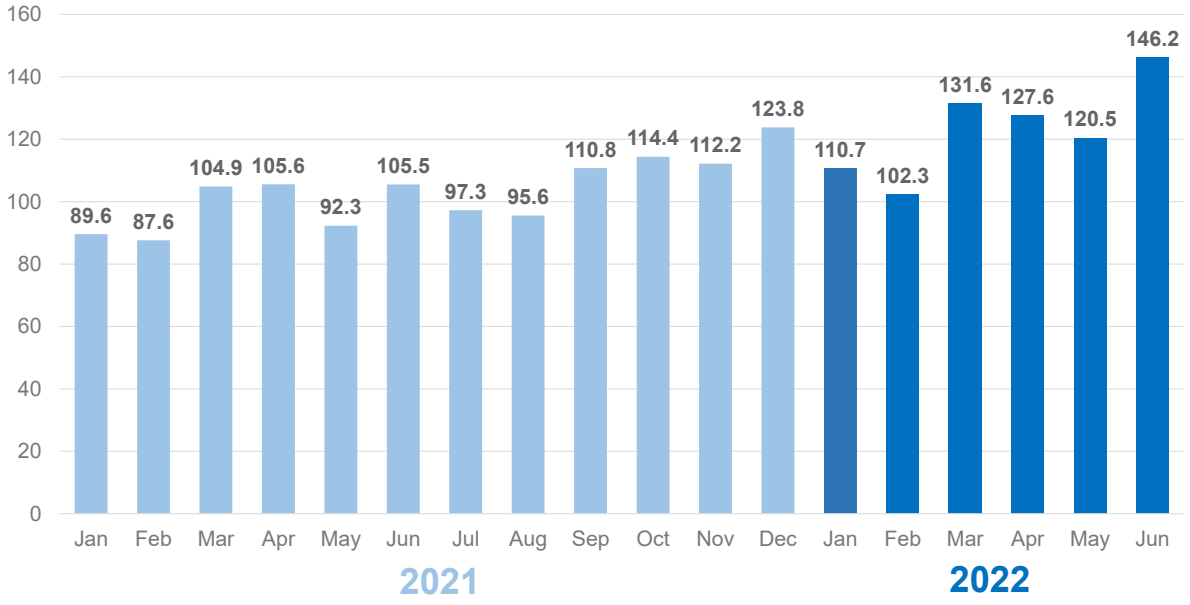
Malaysia's exports have been the saving grace for the national economy at a time when other business and social activities have been disrupted. Export revenue grew by 26.0% and breached the trillion-ringgit mark for the first time to reach a record RM1.2 trillion in 2021 (See **CHART 6**) on the back of pent-up external demand and higher commodity prices.

The Government had prudently allowed the bulk of export-oriented industries to operate throughout two iterations of the full MCO in 2021 upon realising the impact that pandemic restrictions were having on economic and socioeconomic health.

Robust demand for exports flowed into the first half of 2022, which recorded revenue of RM739.2 billion in just six months. If extrapolated, Malaysia is set to post another bumper year in exports of almost RM1.5 trillion.

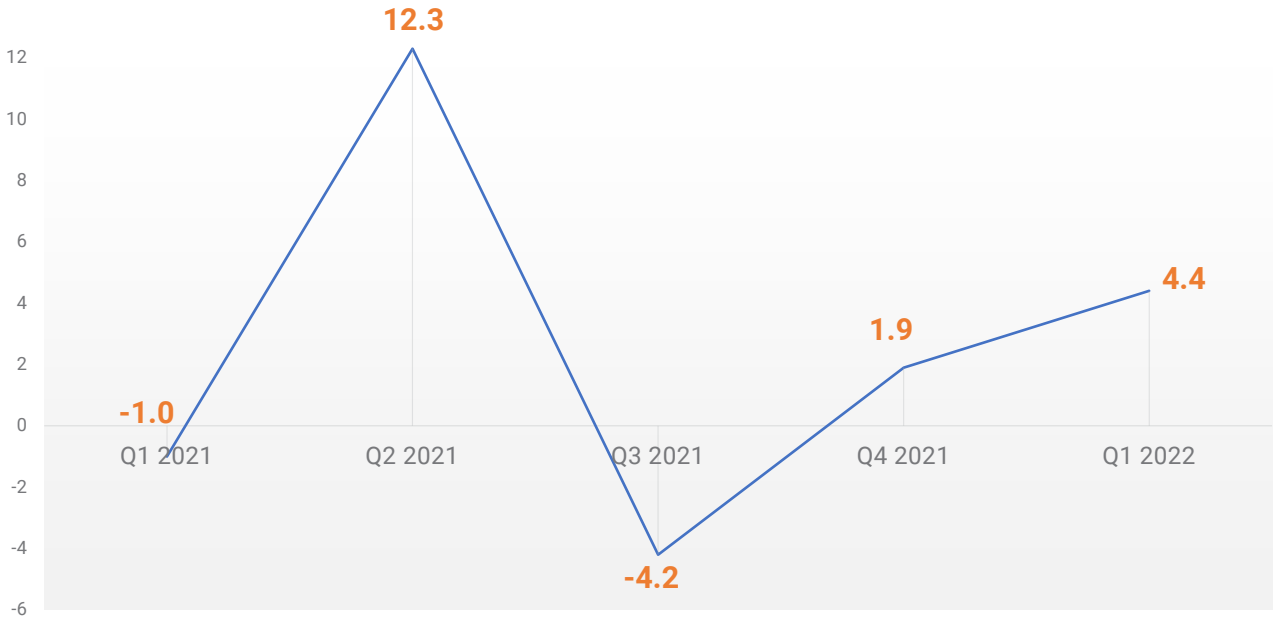
Analysis of monthly exports between January 2021 and June 2022 shows the same positive trend. Monthly exports have now exceeded the RM100-billion milestone for 10 consecutive months beginning September 2021 (See **CHART 7**). As it was, this surge in exports coincided with the gradual relaxation of various business and social curbs in line with the increase of Covid-19 vaccination in Malaysia as well as our exports destinations.

Chart 7: Monthly Exports (RM billion) January 2021 – June 2022



Sources: **DOSM, MITI, MATRADE**

Chart 8: Growth Rate of Aggregate Domestic Demand (%) Q1 2021 – Q1 2022



Sources: **DOSM**

Meanwhile, imports into Malaysia also expanded by a considerable 23.3% to RM981.7 billion in 2021, bringing total trade to RM2.2 trillion and representing an increase of 24.8% over the year before. The trade surplus also widened to 37.7% to RM252.6 billion in the same period.

Domestic Demand

It was a similar story with domestic demand in which the separate periods of shutdowns and lockdowns coincided with negative growth rates in Q1 2021 and Q3 2021 (-0.1% and -4.2% respectively).

Likewise, domestic demand rebounded with a vengeance in Q2 2021 (growth of 12.3%) with the relaxation of restrictions and again in Q4 2021, albeit at a more docile rate of 1.9% before ramping up in the first half of 2022.

For many of the same reasons outlined earlier, private consumption was affected by the two sets of MCOs in

Chart 9: Growth Rate of Consumption (%) Q1 2021 – Q2 2022

Sources: **DOSM**

2021, growing only marginally by 1.9% for the year. To compensate for this weak performance, the Government hiked its consumption expenditure by a considerable 5.3% in 2021.

However, it should be noted that public consumption nominally accounts for only a small proportion of total consumption. In 2021, private consumption constituted 58.8% of GDP while public consumption was at 13.8%.

CHART 9 tracks the quarterly growth rates of the respective consumption expenditures. The performance of private consumption was highly uneven with contractions in Q1 and Q3 2021. In sharp contrast, the quarterly growth rates of public consumption remained in the positive realm throughout the year. Moving into 2022, both private and public consumption expenditures recorded healthy growth rates of 5.5% (Q1) and a whopping 18.3% (Q2), and 6.7% (Q1) and 2.6% (Q2) respectively.

In the case of investment, the private sector far outstripped its public counterpart with growth rates of 2.6% and -11.3% respectively for 2021. As a proportion of GDP, private investment was more than three times higher that public investment at 15.6% against 4.5%.

CHART 10 shows the quarterly growth rates of private and public investment and it is clear the performance of both have tapered off since Q2 2021 when their respective growth rates were 17.3% for private and 12.0% for public.

Nevertheless, BNM is optimistic that expenditure from both sectors will improve in 2022. The central bank, in a February 2022 release, stated that: "For 2022, the domestic economy is expected to remain on its recovery path, supported by the continued expansion in global demand and higher private sector expenditure given improving labour market conditions and on-going policy support. The continuation of major investment projects in both private and public sectors will also support growth."

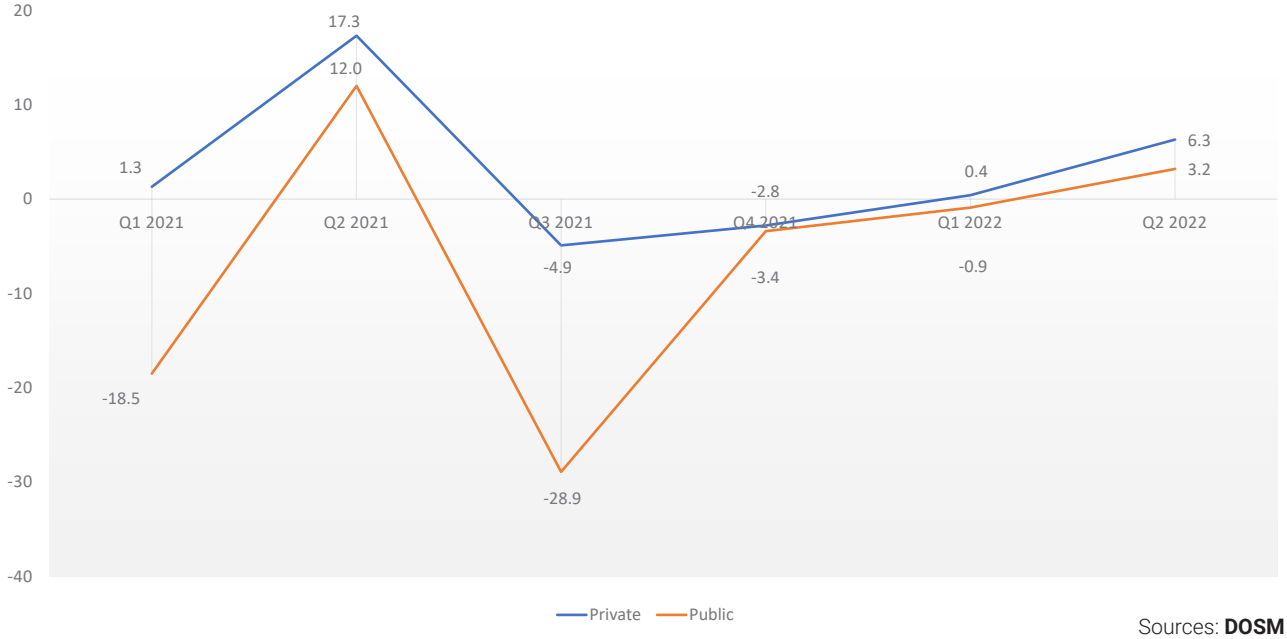
Foreign Direct Investment (FDI)

FDI remains a key catalyst for economic development in Malaysia given the nation's focus on driving growth in high-value industries by galvanising innovation and developing talents in emerging technologies.

Following an alarming dip in 2020, net FDI inflow into the country ballooned to RM48.1 billion in 2021, the highest since 2016 and representing an upsurge greater than 2.5 times the amount in 2020 (See **CHART 11**).

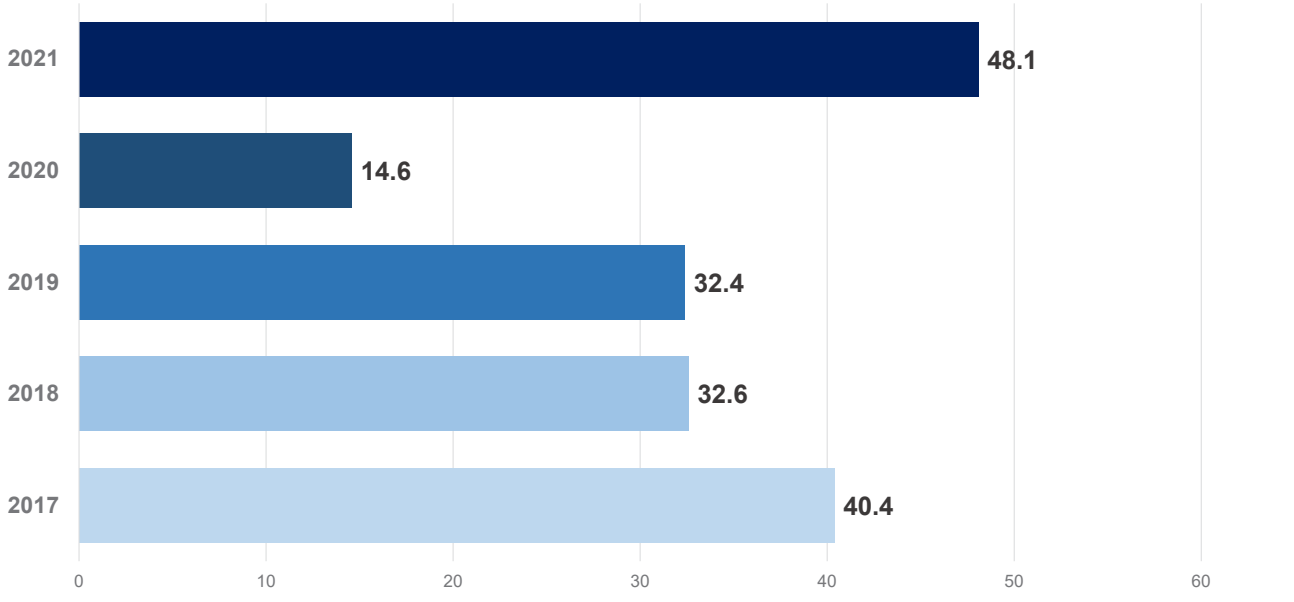
According to DOSM, the increase was driven by higher flows in equity and investment fund shares. The Manufacturing sector was the main recipient of FDI inflow, followed by the Services and Mining & Quarrying sectors. FDI in manufacturing were mainly for the electrical, transport equipment and other subsectors

Chart 10: Growth Rate of Investment (%) Q1 2021 – Q2 2022



Sources: **DOSM**

Chart 11: FDI Net Inflow (RM billion) 2017 - 2021



Sources: **DOSM**

while investment in the Services sector were in financial and insurance activities.

Malaysia was among the best performing economies in terms of FDI growth (See **INFOGRAPHIC 2**). Based on figures by the United Nations Conference on Trade and Development (Unctad), global FDI grew by 77% while FDI into ASEAN expanded by 35%.

Unctad's Investment Trends Monitor, in a 19 January 2022 update, stated that: "Global foreign direct investment (FDI) flows showed a strong rebound in 2021, up 77% to an estimated US$1.65 trillion, from US$929 billion in 2020, surpassing their pre-COVID-19 level."

Bursa Malaysia

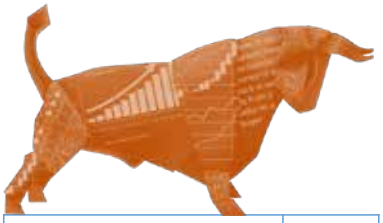
The local bourse has been on a downtrend since the start of the pandemic in Q1 2020. In 2021, the FTSE Bursa Malaysia Kuala Lumpur Composite Index (FBMKLCI) declined by 3.7% as a result of what the Securities Commission (SC) termed as "continued headwinds both globally and domestically".

Infographic 2: FDI Growth (%) 2021

World	77%
Developing Economies	30%
ASEAN	35%
MALAYSIA	262%

Sources: **UNCTAD**

Infographic 3: Performance of Asia Pacific Stock Market Indices 2022*



Indonesia: Jakarta Composite	5.7%
Singapore: Straits Times Index	4.5%

India: Nifty 50	-1.3%
Japan: Nikkei 225	-3.7%
MALAYSIA: Bursa KLCI	-4.4%
Thailand: SET Composite	-4.6%
Australia: S&P/ASX 200	-5.9%
Philippines: PSE Composite	-8.9%
US: Dow Jones	-10.3%
Hong Kong: Hang Seng	-13.5%
Vietnam: VN-Index	-16.2%
China: Shenzhen Component	-16.4%
South Korea: Kospi	-18.0%
Taiwan: Taiex	-19.3%

***As of 1 August, 2022**

Sources: **Tradingeconomics.com**

This gradual slide carried on into 2022, with the FBMKLCI falling another 4.4% as of 1 August 2022. Nevertheless, Bursa Malaysia can be considered to have weathered the prevailing uncertainties better than other stock markets.

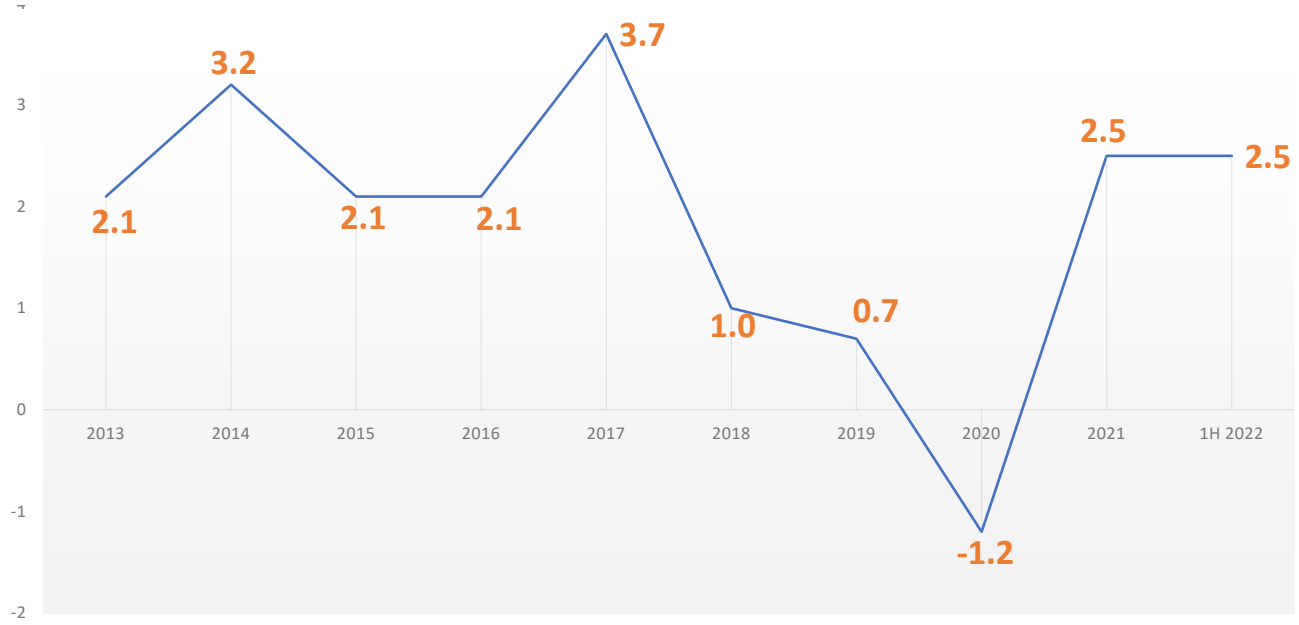
Among major indices in Asia Pacific, only two bourses have made gains, as shown in **INFOGRAPHIC 3**. Indonesia's Jakarta Composite is the leading stock market in terms of gains so far this year, followed by Singapore's Straits Times Index.

At the time of reporting, all other major indices in the region are in the negative zone with some bourses down by double digit percentiles and they include the Dow Jones in the US, Hong Kong's Hang Seng, Vietnam's VN-Index and Taiwan's Taiex.

National Debt

As to be expected, Malaysia's national debt has deepened during the past two years with the Government having to

Chart 12: Inflation Rate (%) 2013 – 1H 2022



Sources: **DOSM, BNM**

dig into its coffers to prop up the economy and society via various stimulus and aid packages.

During this difficult period, the Government has increased the statutory debt-to-GDP ceiling on two occasions, the first to 60% and then to 65%. According to MARC Ratings Bhd, statutory debt comprising government securities, government investment issues and Islamic treasury bills have risen to 63.0% of GDP at the time of reporting from 59.7% at the end of 2021.

In a recent statement, MARC had stated: ""In tandem with the rising fiscal deficit, total direct federal government debt rose to 63.4% of GDP in 2021 from 62.1% previously. Debt service charges have also surged past the administrative ceiling of 15% of revenue, which stood at 17.8% at end-2021."

MARC and several other ratings agencies have speculated that the ceiling could be further increased to 70% this year. Agencies and economists have cautioned against prolonging a high fiscal deficit as this may lead to higher interest rates that could then subject the economy under inflationary pressure.

Inflation

After sustaining deflation in 2020, the nation's inflation rate rose to 2.5% in 2021 (See **CHART 12**) and is expected to hover in the 2.0-3.0% range this year. Prices are being subjected to inflationary pressure from food and fuel, according to DOSM.

It is worth noting that the food sub-index of the Consumer Price Index (CPI) increased by 6.1% in June 2022, followed by the transport sub-index at 5.4%, restaurants & hotels at 5.0% and communications at 3.4%.

The increase in the transport group is largely attributed to the rise in average price of unleaded petrol RON97 by 80% to RM4.77 per litre in June 2022 compared with RM2.65 in the corresponding month of 2021.

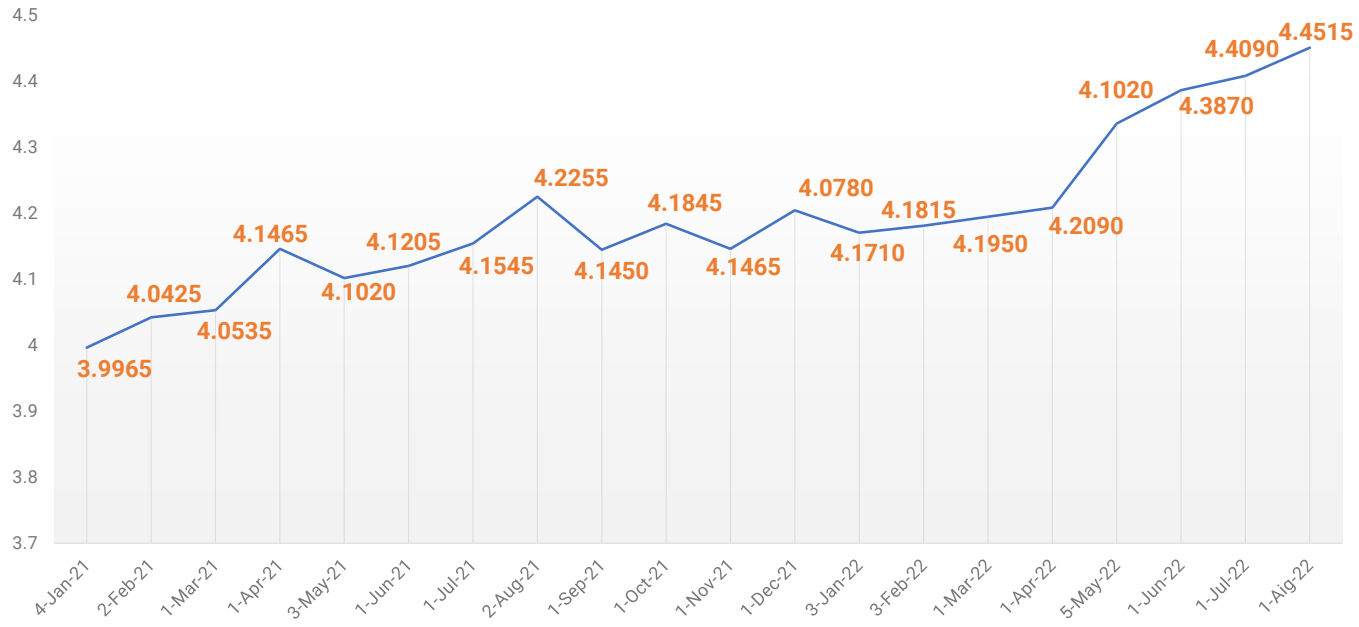
Nevertheless, Malaysia's inflation remains among the lowest in the Asia-Pacific region. In comparison, the June inflation rates are 4.4% in Indonesia, 6.1% in the Philippines, 7.7% in Thailand, 8.6% in the Eurozone and 9.1% in the US.

Currency Exchange

The Ringgit has fallen considerably against the US Dollar since the start of the year, declining 6.8% in seven months from US$1=RM4.170 on 3 January to 4.4515 on 1 August. Before this in 2021, the Ringgit had dipped 4.4% from US$1=3.9965 on 4 January 2021.

However, it should be noted that the greenback has been strengthening against most other major currencies particularly in the past few months due to the interest

Chart 13: Forex (USD-MYR) 1 January 2021 – 1 August 2022



Sources: **BNM**

rate hike by the US Federal Reserve to counter against inflation as well as shift in investment assets stateside in a response to the Russia-Ukraine conflict.

In contrast to its comparison with the US Dollar, the Ringgit has been gaining ground against other major currencies. From January to May 2022, the Ringgit appreciated 8.4% against the Japanese yen, 5.4% against the Euro, 3.0% against the Australian Dollar and 1.7% against the British Pound.

According to MIDF Research, the Ringgit can be expected to strengthen against the Dollar in the remaining months of the year to a rate of US$1=RM4.2500 by year end. MIDF Research noted that the strength of the Ringgit will be supported by a domestic economy that is growing and stands to benefit from high commodity prices given that Malaysia is a net exporter of crude oil, liquefied natural gas and palm oil.

Employment

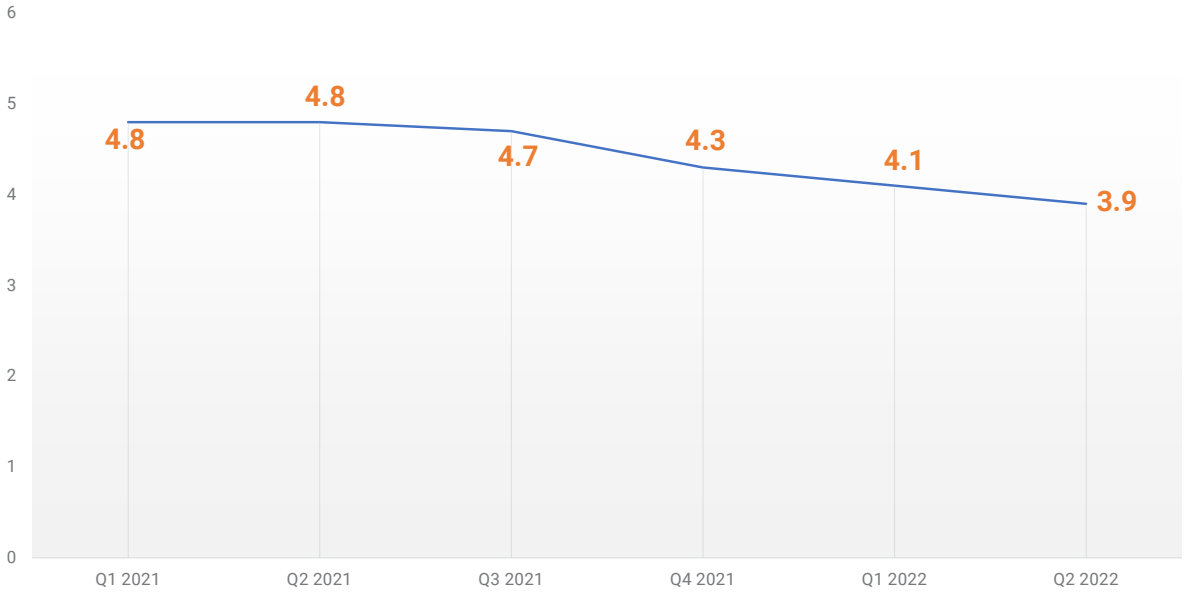
Malaysia's employment rate is now trending upwards following a torrid period of business closures and retrenchments during the first half of 2021. This is reflected by an unemployment rate that has fallen to 3.9% in Q2 2022 from rates above 4.0% throughout the previous year.

CHART 14 shows the unemployment rate falling from 4.8% in Q1 and Q2 2021 to 4.1% at the end of the same year. Correspondingly, the number of employed persons increased to 15.44 million in 2021 from 15.22 million the year before (See also **INFOGRAPHIC 4**).

In addition, the labour force participation rate has risen marginally to 68.7% year on year, with more people employed in Services, Manufacturing and Construction as these sectors resumed operations after the MCO.

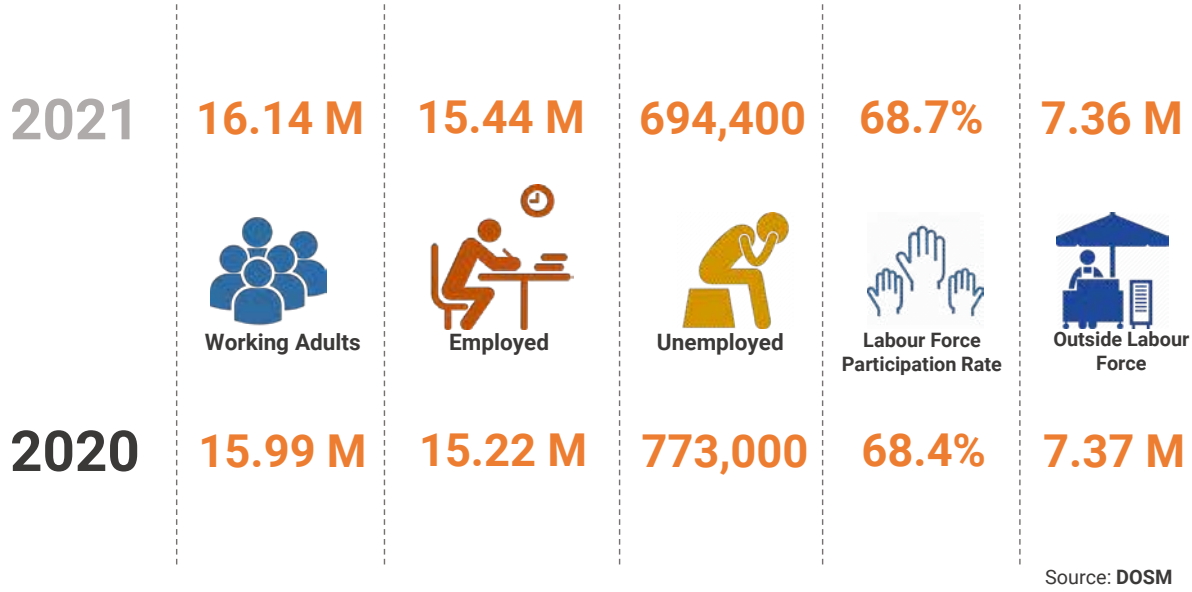
The labour market continued to improve in Q2 2022 with DOSM reporting a 3.2% increase or addition of 267,000 jobs. Total number of jobs was 8.619 million while the number of filled positions amounted to 8.427 million (97.8% of available jobs). More than half of these latest jobs were in the Services sector with the bulk of the remainder going to Manufacturing.

Chart 14: Quarterly Unemployment Rate (%) Q1 2021 – Q2 2022



Source: **DOSM**

Infographic 4: Employment Statistics 2021



Source: **DOSM**

FACTORS IMPACTING THE ECONOMY IN 2021

The reopening of the economy in tandem with rising vaccination rates during the second half of 2021 brought about a sea change to the national economy, businesses, and the lives and livelihoods of Malaysians and Malaysian residents.

Entire industries and hundreds of thousands of businesses were able to open after more than a year in which operations were sporadically interrupted by enforced restrictions and activities delayed under the threat of potential curbs.

Industries swiftly reverted to full-scale operations to fulfil pent-up demand from clients and consumers while retail and other outlets could once again enjoy unrestricted patronage. At the same time, employees progressively discarded their work-from-home routine to resume work at their respective premises.

This return to a new normal revived the national economy by ramping up exports, jacking up domestic consumption and fuelling employment. Thus, Malaysia successfully reversed the downward trend endured in 2020 to register economic growth of 3.1% for 2021.

In the first half of 2022, the nation continued on its path towards recovery even as it officially moved into the endemic phase of Covid-19 on 1 April. The same causes for economic revival continued to hold sway through the first half of this year.

Without a doubt, the removal of restrictions from as early as July 2021 had the greatest impact on the economy. Nevertheless, let us look at some of the other factors that have supported or dampened the recovery:

Global Economy

The global economy recovered from its slump by -3.3% in 2020 to achieve growth by 5.7% in 2021, according to the World Bank. The IMF has projected a higher 6.1% expansion in 2021 against a contraction of -4.9% in 2020.

Similar to Malaysia, growth was spurred by reopening of national economies leading to significantly higher domestic and external demand. However, the disruption to the global supply chain as a result of pandemic-related closure of national borders and other reasons have to an extent impeded even greater growth and economic revival.

Foreign Labour Shortage

While the relaxation of Covid-19 restrictions enabled industries to operate at full swing, production was hampered by an acute shortage of foreign workers who had returned to their home countries during the height of the pandemic and had been unable to return due to closed borders.

In addition, the Government imposed a freeze on the hiring of foreign workers in 2021 and this was only lifted in February 2022. The migrant workforce is dominated by Indonesians, Bangladeshis and Myanmarese.

According to the Government, industries are facing a shortfall of some 1.2 million workers for the manufacturing (600,000), construction (550,000) and plantation (120,000) industries. This situation has reportedly led to some companies turning down orders and relinquishing sales.

Commodity Prices

Malaysia's economy continues to be dependent on commodity prices since the nation is a net exporter of crude oil and is the world's largest producer of crude palm oil after neighbouring Indonesia.

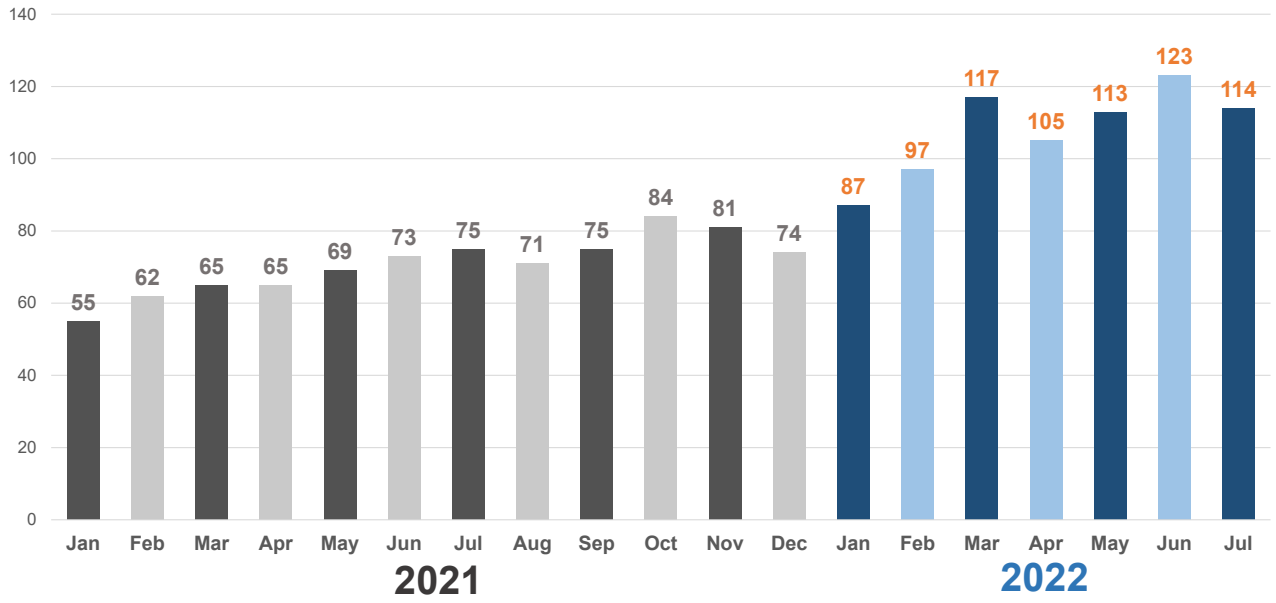
In 2021, prices of both commodities surged significantly as shown by **CHART 15** and **CHART 16**. From a low average of US$55 per barrel in January 2021, prices of crude oil inched upwards to close at an average of US$74 per barrel by December the same year, a gain of 34.5%. The average price reached a high for the year at US$84 (Oct 2021). In the same period, average prices of crude palm oil increased by 28.3% to US$1,270 per metric tonne in December 2021 from US$990 12 months earlier.

Their prices continued to break new records in the first half of 2022, with crude oil reaching US$123 per barrel in June 2022 and crude palm oil a stratospheric US$1,780 per metric tonne in March 2022.

Interest Rates

In a bid to revive the economy while also easing the financial burden of Malaysians grappling with the impact of the pandemic, BNM had lowered the Overnight Policy Rate (OPR) from 2.50% to 2.00% in May 2020, followed by another reduction of 25 basis points to 1.75% in July.

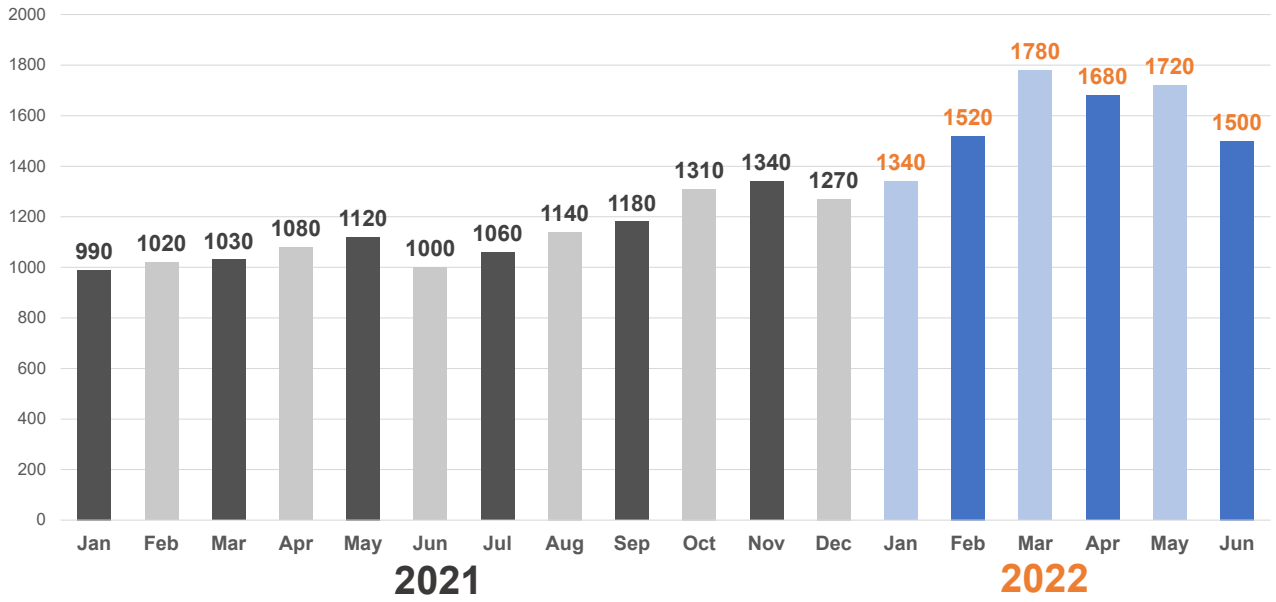
Chart 15: Average Monthly Crude Oil Prices (Brent) (US$) Jan 2021 – July 2022



*All prices have been rounded off.

Source: Statista.com

Chart 16: Average Monthly Palm Oil Prices (US$) Jan 2021 – June 2022



*All prices have been rounded off.

Source: **Indexmundi.com**

This low rate was maintained throughout 2021. In July the same year, BNM gave an explanation for this policy: "The MPC (Monetary Policy Committee) considers the stance of monetary policy to be appropriate and accommodative. In addition, fiscal and financial measures will continue to cushion the economic impact on businesses and households and provide support to economic activity.

Given the uncertainties surrounding the pandemic, the stance of monetary policy will continue to be determined by new data and information and their implications on the overall outlook for inflation and domestic growth. The Bank remains committed to utilise its policy levers as appropriate to foster enabling conditions for a sustainable economic recovery."

As a measure to stave off inflationary pressure, BNM only raised the OPR to 2.00% in May 2022, but this was followed swiftly by a second increase to 2.25% in early July. In making these decisions, BNM had taken into account that the sustained reopening of the global economy would continue to bolster economic activities.

ECONOMIC OUTLOOK 2022 AND BEYOND

Malaysia is projected to achieve higher growth this year in excess of 5.0% on the back of a recovering domestic economy and booming exports despite growing geopolitical and geoeconomic concerns prevalent at the time of reporting.

INFOGRAPHIC 5 provides a snapshot of projections from various local, regional and global organisations. BNM expects the economy to expand by 5.3-6.3%. Even the lowest estimate by the IMF has GDP growth at 5.1%.

Nevertheless, such forecasts are subject to the volatility of the global market which is already showing fissures caused by the impact of the on-going Russia-Ukraine conflict, the latest tensions between the US and China over Taiwan, the threat to global crops from climate change and other issues.

Firstly, the eastern European war has affected grain and other types of food production, particularly in Europe. However, the spillover effects could fuel food inflation on a global scale. In addition, the war continues to disrupt the global supply chain, also resulting in higher prices for imports into Malaysia.

Secondly, the kerfuffle over Taiwan could spiral into negative economic measures imposed by China against what it considers as its province. These may manifest as an economic blockade of the island and further disrupt supply lines.

After two years of battling Covid-19 and forgoing its focus on climate change, the world is beginning to suffer the consequences of higher temperatures, flooding and other natural disasters. Such events are a direct threat to food security and have the potential to inflate food prices.

Infographic 5: Malaysia's Economy Growth Forecast 2022

BNM	5.3 – 6.3%
OECD	6.1%
ADB	5.8%
WB	5.5%
IMF	5.1%

In a recent review of the Malaysian economy in 2022, the IMF stated that: "While there is a surge in growth, external headwinds and global uncertainties pose a challenge and add to the country's downside risks." The organisation listed these challenges as the deceleration in global growth to 3.2% in 2021 (WB: 2.9%), the spillover from the eastern European war, declining pent-up demand and reduced macroeconomic support amid high inflation.

The IMF also warned of slower regional growth on account of China, the potential for a resurgence of Covid-19, relatively high levels of household and corporate debt and increased fiscal risks.

This gloomy global sentiment could have an impact on Malaysian projections of growth. Finance Minister Zafrul Aziz was recently quoted as saying that the nation's economic outlook could be affected by pessimism in the global economy. He cautioned that Malaysia needed to prepare for a global economy slowdown with rising recession risks heightened by monetary tightening in the US and slowing growth in China.

PIKOM'S PROJECTIONS

METRIC	2022 FORECAST	AGAINST 2021
GDP	5.5% – 6.0%	↑
Domestic Demand	4.5% - 5.0%	↑
Exports	15% - 20.0%	↑
FDI	> RM100 B	↑
Unemployment	3.0%	↓
Crude Oil Prices (annual average)	US$105 / barrel	↑
Currency	US$1 = RM4.3	↑
Inflation	3.0%	↑
OPR	2.75%	↑
National Debt (% of GDP)	65% - 70%	↑

PIKOM's Estimates

glocomp

YOUR ONE-STOP ICT SOLUTIONS PROVIDER

Glocomp is one of the region's pioneer ICT solution providers, providing comprehensive portfolio of solutions paired with end-to-end professional services from in-depth analysis and architecting consultations, implementation & deployment, network & system migration, optimizing customer's infrastructure to system support.

Computing & Information Management

IP Communications

Security & Privacy

Automation, Analytics, AI

Productivity

Cloud & Technology Services

WE'RE HIRING!

JOIN US NOW.

Please visit www.glocomp.com for all current job postings.

www.glocomp.com info@glocomp.net glocompsystems

CHAPTER 2

Digital Economy Review and Outlook in Malaysia

HDC

HIGH PERFORMANCE DATA CENTRE

NON-COMPROMISE TIER III DATA CENTRE

Integrity, accountability & global credible data centre

High Availability	Malaysia's 1st Uptime Institute Certified Tier III Data Centre	Multi Layers Security
Flexibility and Scalability	Wide Connectivity	MSC Cybercentre City at Shah Alam
Multi Award Winner of Best Practice Infrastructure Management Services		

Certified with:

TIER III DESIGN

ISO ISO/IEC 27001:2013

PCI DSS

HDC

M-04-3A, Block M, No.6, Persiaran Multimedia,
i-City, Section 7, 40000 Shah Alam. Selangor. Malaysia.

Telephone: 603- 5521 8998
Fax No.: 603- 5521 8732
Website: www.hdc.net.my
Email: info@hdc.net.my

Malaysia's digital economy has accelerated since the start of the Covid-19 pandemic with the unique circumstances during this period compelling people, businesses and the government to migrate their activities online.

Forced to isolate at home for lengthy periods at a go, Malaysians turned to digital means to meet their daily consumption requirements: relying on digital delivery platforms for meals; purchasing groceries, provisions and other consumables online; shopping on the internet; signing up for online entertainment services; and so on.

For work, they coped and compensated for movement restrictions by regimenting work-from-home (WFH); and leveraging on digital conferencing tools for discussions, meetings, consultations, workshops and seminars.

As a response to the growing mass of digital consumers, businesses especially those in the retail sector stepped up adoption of digital technologies for front-end and back-end operations in order to adapt to the rapidly-shifting shopping and purchasing trends.

The explosion of digital avenues for business-to-consumer (B2C) interaction was also matched by a rise in digital business-to-business (B2B) engagement. In many cases, it was either get on board with the digital way of doing business, or go bust.

It was a similar situation for the Government with public sector agencies having to swiftly extend their capacities in the provision of online services to replace many traditional over-the-counter (OTC) tasks.

This was the new normal and everyone and everything had to go digital. As a result, the nation's digital economy breezed past the target for 2020 to reach 22.6% share of the national economy, according to the Department of Statistics Malaysia (DOSM).

(DOSM releases data on each previous year's ICT Satellite Account in October of the subsequent year. While some of the figures in this Chapter are confirmed only until 2020, wherever possible, we have included forecasts, trends and opinions to provide a better picture for this report.)

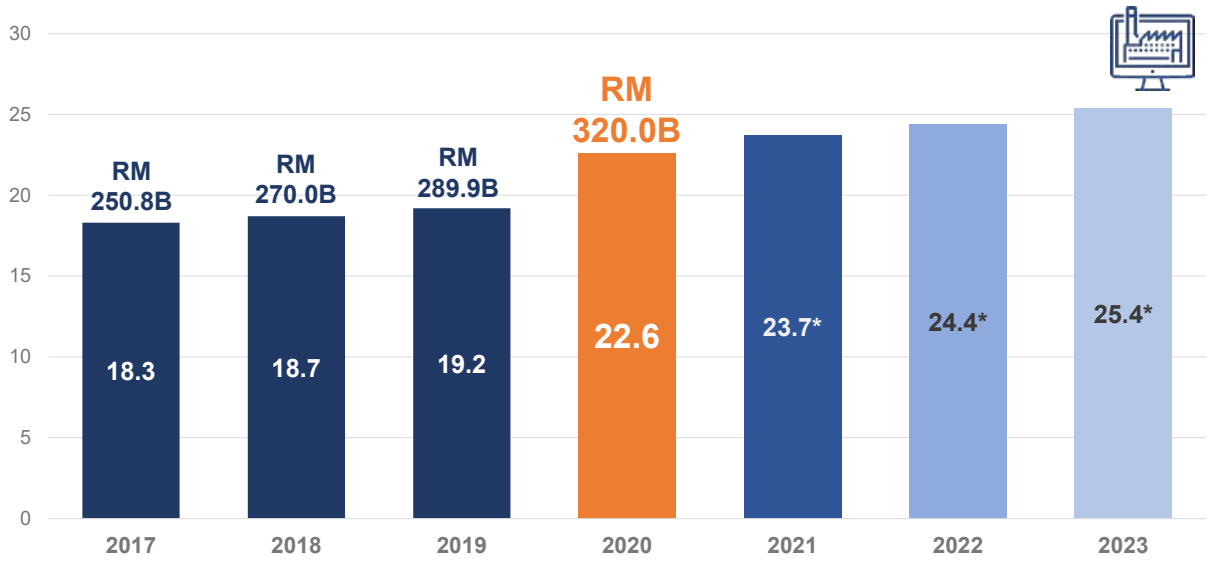
Equally as telling, the digital economy grew by a record 10.4%, an impressive rate which stood in stark contrast with the 5.5% contraction suffered by the national economy constrained by shutdowns and lockdowns for significant periods during the year.

While the main catalyst for this surge was undoubtedly the pandemic, at the same time, the Government also recognised this opportunity by ramping up efforts to support and boost the digital economy.

At the time of reporting, the Government has launched or revamped several national initiatives aimed at fuelling the growth of the digital industry by facilitating digital adoption, developing homegrown capabilities and attracting digital investments.

THE DIGITAL ECONOMY IN 2020 AND BEYOND

Chart 1: Share of Digital Economy to National Economy (%) 2017 - 2023



The forecast for 2021 – 2023 were determined with the following approach: First, we extrapolated the growth of the digital economy using geometric mean as the basis of calculation. Next, we projected the growth of the national economy using confirmed data (2021) and forecasts for 2022 (BNM) and 2023 (World Bank). The share of the digital economy is then the size of the digital economy as a proportion of the national economy.

***Forecast**

Source: **DOSM & PIKOM Estimates**

The digital economy contributed RM320.0 billion to Malaysia's gross domestic product (GDP) in 2020 to achieve a 22.6% share of the national economy and surpass the aspirational target of 20% set a decade ago (See **CHART 1**).

In the process, its GDP contribution also breached the RM300-billion milestone, reflecting the considerable swing by the economy and society towards digital tools, platforms and technologies for work and life.

Following this jump, the Economic Planning Unit (EPU) under the Prime Minister's Department has estimated that the digital economy's share could reach 25.5% of GDP by 2025 even as the rest of the national economy recovers over the next few years.

However, PIKOM believes this estimation is highly, but also understandably, conservative. According to our forecasts, the share of the digital economy should grow progressively to reach an estimated 25.4% in 2023 (See **CHART 1**).

Over and above the negative growth sustained by the national economy, the digital economy's higher share in 2020 was boosted by double-digit growth of 10.4% during the year, as shown by **CHART 2**.

This was its highest growth rate since the digital economy was defined and deemed to include the activities of the traditional ICT industry (also referred to as the digital industry) and revenue from eCommerce almost a decade ago.

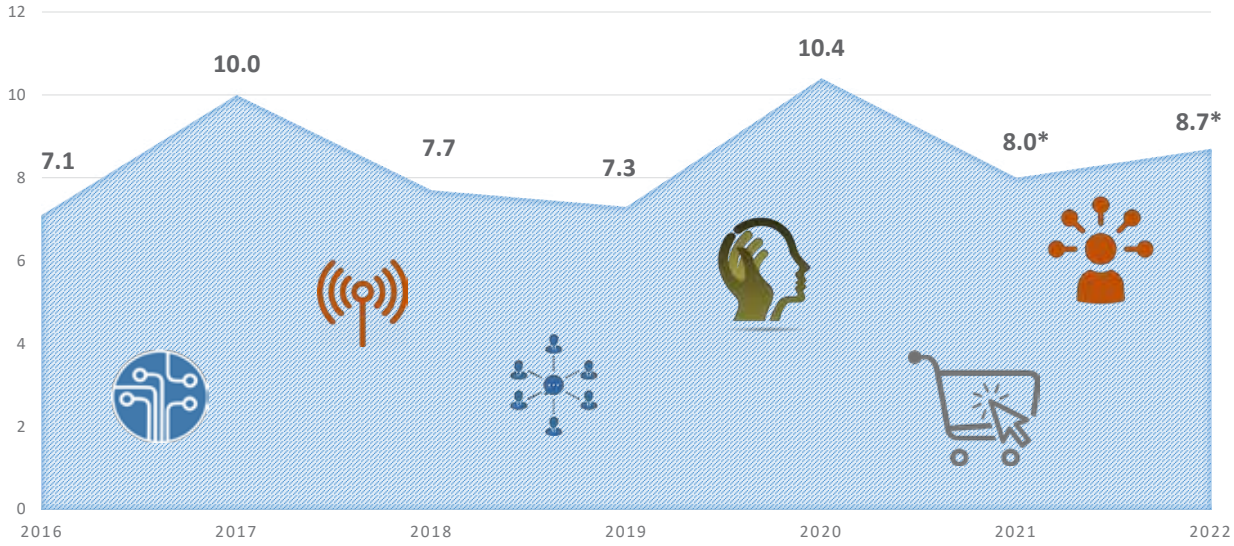
In addition, the healthy expansion in 2020 was a welcome reversal of the downward trend in the previous two years, which had raised concerns that growth was beginning to stagnate. After growing by 10.0% in 2017, the digital economy expanded by a more sedate 7.7% the following year, followed by 7.3% in 2019.

With pandemic conditions prevailing throughout 2021, the healthy growth rate of 2020 is expected to be replicated during that year.. Entrenched as the new status quo, the digital way for society, business and industry as well as government should augment the growth prospects of Malaysia's thriving digital economy in 2022 and beyond.

Contribution by Digital Economy Components

The ICT industry, which is composed of the ICT Services, ICT Manufacturing, ICT Trade and Content & Media sub-sectors as defined by DOSM, accounted for 14.2% of national GDP in 2020 with eCommerce contributing a further 8.4%, as shown by (**INFOGRAPHIC 1**).

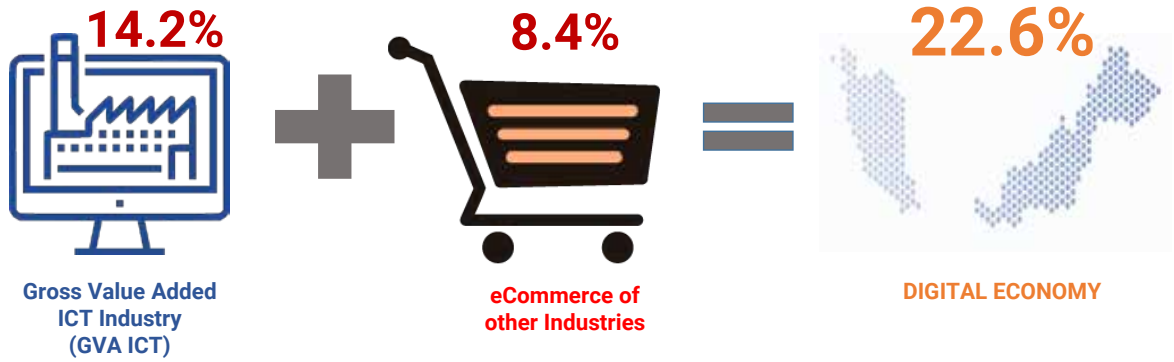
Chart 2: Growth of Digital Economy (%) 2016 - 2022



*The forecasts for 2021 and 2022 are calculated using the geometric mean.

Source: **DOSM & PIKOM Estimates**

Infographic 1: Contribution of Digital Economy Components to National Economy (%) 2020



Source: **DOSM**

As mentioned earlier, the pivot towards eCommerce as a substitute for physical businesses transactions led to the tremendous rise in eCommerce revenue, which increased by 26.5% during that year (See **CHART 3**).

Gross value-added revenue from the ICT industry (GVA ICT) also increased, albeit at a much slower pace of 3.3% to RM201.6 billion in 2020 as compared with RM195.2 billion the year before.

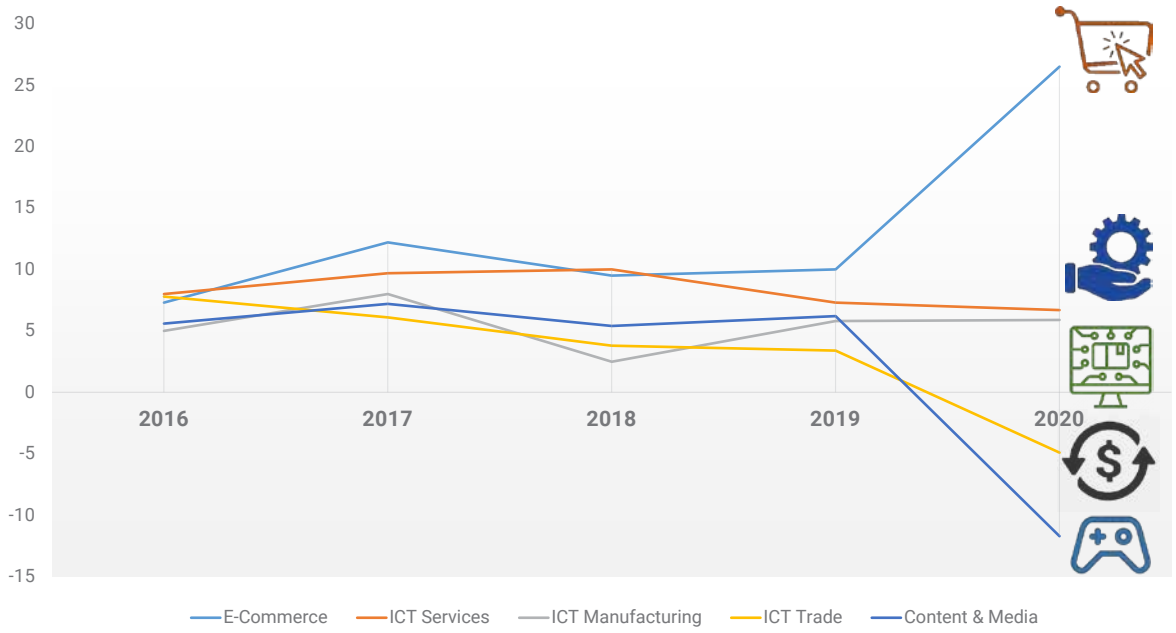
As shown by **CHART 3**, ICT industry growth was moderated by contractions in the ICT Trade and Content & Media segments by -4.9% and -11.7% respectively. The industry's largest sub-sector, ICT Services, also recorded slower growth of 6.7% (2019: 7.3%) for the year with ICT Manufacturing the only component to expand although only marginally to 5.9% (2019: 5.8%).

Following its quantum leap in 2020, eCommerce achieved a relatively high annual average growth rate (AAGR) for the period 2015 – 2020 of 13.1%. ICT Services also maintained a robust single-digit AAGR, but the respective averages for ICT Trade and Content & Media dropped markedly. eCommerce and ICT Services are expected to post similarly healthy growth rates in 2021 and sustain this upward trend through 2022 and the years ahead.

As to be expected, ICT Services and ICT Manufacturing increased their respective shares of the ICT industry in 2020: ICT Services to 45.0% from 43.6% previously and ICT Manufacturing to 34.5% (2019: 33.6%) (See **CHART 4**).

The digital sub-sector with the fastest growth rate for the past few years, ICT Services includes the industry clusters of telecommunication services, computer programming, consultancy, information activities and assorted

Chart & Table 3: Growth of Digital Economy Components (%) 2016 - 2020



	2016	2017	2018	2019	2020	AAGR*
eCommerce	7.3%	12.2%	9.5%	10.0%	26.5%	13.1%
ICT Services	8,0%	9.7%	10.0%	7.3%	6.7%	8.3%
ICT Manufacturing	5.0%	8.0%	2.5%	5.8%	5.9%	5.4%
ICT Trade	7.8%	6.1%	3.8%	3.4%	-4.9%	3.2%
Content & Media	5.6%	7.2%	5.4%	6.2%	-11.7%	2.5%

***AAGR (2015 – 2020)**

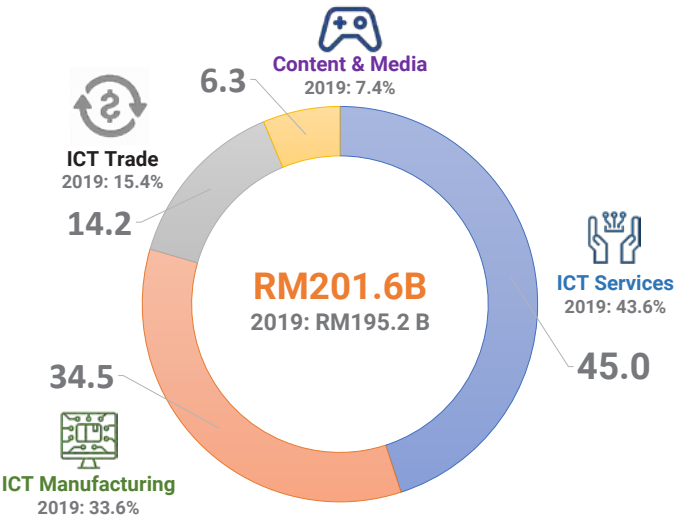
Source: **DOSM & PIKOM Estimates**

other digital services. Meanwhile, ICT Manufacturing encompasses the production of computers and peripheral equipment, electronic components and boards, communication equipment as well as consumer electronics.

Due to their decline in 2020, the industry share of ICT Trade and Content & Media in the same year dipped to 14.2% (2019: 15.4%) and 6.3% (2019: 7.4%) respectively. ICT Trade involves both retail and wholesale trade while activities such as the publishing of books, periodicals and other publications; motion pictures, video, television programmes, photography and creative activities fall under the Content & Media cluster.

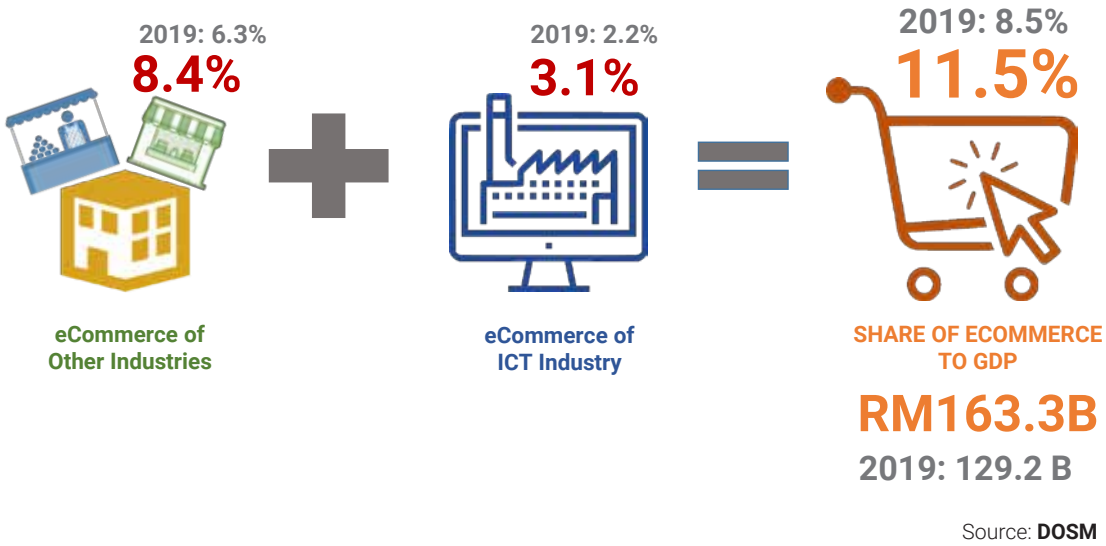
It is not surprising that revenue from Content & Media activities dropped so significantly since many of these are classified as non-essential services and consequently were not permitted to be carried out throughout the course of the various Movement Control Order (MCO) imposed by the Government.

Chart 4: Share of Digital Sub-sectors to ICT Industry (%) 2020



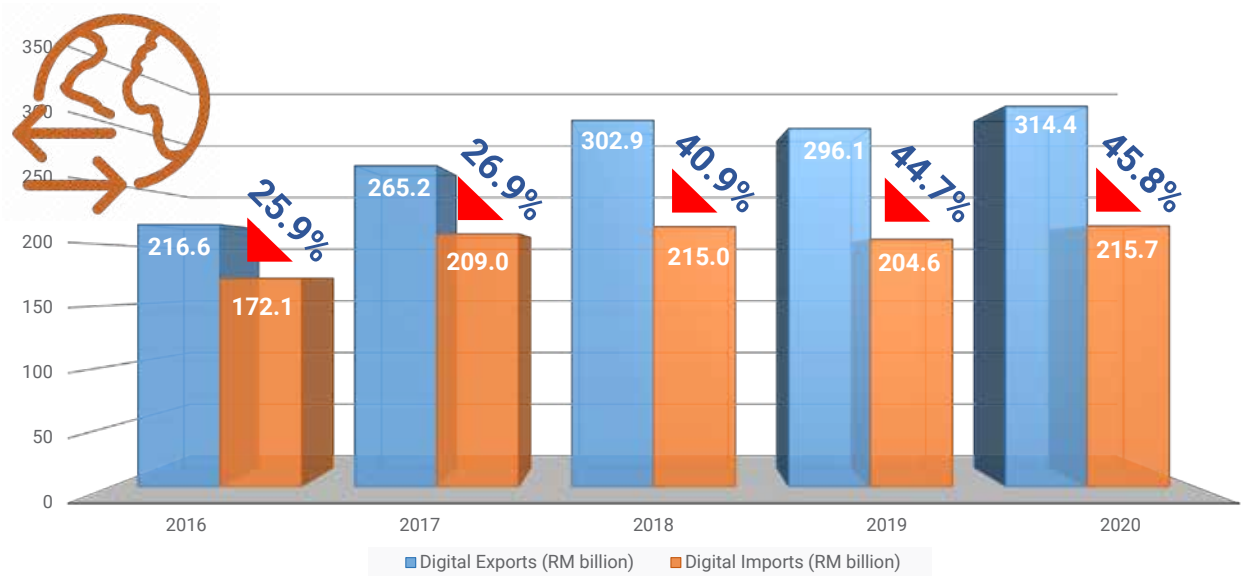
Source: **DOSM**

Infographic 2: Share of eCommerce to GDP by Industry (%) 2020



Source: **DOSM**

Chart 5: Digital Exports Versus Digital Imports (% difference) 2016 - 2020



Source: **DOSM**

eCommerce

Under its accounting practices, DOSM makes a distinction between the activities and contributions to GDP by 'eCommerce of other industries' and 'eCommerce of ICT industry'. Revenue from eCommerce of the ICT industry falls under the respective industry sub-sector (ICT Services, et al).

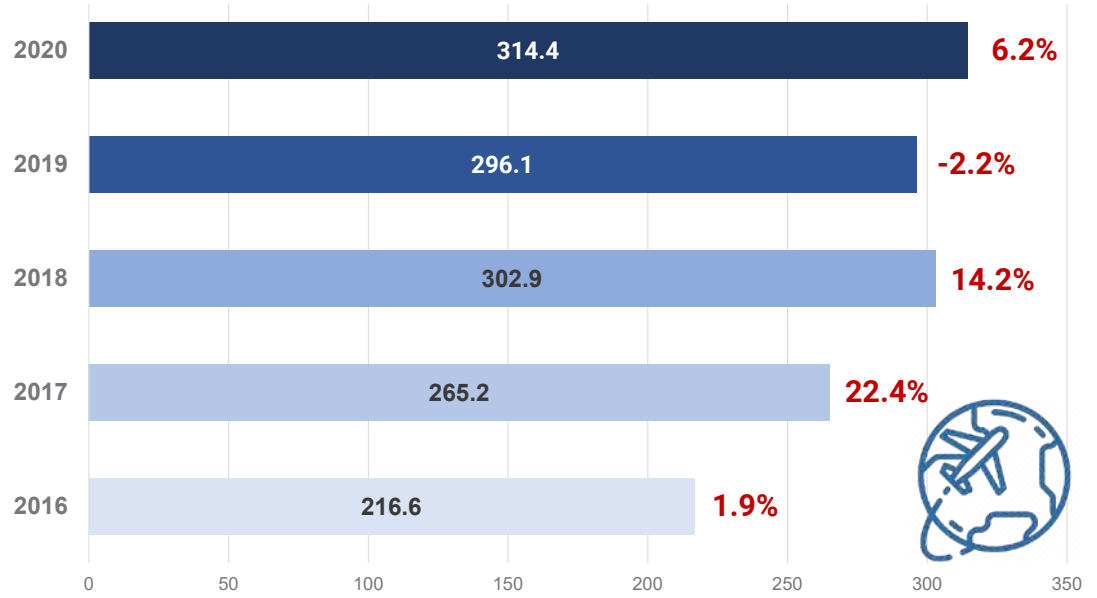
Combined, the respective contributions by both types of eCommerce activities amounted to RM163.3 billion in 2020, representing an 11.5% share of GDP (See **INFOGRAPHIC 2**) as well as a jump of 26.4% against RM129.2 billion (8.5% of national GDP) the year before.

Both sets of eCommerce contributions also shot up: eCommerce of other industries from 6.3% in 2019 to 8.4% and eCommerce of ICT industry from 2.2% to 3.1%, with the bulk of sales coming from the ICT Manufacturing segment. As before, eCommerce remains the most aggressive and fastest-growing sub-sector as more companies capitalise on online and other digital platforms to drive their business.

Digital Exports & Imports

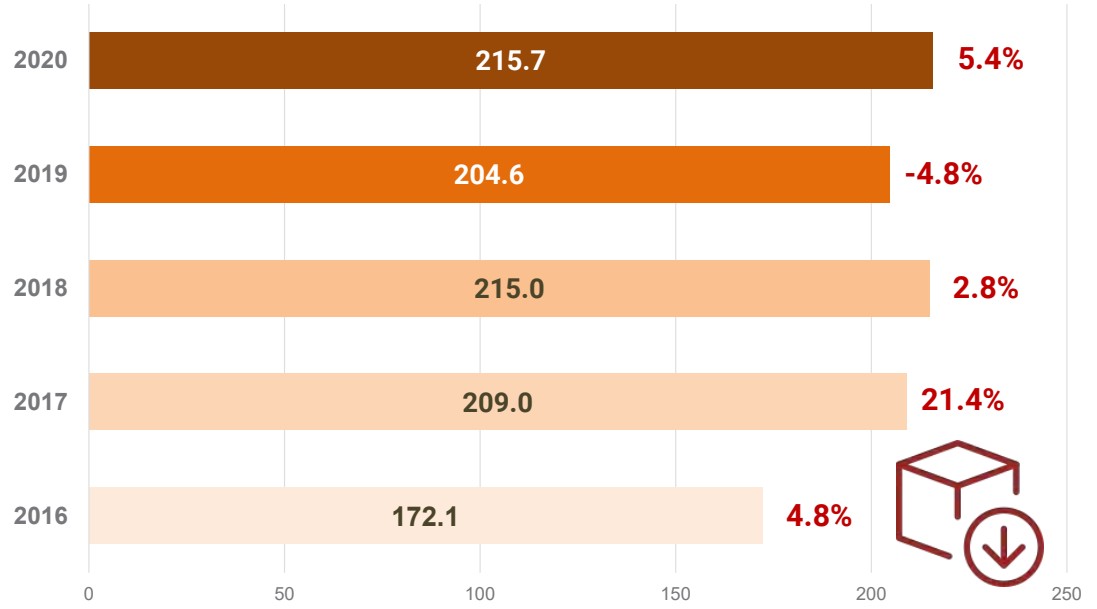
Malaysia strengthened its status as a nett exporter of digital products, services and solutions, with the difference between digital exports and digital imports growing to 45.8% or RM98.7 billion in 2020 (See **CHART 5**).

Chart 6: Growth of Digital Exports (RM Billion) 2016 - 2020



Source: **DOSM**

Chart 7: Growth of Digital Imports (RM Billion) 2016 - 2020



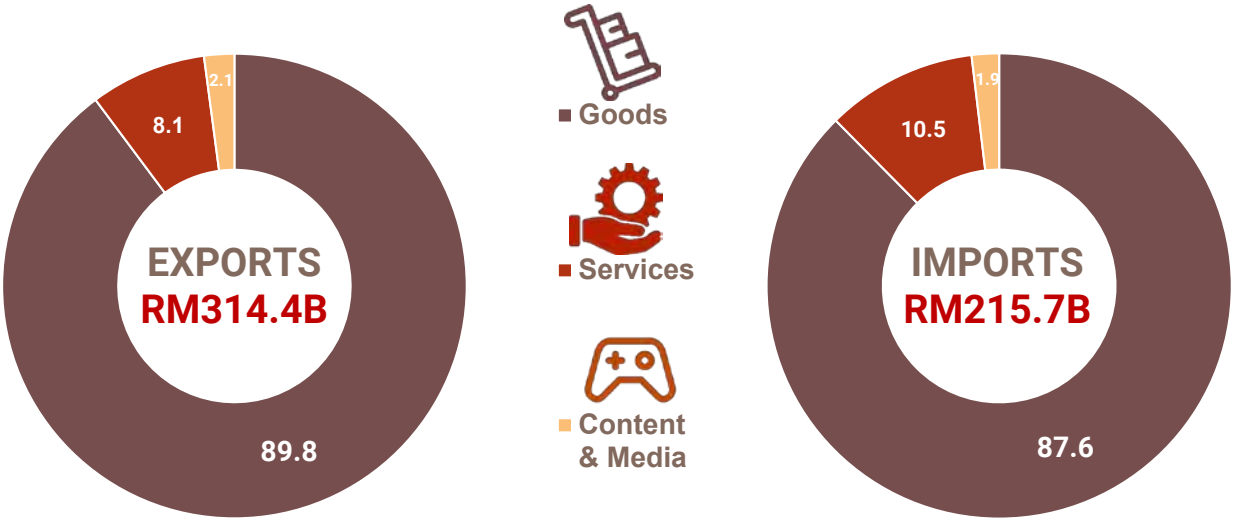
Source: **DOSM**

This variance is almost double the quantum in 2016 (25.9%), cementing the nation as among the leading digital producers in the region alongside its reputation as a voracious digital consumer.

Separately, the value of both digital exports and digital imports increased in 2020 after a slump the year before. Digital exports amounted to RM314.4 billion for the year, increasing by 6.2% after negative growth of -2.2% in 2019 (See **CHART 6**) while digital imports also increased spending by 5.4% to RM215.7 billion (2019: -4.8%) (See **CHART 7**). A similar pattern of aggressive growth can be expected for 2021 and this year with digital adoption becoming a business and operational imperative post pandemic.

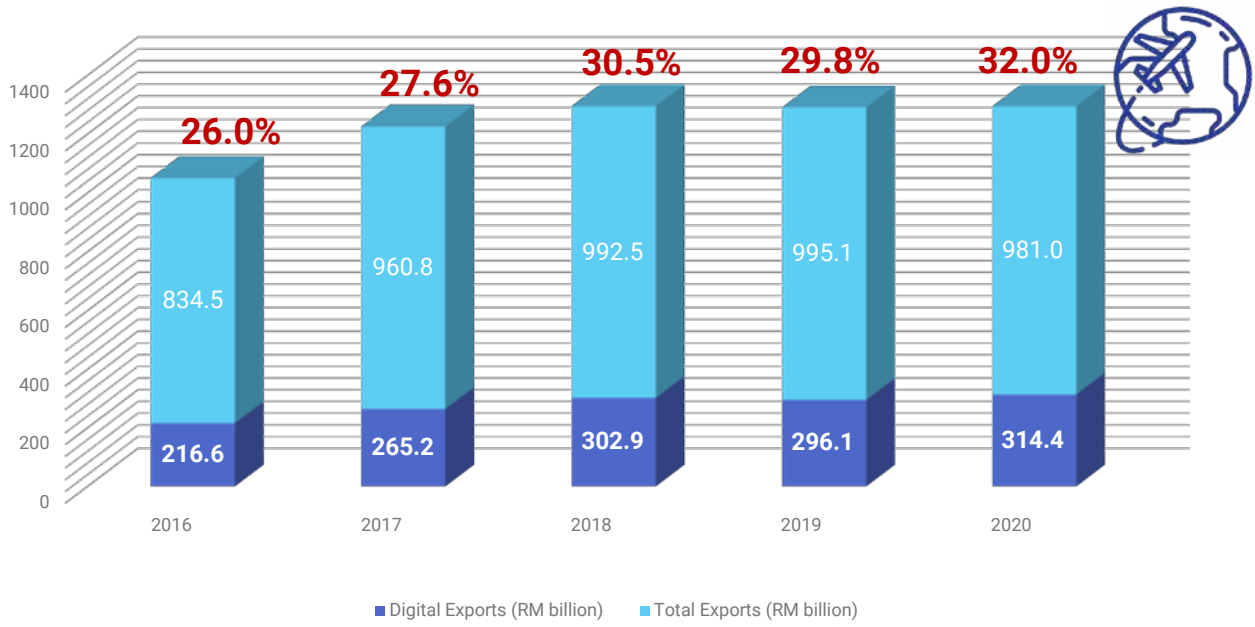
ICT goods accounted for the lion's share of both digital exports and digital imports at 89.8% and 87.6% respectively (See **CHART 8**). ICT Services was next with digital imports higher at 10.5% as compared to digital exports at 8.1%, suggesting that Malaysians and Malaysian companies continue to rely on the provision of digital services from external sources.

Chart 8: Exports and Imports of ICT Products by Type (%) 2020



Source: **DOSM**

Chart 9: Share of Digital Exports to Total Exports (%) 2016 - 2020



Source: **DOSM**

Malaysia's share of digital exports/imports to total exports/imports also went up in the same period: in 2020, digital exports accounted for 32.0% of total exports (2019: 29.8%) (See **CHART 9**) while digital imports as a proportion of total imports appreciated to 27.1% (2019: 24.1%) (See **CHART 10**).

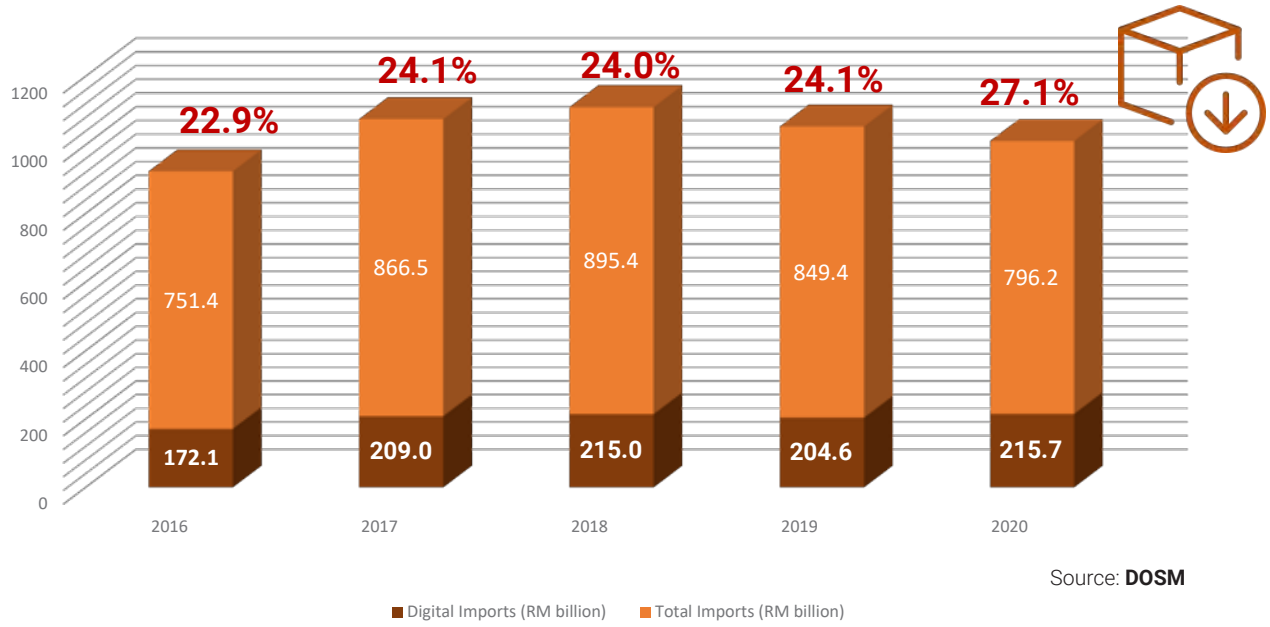
Again, this quantum can also be expected to rise in 2021 and beyond with the development of the nation's digital industry amid the heightened use of digital technologies in Malaysia and across the ASEAN region.

Employment in the Digital Industry

In tandem with the growth of the industry, digital employment increased by 2.0% to 1.16 million talents in 2020 (See **CHART 11**). The number of ICT professionals grew in the sub-sectors of ICT Services, ICT Manufacturing and ICT Trade with Content & Media the only segment to post a decline (See **CHART 12**).

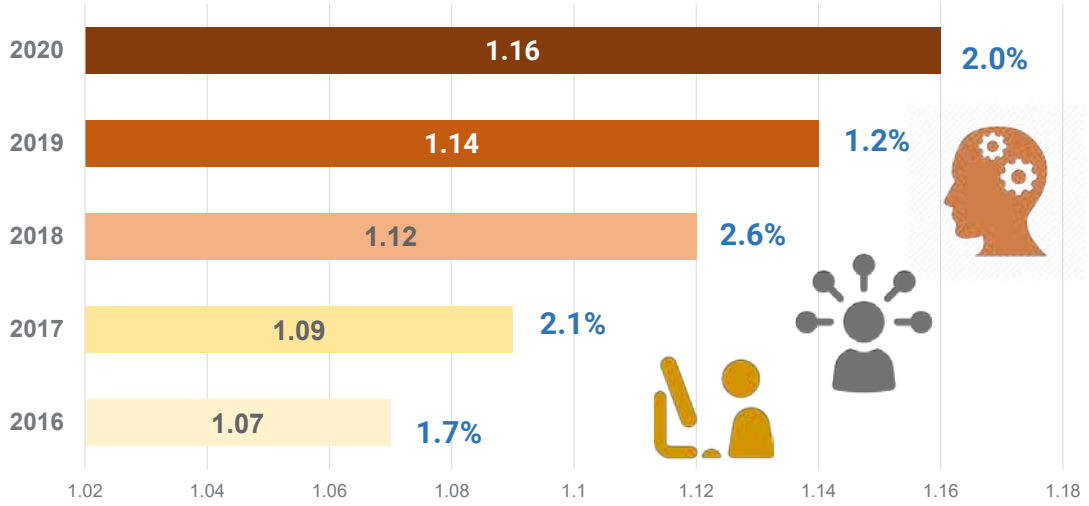
In 2020, ICT Manufacturing remains the largest employer of digital talents with more than one third of

Chart 10: Share of Digital Imports to Total Imports (%) 2016 - 2020



Source: **DOSM**

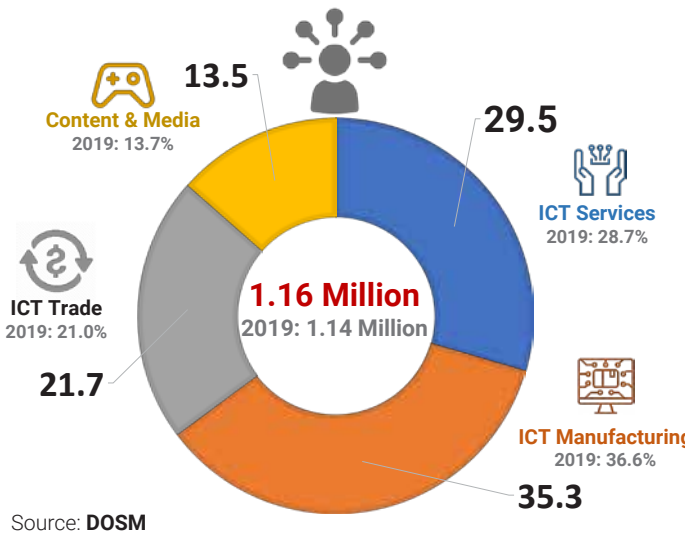
Chart 11: Growth of Employment in ICT Industry (million persons) 2016 - 2020



Source: **DOSM**

employees, ahead of ICT Services and ICT Trade. Nevertheless, employment in companies providing digital services are expected to eventually surpass their manufacturing counterparts in the years to come with the latter's share of employment projected to narrow in 2021 and 2022.

Chart 12: Share of Employment by Digital Sub-Sectors (%) 2020



Source: **DOSM**

KEY DEVELOPMENTS IN 2020 AND BEYOND

Covid-19 may have precipitated a global recession, but among its most profound effects was to accelerate the digital transformation of the economic and social landscape particularly in Southeast Asia where the shift towards digital was already faster than anywhere else in the world.

Digital apps for eCommerce, food delivery, transport, the media and at a later stage, online travel and hospitality became the default platforms for hundreds of millions of residents in this region at a time when restrictions prevented the normal way of living, working and doing business.

According to a report 'e-Conomy SEA 2021' by Google, Temasek and Bain & Company, the gross merchandise value of digital trade and eCommerce in the region has been and is projected to grow at an annual rate of 14% through to 2025 when it could reach US$35 billion.

The report noted that Malaysia gained three million new digital consumers in only one year following the onset of the pandemic. In response, enterprises increased their rate of digital adoption, first to ensure survival and later to sustain their business in the new normal.

The report also quoted the Institute of Strategic and International Studies (ISIS) as stating the value of digital trade and eCommerce could expand by nine-fold to US$52.7 billion by 2030 with the proviso that the nation jack up digital adoption.

On this score, the World Bank has cautioned that overall adoption rates among smaller Malaysian businesses remain relatively low as compared to larger companies. The organisation's Digital Adoption Index appears to indicate that Malaysia has fallen behind not only Singapore, but Thailand, Vietnam and the Philippines in recent years.

Well aware of such perceived shortcomings, the Malaysian Government intends to inject further impetus to the growth and development of its digital economy. It has launched or revamped several national initiatives aimed at fuelling the growth of the digital industry by facilitating digital adoption, developing homegrown capabilities and attracting digital investments.

Malaysia Digital

The latest of these high-profile initiatives is Malaysia Digital, the successor to MSC Malaysia launched 25 years ago to develop a knowledge-based economy as well as creative and innovative talents.

The agency tasked with driving this initiative is the Malaysia Digital Economy Corporation (MDEC), the same as previously. MDEC's role is to encourage and attract companies, talents and investment while enabling Malaysian businesses and citizens to play a leading part in the global digital economy.

The agency has formulated a new framework to address three strategic priorities:

- driving digital adoption among aspiring young entrepreneurs, companies and the people;
- supporting local tech companies to become 'Malaysian champions' and successful international players; and
- attracting high-value digital investments into the country.

National Robotics Roadmap (NRR)

At the launch of Malaysia Digital, Prime Minister Dato' Sri Ismail Sabri Yaakob also announced that the Government will develop a National Robotics Roadmap as part of the nation's 4th Industrial Revolution (4IR) agenda.

The NRR is intended to improve productivity in the manufacturing sector by reducing the reliance on foreign labour and minimising currency outflow. Among the targets set are to raise robot density from 55 robots per 10,000 workers (2019) more than three fold to a ratio of 195 : 10,000 by 2030.

For starters, some of the early catalytic projects will involve smart healthcare services at hospitals provided via 5G technologies. Others will include the application of smart city use cases to enhance sustainable living and wellbeing of residents.

MyDIGITAL

In early 2021, the Government launched MyDIGITAL with the objective of transforming Malaysia into a "digitally-enabled and technology-driven high-income nation and regional lead in digital economy".

MyDIGITAL is anchored on the Malaysia Digital Economy Blueprint, which builds the foundation to drive digitalisation and bridge the digital divide across the nation while charting its contribution to the national economy.

Its desired outcome is a future nation where the people are digitally literate, have high-income jobs, better wellbeing and a sustainable environment, and a robust backbone of micro, small and medium enterprises (MSME). This will then place us in a stronger position to capitalise on local, regional and international opportunities.

Among the more prominent goals are to:

- Create hundreds of thousands of new jobs;
- Gain access to online learning by all students;
- Increase national productivity by 30%;
- Raise the GDP contribution of the digital economy to 22.6%;
- Propel 875,000 MSMEs onto eCommerce;
- Attract RM70 billion investment in digitalisation;
- Increase the number of start-ups to 5,000;
- Ensure 80% of Government online services;
- Provide cashless option for all public sector payments; and
- Raise cloud storage to 80% of Government data.

The blueprint encapsulates six strategic thrusts, 22 strategies, 48 national initiatives and 28 sectoral initiatives.

PIKOM'S PROJECTIONS

METRIC	2022 FORECAST	AGAINST 2021
Share of GDP	24.4%	↑
Growth Rate	8.7%	↑
eCommerce	15% - 20.0%	↑
Exports	7.0%	↑
Employment (by growth rate)	2.0%	=

iForté

iForté specialises in Technology Managed Services, Digital Automation and Intelligent Workforce Solutions.

Our organisation place great emphasis in Talent Acquisition, Talent Management and Talent Development.

B-3A-28,Merchant Square @ Tropicana, Jalan Tropicana Selatan 1, 47410 Petaling Jaya, Selangor.

hello@iforte.com.my +603-7883 0999 www.iforte.com.my

JobStreet by SEEK

Asia's No. 1
Trusted Talent Partner

Over **5.2 mil** talent

Over **179 mil** pageview

4x more successful at placing talent with employers

1st choice among job seekers in **Malaysia**

Get a FREE lite ad* to hire your team member today!
Email us at partners@jobstreet.com or call 03-2778 9000
to redeem yours!

Based on Jobseeker and Employer Market Survey 2020 by a third-party research agency and JobStreet Internal Data.
* Terms and conditions apply

CHAPTER 3

Digital Employment and Salary Trends in Malaysia

HRCI & NHRC

Dual HR Certification

1ST DUAL HR CERTIFICATION COMBINING HRCI AND NHRC.

JOIN MORE THAN 500,000 HR PROFESSIONALS IN OVER 100 COUNTRIES WHO HAVE EARNED THEIR CREDENTIALS AS **QUALIFIED PROFESSIONALS IN THE HUMAN RESOURCES** FIELD.

HRCI

AsiaHR ACADEMY

FOUNDATIONAL

aPHRi | MyCA

HR certification designed for professionals who are just beginning their HR career journey in any local.

CERTIFICATION COURSE

- Associate Professional in Human Resource International (aPHRi)
- Certified Associate Professional in Human Resources - Malaysia (MyCA)

FUNCTIONAL AREAS

- HR Operations
- Recruitment and Selection
- Compensation and Benefits
- Human Resource Development and Retention
- Employee Relations, Health and Safety

WHO SHOULD ENROLL

- HR Officer
- HR Executive
- Associate
- HR Analyst
- HR Assistant Manager
- HR Project Manager
- HR Intern

PROFESSIONAL

PHRi | MyCP

This credential demonstrates mastery of generally accepted technical and operational HR Principles.

CERTIFICATION COURSE

- Professional in Human Resource International (PHRi)
- Certified Professional in Human Resources - Malaysia (MyCP)

FUNCTIONAL AREAS

- Talent Acquisition
- HR Administration and Shared Services
- Talent Management and Development
- Compensation, Benefits and Work Experience
- Employee Relations & Risk Management
- HR Information Management

WHO SHOULD ENROLL

- HR Programme Manager
- HR People Manager
- HR Business Partner
- HR Senior Manager

STRATEGIC

SPHRi | MyCSP

Validates senior-level HR competency and mastery of generally accepted HR principles in strategy, policy development and service delivery.

CERTIFICATION COURSE

- Senior Professional in Human Resource International (SPHRi)
- Certified Senior Professional in Human Resource-Malaysia (MyCSP)

FUNCTIONAL AREAS

- Business Leadership
- Talent Development and Manage-
- ment
- HR Service Delivery
- Measurement and Analysis

WHO SHOULD ENROLL

- Chief HR Officer (CHRO)
- Vice President
- HR Director

FOR MORE INFORMATION PLEASE CONTACT

info@asiahracademy.com | 0179902842/ 01128217228 | www.asiahracademy.com

Since the start of the Covid-19 pandemic in early 2020, Malaysia as with other economies worldwide has experienced dramatic changes to the employment structure including an increasing shift towards jobs in the digital industry and digital-related services.

The implementation of pandemic-related movement control orders (MCO) has precipitated a rise in digital delivery platforms, enhanced work-from-home (WFH) regimens, digital and video conferencing as well as online everything: from education, banking, bill payments and interaction with the authorities and private sector.

Throughout 2020 and 2021, restrictions on activities and movement were periodically lifted in tandem with infection rates before Covid-19 vaccination eventually reached a high enough level for curbs to be progressively lifted.

Yet, we did not fully return to the previous state-of-affairs. Malaysians had readily adopted a noticeably different way of life and work where the digital culture appears permanently entrenched as part of a 'new normal'.

A similar transformation has also taken place at the global level. There is a profound change in all types of engagement across the public and private sectors in terms of outreach, interaction, transactions and other activities.

It is only natural then that digital professionals and talents are now on the front foot in order to cope with and capitalise on the rapidly-rising digitalisation of everything we do. Likewise, companies of all sizes are addressing the needs of consumers and customers by migrating onto digital platforms and leveraging on digital tools to ensure business continuity and sustainability.

The primacy of digital workers is also evident from the fact that their demand has skyrocketed over the previous two years at a time when unemployment in Malaysia rose to 4.5% in 2020 and 4.8% in 2021.

This pressing requirement for digital talents will remain acute in the current year (2022) despite an upturn in employment across the board. Data from leading recruitment agency, Jobstreet by SEEK, reflects this scenario.

Jobstreet recorded 106,275 job postings for digital-related positions in 2021. However, this figure has already reached 99,583 in the first half of 2022 and is on track to hit 200,000 or almost double the 2021 total.

Clearly, such numbers have been boosted by the trend towards eCommerce, the gig economy, remote-working and online interactions as businesses turned to anything and everything digital in order to circumvent pandemic restrictions on business operations.

As a result, a tsunami of opportunities is now emerging in areas such as fintech, software development and eCommerce as well as specialised job positions like tech and network engineers, cyber security specialists, data analysts; and jobs in artificial intelligence, digital marketing and digital content.

This section looks at the salary landscape for digital professionals in Malaysia with data derived from job openings advertised in Jobstreet by SEEK during the period January 2021 to June 2022. The data covers salary trends of various positions and levels across selected industries. It also includes PIKOM estimates and projections for 2022 and 2023. Apart from salary trends, the section also reviews top-paying industries. In addition, we review the salary trends for specialised jobs in cybersecurity and AI / data science.

TRACKING PARAMETERS AND METHODOLOGY

The results presented in in this Chapter are based on estimates using Jobstreet salary records, which are essentially what industry players offer digital professionals on an average. The scope of information reported by Jobstreet entails job positions, industry and state locations.

The data extends to more than 100,000 records, but they are subject to heavy sanitisation to remove irrelevant records such as overseas job postings, presence of extreme values, erroneous and unrealistic records, and non-executive job categories.

Based on industry knowledge and past experience, the analysis of data is confined to five job position levels, as shown in **TABLE A**. In order to reflect the situation on the ground, the salary records selected for analysis are categorised according to these levels.

Table A: Job Position Levels According to Salary Ranges

Entry Level	Junior Executive	Senior Executive	Manager	Senior Manager	Overall
RM2,500 – RM3,000	RM3,000 – RM5,000	RM5,000 – RM8,000	RM8,000 – RM20,000	RM20,000 – RM40,000	RM2,500 – RM40,000

Similarly, for the sake of consistency in reporting and to provide meaningful comparisons with previous trends, only 22 industries are considered in the final analysis as shown in **TABLE B**.

Table B: 22 Selected Industries

1.	Agriculture / Plantation / Aquaculture
2.	Automotive / Heavy Industry / Machinery
3.	Banking
4.	Contact Centre / IT-Enabled Services / BPO
5.	Computer / Information Technology (Hardware)
6.	Computer / Information Technology (Software)
7.	Construction / Building / Engineering
8.	Consulting (Business / Technical)
9.	Education
10.	Electrical & Electronics
11.	Financial Services / Securities / Insurance
12.	Hotel / Restaurant / Food Service / Hospitality
13.	Manufacturing / Production
14.	Oil / Gas / Petroleum
15.	Printing / Publishing
16.	Property / Real Estate
17.	Science & Technology / Aerospace / Bio Technology
18.	Semiconductor / Wafer Fabrication
19.	Telecommunication
20.	Transport / Storage / Freight / Shipping
21.	Utilities
22.	Wholesale / Retail / Trading

Excel worksheets and a standard statistical package are used for all data entry, data manipulation, computation and in estimation procedures. We used the Pearson product moment correlation, moving average, linear and quadratic including R-square values for trend analysis and short-term forecasts for 2022 and 2023, wherever applicable.

From 2009 to 2018, salaries for the Manager and Senior Manager position levels were published based on data from an average twelve and seven industries respectively in comparison to 22 industries for entry, junior executives and senior executive levels.

Thus, in order to streamline the average salaries for all 22 industries by job category, an attempt was made to provide estimates for missing data using the trend estimation procedure. As a first step, efforts were made to establish the correlation between average salaries in the software industry against other known industries using the Pearson product moment correlation as shown on this page.

$$rxy = \frac{N\sum XY - \sum X \sum Y}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

N = number of pairs of scores
∑xy = sum of the products of paired scores
∑x = sum of x scores
∑y = sum of y scores
∑x2 = sum of squared x scores
∑y2 = sum of squared y scores

The correlation matrix that was generated for the 22 industries using the salary data for the period 2010 – 2022 is shown in **TABLE C**. The overall average of all the coefficient values is 0.897; the maximum value is 0.997 and minimum is 0.557. This indicated that the correlation of salary trends among the industries is very high.

For all industries except for Property / Real Estate, the correlation is higher than 0.9; even by statistical standards, 0.83 is already considered a high correlation. After establishing this high correlation, an attempt was made to gauge the salary estimates of unavailable information at managerial and senior managerial categories.

In recent years especially the post-pandemic era, the salary records were subject to a high degree of fluctuation in certain industries. Recognising this statistical concern, three-year moving average estimation procedures were used to iron out undue fluctuations, after which a smoothening process was applied to produce estimates for 2023.

Table C: Correlation Matrix for 22 Industries

Industry		V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21
Agriculture / Plantation / Aquaculture	V1																					
Automotive / Heavy Industry / Machinery	V2	0.919																				
Banking	V3	0.944	0.953																			
Contact Centre / IT-Enabled Services / BPO	V4	0.964	0.937	0.988																		
Computer / Information Technology (Hardware)	V5	0.930	0.981	0.947	0.953																	
Computer / Information Technology (Software)	V6	0.775	0.914	0.798	0.805	0.940																
Construction / Building / Engineering	V7	0.931	0.992	0.971	0.965	0.986	0.899															
Consulting (Business/Technical)	V8	0.880	0.976	0.913	0.914	0.989	0.974	0.973														
Education	V9	0.935	0.982	0.940	0.948	0.999	0.944	0.984	0.990													
Electrical & Electronics	V10	0.854	0.822	0.940	0.910	0.785	0.554	0.852	0.726	0.772												
Financial Services/Securities/Insurance	V11	0.954	0.945	0.997	0.994	0.948	0.795	0.966	0.910	0.942	0.930											
Hotel/Restaurant/Food Service/Hospitality	V12	0.886	0.965	0.902	0.913	0.991	0.971	0.965	0.993	0.991	0.708	0.907										
Manufacturing / Production	V13	0.921	0.965	0.925	0.935	0.993	0.948	0.966	0.983	0.993	0.746	0.926	0.988									
Oil / Gas / Petroleum	V14	0.912	0.958	0.979	0.966	0.961	0.854	0.971	0.939	0.952	0.886	0.966	0.927	0.955								
Printing / Publishing	V15	0.709	0.905	0.826	0.811	0.910	0.950	0.906	0.949	0.903	0.643	0.811	0.932	0.899	0.882							
Property / Real Estate	V16	0.859	0.951	0.965	0.945	0.951	0.866	0.967	0.942	0.939	0.868	0.951	0.927	0.937	0.988	0.926						
Science & Technology / Aerospace / Bio Technology	V17	0.953	0.879	0.972	0.969	0.876	0.668	0.903	0.814	0.870	0.958	0.978	0.815	0.854	0.922	0.678	0.886					
Semiconductor / Wafer Fabrication	V18	0.759	0.934	0.841	0.827	0.939	0.978	0.923	0.973	0.936	0.642	0.827	0.959	0.937	0.901	0.989	0.927	0.703				
Telecommunication	V19	0.855	0.947	0.969	0.949	0.938	0.840	0.967	0.929	0.926	0.893	0.957	0.910	0.911	0.974	0.917	0.993	0.894	0.907			
Transport/Storage/Freight/Shipping	V20	0.901	0.978	0.908	0.917	0.991	0.965	0.976	0.993	0.993	0.724	0.908	0.994	0.986	0.933	0.927	0.928	0.821	0.956	0.913		
Utilities	V21	0.722	0.904	0.788	0.778	0.920	0.988	0.887	0.959	0.919	0.556	0.778	0.955	0.925	0.853	0.973	0.881	0.644	0.991	0.854	0.945	
Wholesale/Retail/Trading	V22	0.740	0.916	0.827	0.815	0.930	0.975	0.907	0.964	0.925	0.621	0.812	0.952	0.934	0.895	0.988	0.923	0.686	0.997	0.898	0.946	0.991

Sources: **Jobstreet & PIKOM estimates**

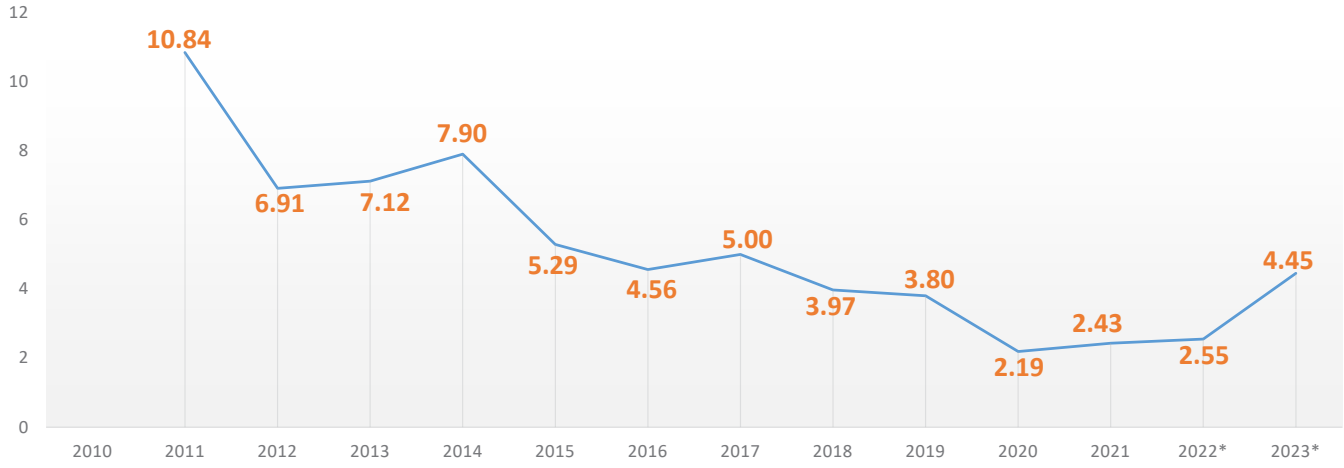
Table 1: Average Monthly Salaries of Digital Professionals (Overall and By Position Level) (RM and %) 2010 - 2023

	Entry Level	Junior Executive	Senior Executive	Manager	Senior Manager	Overall
2010	2,181	2,936	4,514	7,005	10,795	5,626
2011	2,238	3,151	5,039	7,837	12,166	6,236
2012	2,324	3,205	5,344	8,434	13,674	6,667
2013	2,438	3,459	5,744	8,986	14,661	7,142
2014	2,581	3,719	6,157	9,591	16,057	7,706
2015	2,718	3,894	6,483	10,195	17,053	8,114
2016	2,817	4,052	6,727	10,646	18,132	8,484
2017	2,958	4,259	7,057	11,168	19,147	8,908
2018	3,080	4,458	7,469	11,888	20,521	9,262
2019	3,210	4,663	7,865	12,589	21,916	9,614
2020	3,282	4,716	7,841	12,994	22,497	9,825
2021	3,398	4,816	8,020	13,152	22,558	10,064
2022*	3,560	5,020	8,289	13,882	23,057	10,321
2023*	3,667	5,270	8,654	14,443	24,016	10,780
Y-o-Y 2020-2021	3.53	2.12	2.28	1.22	0.27	2.43
Y-o-Y 2021-2022	4.77	4.24	3.35	5.55	2.21	2.55
AAGR 2012-2021	4.62	5.03	5.01	5.59	6.50	5.10

*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

Chart 1: Growth Rate of Overall Average Monthly Salaries of Digital Professionals (%) 2011 - 2023



*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

Salaries of Digital Jobs in Malaysia

Initially, the demand for digital talents was not matched by salary increases during the height of the pandemic.

Then, employers were hard hit by a slump in business and sought to control overheads by reducing or in most cases maintaining wage levels. As such, the normal annual increments for employees were taken off the table. Employers were also able to fill vacancies at par or lower rates from among the ranks of the newly-retrenched, many of whom would be considered desperate for guaranteed employment and regular income.

In 2022 following the reopening of business sectors, the salaries and employment of digital professionals are gradually returning to normal and projected to rise further in 2023 (See **TABLE 1** and **CHART 1**).

The average salary of digital professionals increased by 2.43% to RM10,064 in 2021. On the assumption that there will be continuity in the increase with the sustained recovery of the economy and by extrapolating, the average salary is expected to increase by 2.55% to RMRM10,321 in 2022, then by 4.45% to RM10,780 in 2023.

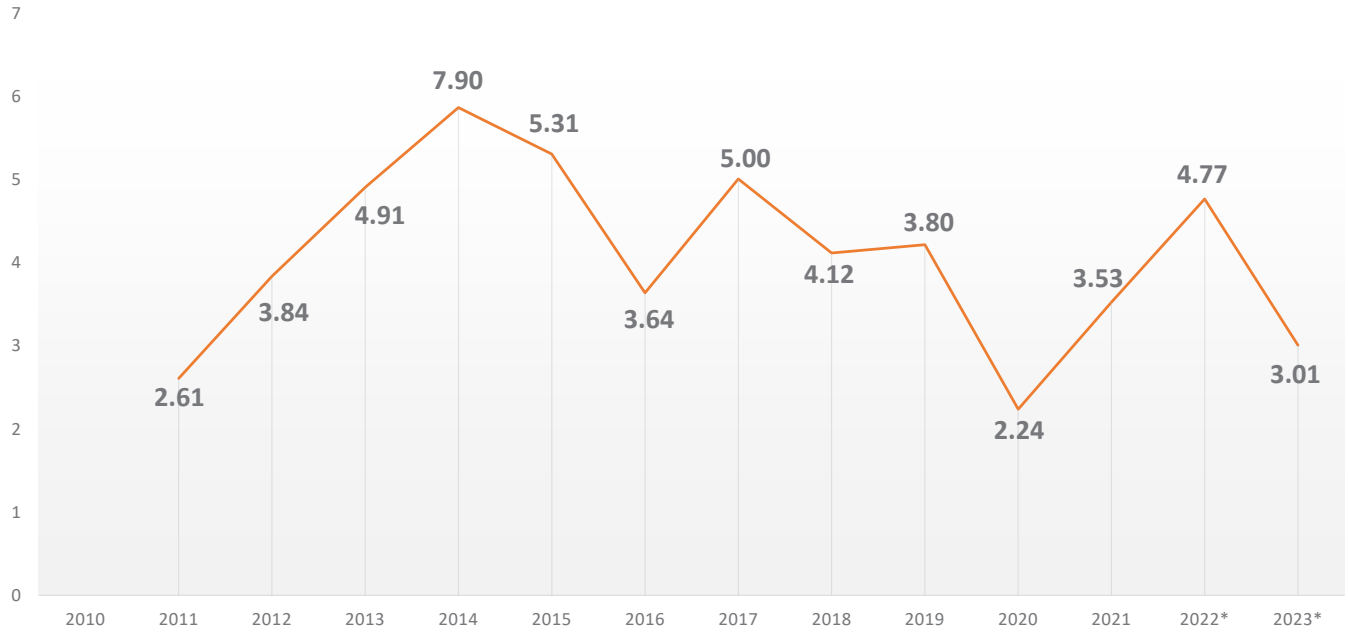
Table 2: Growth Rates of Salaries of Digital Professionals (By Position Level) (%) 2010 - 2023

	RM2500 -RM3000	RM3000-RM5000	RM5000-RM8000	RM8000-RM20000	RM20000-RM40000	RM2500-RM40000
	Entry Level	Junior Executive	Senior Executive	Manager	Senior Manager	Overall
2011	2.61	7.32	11.63	11.88	12.70	10.84
2012	3.84	1.71	6.05	7.62	12.40	6.91
2013	4.91	7.93	7.49	6.54	7.22	7.12
2014	5.87	7.52	7.19	6.73	9.52	7.90
2015	5.31	4.71	5.29	6.30	6.20	5.29
2016	3.64	4.06	3.76	4.42	6.33	4.56
2017	5.01	5.11	4.91	4.90	5.60	5.00
2018	4.12	4.67	5.84	6.45	7.18	3.97
2019	4.22	4.60	5.30	5.90	6.80	3.80
2020	2.24	1.14	(0.31)	3.22	2.65	2.19
2021	3.53	2.12	2.28	1.22	0.27	2.43
2022*	4.77	4.24	3.35	5.55	2.21	2.55
2023*	3.01	4.98	4.40	4.04	4.16	4.45

*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

Chart 2: Growth Rates of Average Monthly Salaries of Entry Level Digital Professionals (%) 2010 - 2023



*** Forecast**

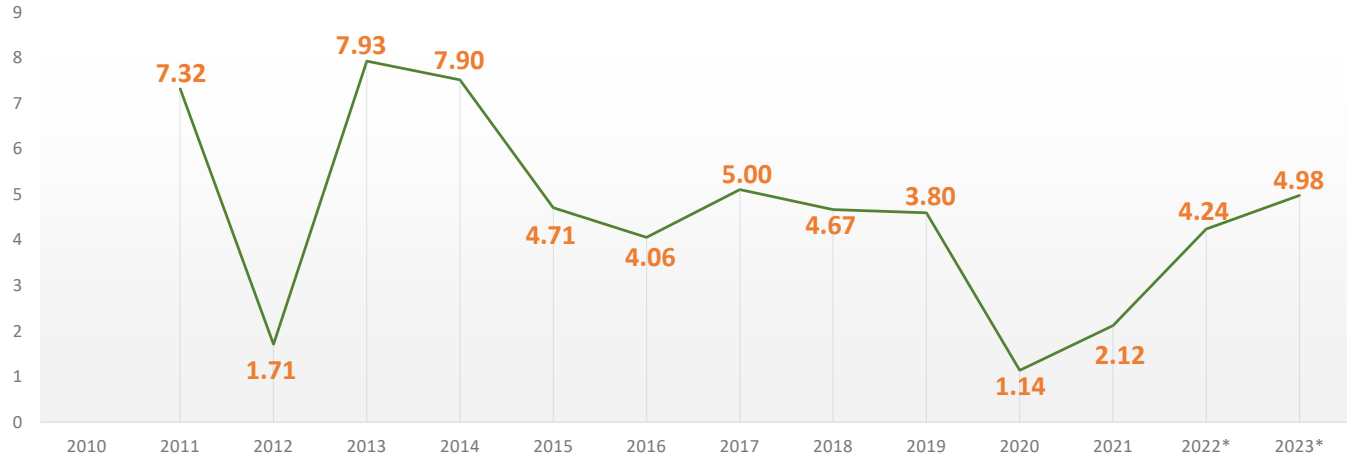
Sources: **Jobstreet & PIKOM estimates**

Further analysis of the data by position levels indicates that the average salary at entry level would grow by 4.77% in 2022 and 3.01% in 2023; 4.24% and 4.98% respectively for junior executives; 3.35% and 4.40% for senior executives; 5.55% and 4.04% for managers; and a corresponding 2.21% and 4.16% for senior managers (See **TABLE 2** and **CHARTS 2 - 6**).

It should be noted that these estimates are conservative due to challenges arising from the current Russia-Ukraine war, which is exerting pressure on the prices of goods and services, resulting in trade and business sanctions and causing further disruption to the global supply chain as well as other factors such as fluctuating exchange rates and political uncertainty in Malaysia. Notwithstanding this, PIKOM anticipates better returns for digital professionals due to the heightened demand in the job market.

TABLE 3 on the ratio of salaries against entry level positions shows that the gap dipped marginally in 2020 and 2021 for all categories. This gap is expected to also narrow marginally for all categories except for manager level digital professionals in 2022.

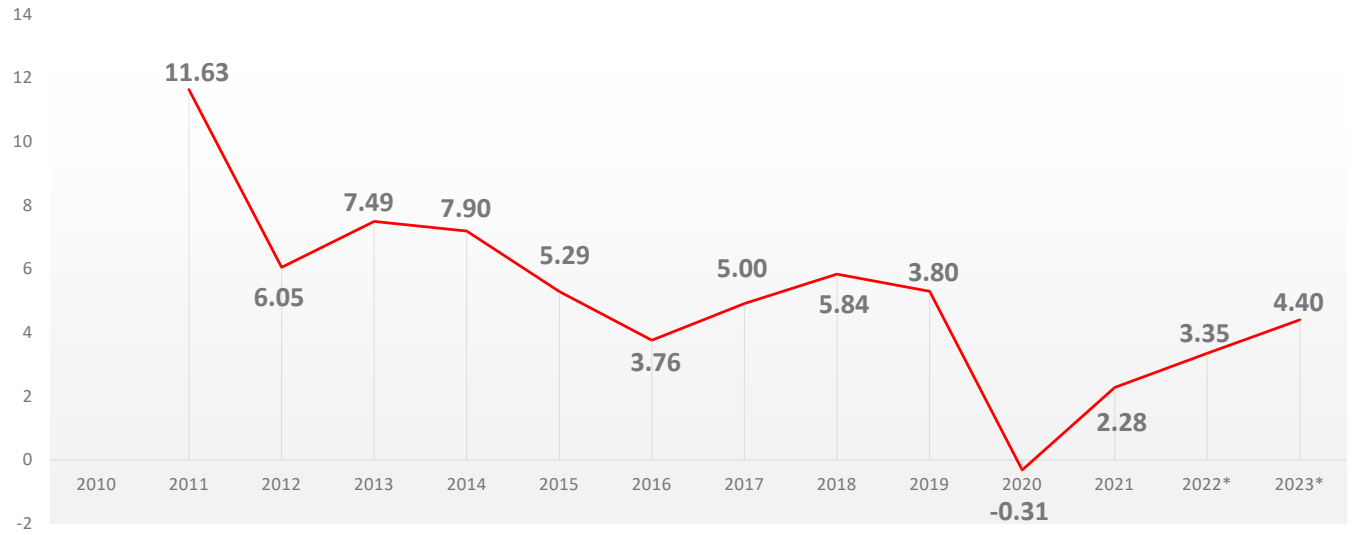
Chart 3: Growth Rates of Average Monthly Salaries of Junior Executive Digital Professionals (%) 2010 - 2023



*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

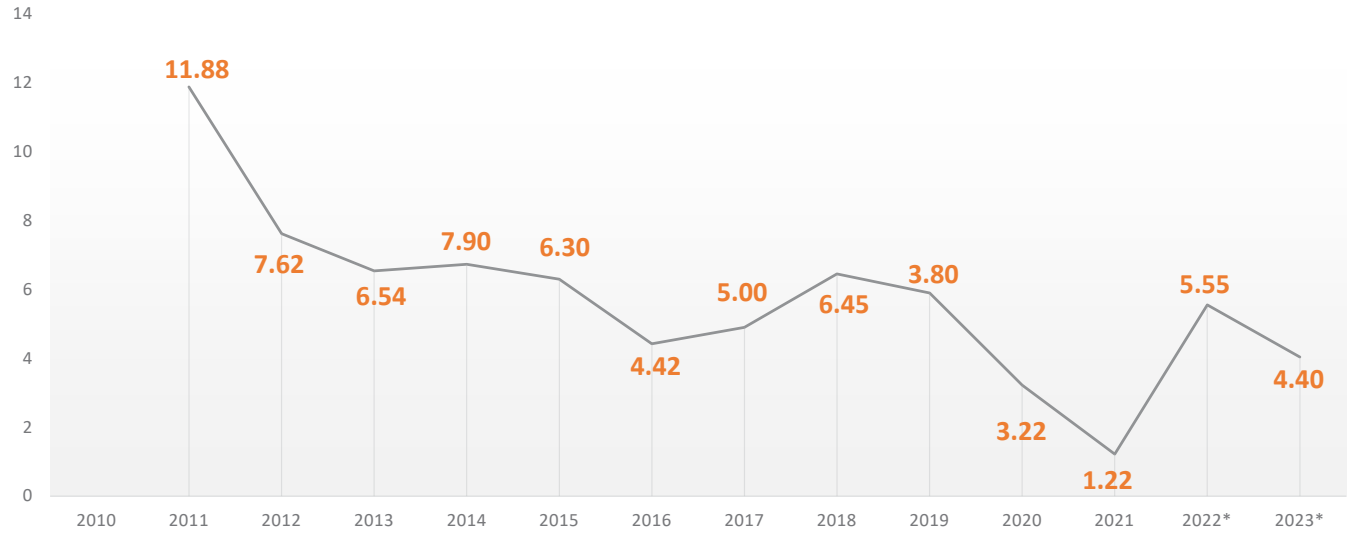
Chart 4: Growth Rates of Average Monthly Salaries of Senior Executive Digital Professionals (%) 2010 - 2023



*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

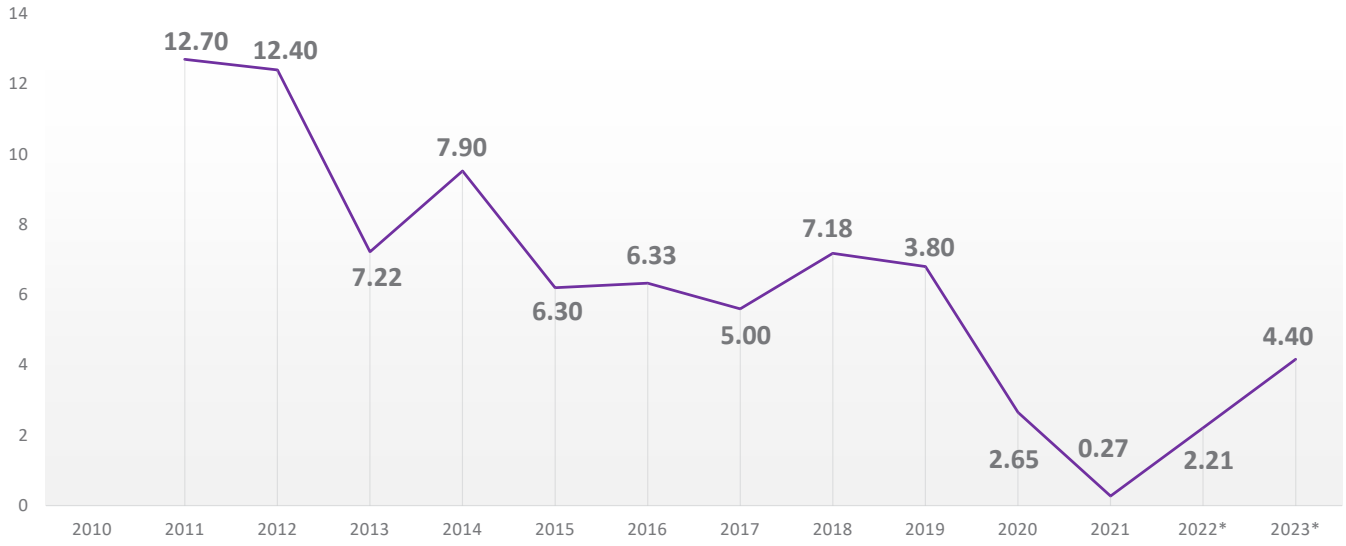
Chart 5: Growth Rates of Average Monthly Salaries of Manager Level Digital Professionals (%) 2010 - 2023



*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

Chart 6: Growth Rates of Average Monthly Salaries of Senior Manager Digital Professionals (%) 2010 - 2023



*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

Table 3: Average Monthly Salaries Benchmarked Against Entry Level Salaries (RM) 2010 - 2023

Year	RM2500 -RM3000	RM3000-RM5000	RM5000-RM8000	RM8000-RM20000	RM30000-RM40000	RM2500-RM40000
	Entry Level	Junior Executive	Senior Executive	Manager	Senior Manager	Overall
2010	1.00	1.35	2.07	3.21	4.95	2.58
2011	1.00	1.41	2.25	3.50	5.44	2.79
2012	1.00	1.38	2.30	3.63	5.88	2.87
2013	1.00	1.42	2.36	3.69	6.01	2.93
2014	1.00	1.44	2.39	3.72	6.22	2.99
2015	1.00	1.43	2.39	3.75	6.27	2.99
2016	1.00	1.44	2.39	3.78	6.44	3.01
2017	1.00	1.44	2.39	3.78	6.47	3.01
2018	1.00	1.45	2.43	3.86	6.66	3.01
2019	1.00	1.45	2.45	3.92	6.83	3.00
2020	1.00	1.44	2.39	3.96	6.85	2.99
2021	1.00	1.42	2.36	3.87	6.64	2.96
2022*	1.00	1.41	2.33	3.90	6.48	2.90
2023*	1.00	1.44	2.36	3.94	6.55	2.94

*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

In 2023, the salary gap is expected to grow in all categories, meaning that digital jobs in higher level positions may net better average incomes compared to their counterparts in entry level positions.

That said, the overall ratio of digital salaries among the positions are still consistently intact, with few drastic changes except for marginal statistical fluctuations experienced during the time series years.

TABLE 4 presents the average monthly salaries of digital professionals by position level and by industry in 2021. From this table, two perspectives are presented; first is benchmarking against the entry level position as depicted in **TABLE 5** and the other is the top five paying industries as depicted in **INFOGRAPHIC 1 - 6**.

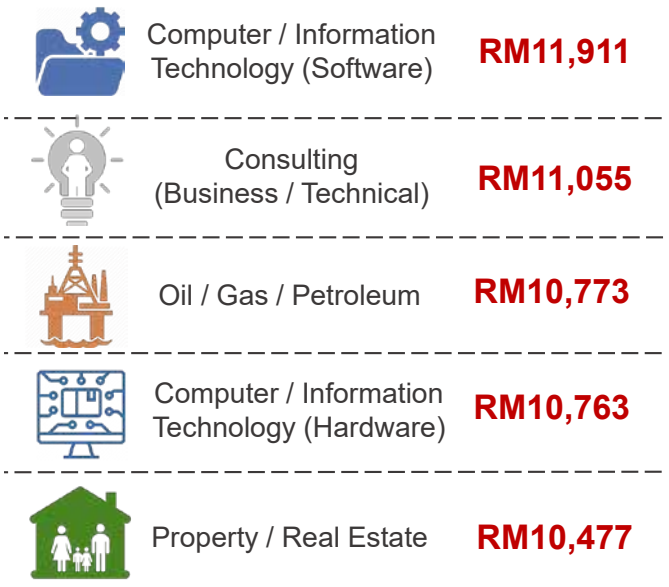
Referring to **TABLE 5,** digital professionals at other levels in the industry clusters of computer/IT hardware

Table 4: Average Monthly Salaries of Digital Professionals by Industry and Position Level (RM) 2021

Industry	Entry Level	Junior Executive	Senior Executive	Manager	Senior Manager	Overall
Agriculture / Plantation / Aquaculture	3,503	4,517	7,181	11,381	23,150	9,576
Automotive / Heavy Industry / Machinery	3,290	4,530	7,510	11,917	19,690	9,449
Banking	3,526	5,125	8,035	11,786	26,526	9,700
Contact Centre / IT-Enabled Services / BPO	3,377	4,773	7,546	12,013	29,944	9,982
Computer / Information Technology (Hardware)	3,455	5,034	8,095	11,695	28,519	10,763
Computer / Information Technology (Software)	3,545	5,150	8,588	15,109	18,019	11,911
Construction / Building / Engineering	3,305	4,579	7,442	12,092	22,499	9,705
Consulting (Business/Technical)	3,395	5,089	8,397	13,385	21,808	11,055
Education	3,168	4,724	7,644	11,913	18,738	9,040
Electrical & Electronics	3,554	4,950	8,101	12,392	32,282	10,093
Financial Services/Securities/Insurance	3,709	5,456	7,665	11,593	26,654	9,512
Hotel/Restaurant/Food Service/Hospitality	3,318	4,436	7.998	12,482	18,342	9,547
Manufacturing / Production	3,384	4,652	7,865	12,246	22,319	9,876
Oil / Gas / Petroleum	3,320	5,005	7,911	14,649	25,106	10,773
Printing / Publishing	3,917	4,220	6,600	12,500	17,080	9,807
Property / Real Estate	3,415	4,914	7,399	11,964	24,815	10,477
Science & Technology / Aerospace / Bio Technology	3,511	4,703	7,921	11,667	25,532	9,035
Semiconductor / Wafer Fabrication	3,513	5,176	8,437	12,279	17,358	9,704
Telecommunication	3,859	4,865	8,390	13,293	24,291	10,278
Transport/Storage/Freight/Shipping	3,285	4,761	7,774	13,421	19,206	9,953
Utilities	3,880	4,563	7,497	12,110	15,475	9,960
Wholesale/Retail/Trading	3,320	4,638	7,130	12,134	16,113	9,608

Sources: **Jobstreet & PIKOM estimates**

Infographic 1: Top Paying Industries for Digital Professionals (Overall) 2021



Source: **Jobstreet**

and software, consulting business/technical, oil/gas/petroleum, property/real estate and transportation/storage/freight/shipping are paid at least 3 times more than entry level positions.

Specifically, the computer/IT (software) industry registered the highest ratio of 3.36, which when viewed according to position levels indicates that junior executives earned 1.45 times, senior executives 2.42 times, managers 4.26 times and senior managers 7.66 times more for every RM1 earned by entry level digital professionals.

As shown in **INFOGRAPHIC 2**, the top five paying industries for senior managers were computer/IT software and hardware, consulting business/technical, property/real estate and oil/gas/petroleum.

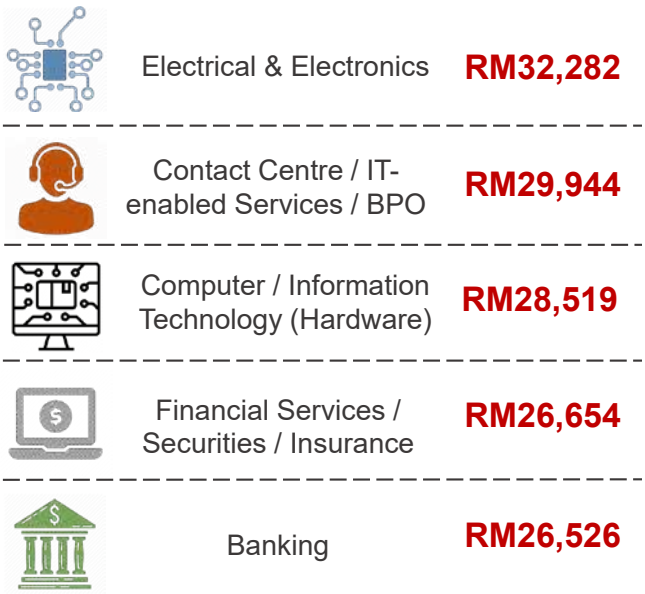
For the manager position level, the top five paying industries were computer/IT software, oil/gas/petroleum, transport/storage/freight/shipping, consulting business/technical and telecommunication (See **INFOGRAPHIC 3**).

Table 5: Benchmarking Salaries of Digital Professionals Against Entry Level Position 2021

Industry	Entry Level	Junior Executive	Senior Executive	Manager	Senior Manager	Overall
Agriculture / Plantation / Aquaculture	1.00	1.29	2.05	3.25	6.61	2.73
Automotive / Heavy Industry / Machinery	1.00	1.38	2.28	3.62	5.99	2.87
Banking	1.00	1.45	2.28	3.34	7.52	2.75
Contact Centre / IT-Enabled Services / BPO	1.00	1.41	2.23	3.56	8.87	2.96
Computer / Information Technology (Hardware)	1.00	1.46	2.34	3.39	8.25	3.12
Computer / Information Technology (Software)	1.00	1.45	2.42	4.26	5.08	3.36
Construction / Building / Engineering	1.00	1.39	2.25	3.66	6.81	2.94
Consulting (Business/Technical)	1.00	1.50	2.47	3.94	6.42	3.26
Education	1.00	1.49	2.41	3.76	5.91	2.85
Electrical & Electronics	1.00	1.39	2.28	3.49	9.08	2.84
Financial Services/Securities/Insurance	1.00	1.47	2.07	3.13	7.19	2.56
Hotel/Restaurant/Food Service/Hospitality	1.00	1.34	2.41	3.76	5.53	2.88
Manufacturing / Production	1.00	1.37	2.32	3.62	6.59	2.92
Oil / Gas / Petroleum	1.00	1.51	2.38	4.41	7.56	3.24
Printing / Publishing	1.00	1.08	1.68	3.19	4.36	2.50
Property / Real Estate	1.00	1.44	2.17	3.50	7.27	3.07
Science & Technology / Aerospace / Bio Technology	1.00	1.34	2.26	3.32	7.27	2.57
Semiconductor / Wafer Fabrication	1.00	1.47	2.40	3.50	4.94	2.76
Telecommunication	1.00	1.26	2.17	3.44	6.29	2.66
Transport/Storage/Freight/Shipping	1.00	1.45	2.37	4.09	5.85	3.03
Utilities	1.00	1.18	1.93	3.12	3.99	2.57
Wholesale/Retail/Trading	1.00	1.40	2.15	3.65	4.85	2.89

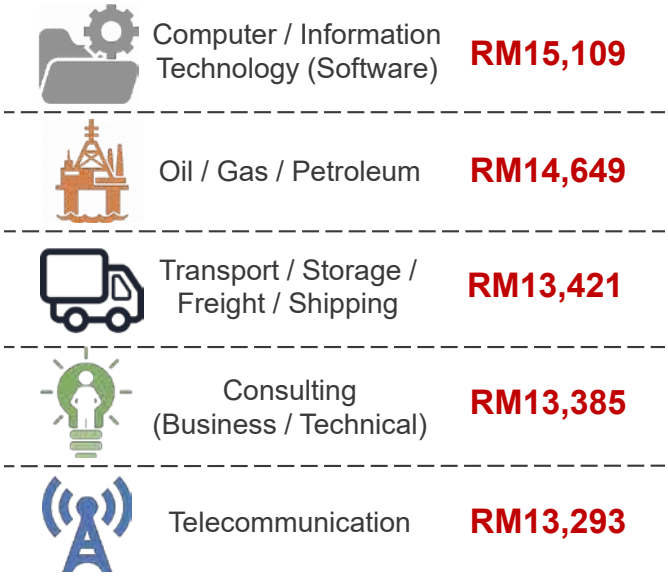
Sources: **Jobstreet & PIKOM estimates**

Infographic 2: Top Paying Industries for Digital Professionals (Senior Manager) 2021



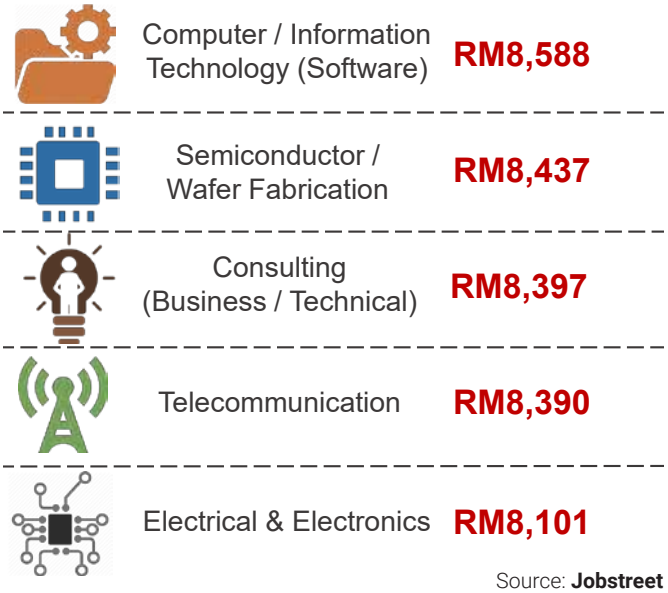
Source: **Jobstreet**

Infographic 3: Top Paying Industries for Digital Professionals (Manager) 2021



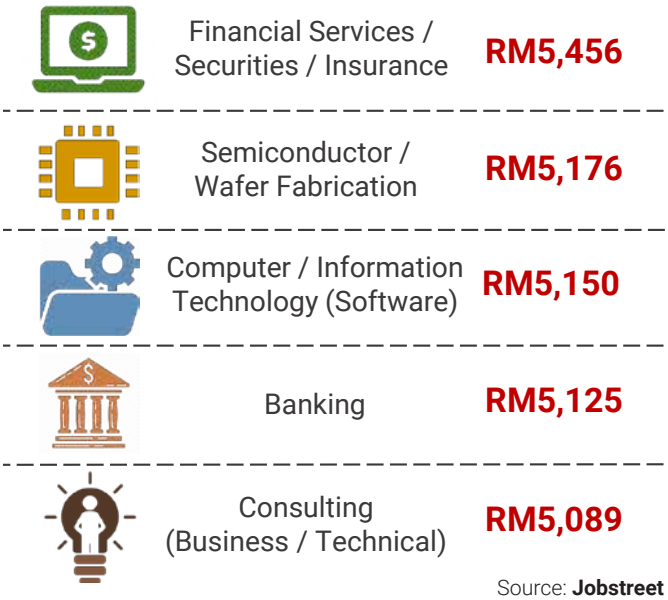
Source: **Jobstreet**

Infographic 4: Top Paying Industries for Digital Professionals (Senior Executive) 2021



Source: **Jobstreet**

Infographic 5: Top Paying Industries for Digital Professionals (Junior Executive) 2021



Source: **Jobstreet**

TABLE 6 presents the average monthly salaries time series of digital professionals by industry. In 2022, salaries in all industries are poised to register healthy growth rates in tandem with the current economic recovery.

Among the industries, the agriculture/plantation/ aquaculture followed by education and construction/ building/engineering are expected to register higher growth rates in salaries of up to 8.00%, 7.83% and 7.31% respectively.

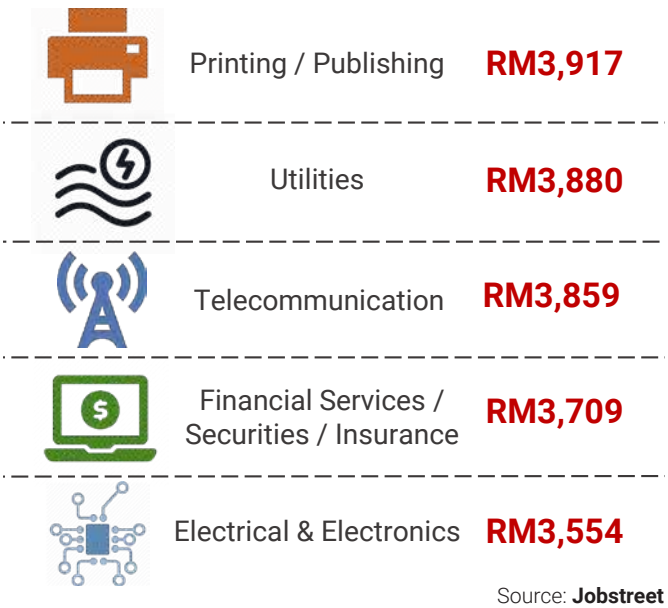
TABLE 6 also shows the annual average growth rate (AAGR) over the past five years (2016-2021). During this period, the printing and publishing industry cluster registered the highest growth rate of 15.51% followed by computer/IT (software) by 12.56%, utilities by 11.57% and wholesale/retail/trading by 11.73%.

At the same time, the 5-year AAGR for agriculture, electrical/electronics, science technology/ aerospace/ bio-technology and computer/IT hardware industries indicate marginal growth in salaries, if not stagnation.

At the entry level, the highest growth rates in salaries are expected in the automobile/heavy industry/machinery (8.69%), electrical & electronics (8.46%), construction/ building/engineering (8.14%) industry clusters (See **TABLE 7**).

In terms of AAGR (entry level) for the period 2016-2021, double-digit growth rates are on track for

Infographic 6: Top Paying Industries for Digital Professionals (Entry Level) 2021



Source: **Jobstreet**

printing and publishing (12.76%), utilities (10.84%) and telecommunication (10.65%). In comparison, the construction/building/engineering registered an AAGR of only 2.53% in the same period.

Further analysis reveals that the average salary growth in the automobile/heavy industry/machinery (-1.80%), electrical and electronics (1.68%), banking (2.53%) and construction/ building/engineering (2.53%) were only marginal in the five-year timeframe for entry level positions.

Table 6: Average Monthly Salaries of Digital Professionals at Overall Level by Industry (RM) 2010 - 2022

Industry	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022*	Y-o-Y 2021-2022	AAGR : 2016-2021
Agriculture / Plantation / Aquaculture	4,645	5,426	5,788	6,664	7,797	8,231	8,740	9,471	10,269	9,744	9,895	9,576	10,343	8.00	1.91
Automotive / Heavy Industry / Machinery	6,184	6,339	6,507	7,009	7,409	7,527	7,781	8,092	8,399	9,352	8,641	9,449	9,844	4.18	4.29
Banking	5,577	6,175	6,781	6,903	7,453	7,857	8,256	8,696	9,193	10,338	10,610	9,700	10,282	5.99	3.50
Contact Centre / IT-Enabled Services / BPO	6,379	6,834	7,251	7,573	8,230	8,467	8,817	9,247	9,699	9,871	10,904	9,982	10,465	4.84	2.64
Computer / Information Technology (Hardware)	5,798	6,227	6,577	7,135	7,473	7,841	8,392	8,876	9,376	9,492	9,802	10,763	11,370	5.63	5.65
Computer / Information Technology (Software)	5,079	5,485	5,721	5,998	6,750	7,126	7,316	7,697	8,121	8,191	8,176	11,911	12,549	5.35	12.56
Construction / Building / Engineering	4,743	4,969	5,029	6,196	6,528	6,814	7,262	7,759	8,250	9,372	9,295	9,705	10,414	7.31	6.73
Consulting (Business/Technical)	5,830	6,092	6,436	6,745	7,430	7,842	8,016	8,392	8,811	9,348	9,413	11,055	11,626	5.17	7.58
Education	3,781	4,180	4,578	5,156	5,707	6,172	6,569	7,062	7,614	7,712	7,832	9,040	9,748	7.83	7.52
Electrical & Electronics	7,354	7,936	8,275	8,657	9,057	9,194	9,746	10,179	10,623	12,679	12,775	10,093	10,610	5.13	0.71
Financial Services/Securities/ Insurance	5,547	5,803	6,744	6,872	7,348	7,826	8,209	8,654	9,172	9,876	10,505	9,512	10,081	5.98	3.18
Hotel/Restaurant/Food Service/ Hospitality	5,293	5,390	5,967	6,411	6,603	6,770	7,199	7,579	7,949	7,899	8,191	9,547	9,987	4.61	6.52
Manufacturing / Production	5,600	6,523	6,691	6,913	7,220	7,546	7,980	8,356	8,759	8,609	8,830	9,876	10,314	4.43	4.75
Oil / Gas / Petroleum	6,864	8,208	8,011	8,082	8,512	8,560	9,145	9,527	9,889	10,742	10,977	10,773	11,217	4.12	3.56
Printing / Publishing	4,588	4,832	4,768	5,175	5,438	5,366	5,523	5,717	5,877	7,595	8,035	9,807	10,245	4.46	15.51
Property / Real Estate	4,829	6,258	6,334	6,527	6,782	6,823	7,490	7,926	8,347	10,180	10,830	10,477	11,120	6.13	7.98
Science & Technology / Aerospace / Bio Technology	5,038	5,697	6,932	6,951	7,656	7,911	8,530	9,140	9,803	10,455	10,943	9,035	9,652	6.83	1.18
Semiconductor / Wafer Fabrication	6,158	6,542	6,508	6,552	6,938	6,865	7,117	7,315	7,489	8,326	8,169	9,704	9,993	2.99	7.27
Telecommunication	5,846	6,367	6,564	6,943	7,246	7,412	7,750	8,075	8,405	10,360	11,005	10,278	10,818	5.26	6.52
Transport/Storage/Freight/Shipping	5,786	6,068	6,102	6,911	7,327	7,353	7,689	8,083	8,435	8,606	8,587	9,953	10,391	4.40	5.89
Utilities	5,090	5,429	5,780	5,814	5,974	6,023	6,310	6,652	6,862	7,539	7,274	9,960	10,331	3.73	11.57
Wholesale/Retail/Trading	4,555	5,449	5,366	5,381	5,656	5,689	6,056	6,228	6,463	7,478	7,539	9,608	10,006	4.14	11.73

*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

Table 7: Average Monthly Salaries of Digital Professionals at Entry Level by Industry (RM) 2010 - 2022

Industry	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022*	Y-o-Y 2021-2022	AAGR : 2016-2021
Agriculture / Plantation / Aquaculture	2,293	2,536	2,735	2,828	2,658	2,876	2,989	3,078	3,184	3,094	3,104	3,503	3,606	2.95	3.44
Automotive / Heavy Industry / Machinery	1,731	2,175	2,175	2,763	3,063	3,387	3,615	3,955	4,324	3,812	3,742	3,290	3,576	8.69	(1.80)
Banking	2,000	2,225	2,425	2,425	2,875	3,008	3,130	3,335	3,566	3,651	3,756	3,526	3,755	6.50	2.53
Contact Centre / IT-Enabled Services / BPO	2,125	2,275	2,275	2,375	2,575	2,660	2,714	2,819	2,928	2,839	3,122	3,377	3,504	3.75	4.89
Computer / Information Technology (Hardware)	2,155	2,213	2,368	2,385	2,485	2,541	2,607	2,697	2,784	2,823	2,841	3,455	3,561	3.06	6.50
Computer / Information Technology (Software)	2,244	2,400	2,450	2,553	2,763	2,861	2,934	3,059	3,189	3,054	3,031	3,545	3,679	3.78	4.17
Construction / Building / Engineering	1,546	1,800	2,023	2,394	2,494	2,722	2,934	3,200	3,472	3,417	3,492	3,305	3,574	8.14	2.53
Consulting (Business/Technical)	2,125	2,275	2,325	2,525	2,625	2,742	2,832	2,965	3,094	3,038	3,072	3,395	3,534	4.11	3.97
Education	1,750	1,975	1,983	2,305	2,433	2,602	2,721	2,900	3,081	2,995	3,016	3,168	3,356	5.93	3.29
Electrical & Electronics	1,769	2,063	2,343	2,343	2,931	3,110	3,279	3,552	3,870	3,893	4,040	3,554	3,855	8.46	1.68
Financial Services/Securities/ Insurance	2,521	2,557	2,584	2,569	2,747	2,806	2,869	2,946	3,026	3,285	3,402	3,709	3,831	3.28	5.86
Hotel/Restaurant/Food Service/ Hospitality	2,199	2,225	2,288	2,288	2,340	2,362	2,388	2,425	2,461	2,514	2,529	3,318	3,377	1.77	7.79
Manufacturing / Production	2,434	2,508	2,508	2,558	2,655	2,698	2,724	2,776	2,828	2,823	2,811	3,384	3,454	2.06	4.85
Oil / Gas / Petroleum	2,705	2,764	2,767	2,738	2,558	2,681	2,786	2,803	2,828	3,035	3,092	3,320	3,377	1.70	3.83
Printing / Publishing	2,131	2,225	2,300	2,300	2,300	2,310	2,391	2,452	2,497	3,006	3,209	3,917	4,037	3.07	12.76
Property / Real Estate	1,961	2,937	2,388	2,339	2,261	2,358	2,539	2,580	2,626	3,188	3,378	3,415	3,525	3.23	6.90
Science & Technology / Aerospace / Bio Technology	2,162	2,350	2,500	2,500	2,500	2,521	2,683	2,806	2,899	3,087	3,178	3,511	3,633	3.47	6.17
Semiconductor / Wafer Fabrication	2,442	2,783	2,787	2,721	2,616	2,759	2,863	2,908	2,968	3,024	3,033	3,513	3,586	2.08	4.54
Telecommunication	2,008	2,120	2,150	2,280	2,375	2,457	2,518	2,613	2,706	3,137	3,332	3,859	4,031	4.44	10.65
Transport/Storage/Freight/Shipping	2,290	2,330	2,302	2,638	2,484	2,617	2,642	2,704	2,762	2,749	2,742	3,285	3,361	2.31	4.87
Utilities	2,113	2,325	2,396	2,437	2,271	2,428	2,516	2,807	2,858	2,740	2,749	3,880	4,012	3.41	10.84
Wholesale/Retail/Trading	1,725	1,800	1,925	2,000	2,075	2,145	2,218	2,315	2,408	2,554	2,597	3,320	3,455	4.08	9.94

*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

Table 8: Average Monthly Salaries of Digital Professionals at Junior Executive Level by Industry (RM) 2010 - 2022

Industry	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022*	Y-o-Y 2021-2022	AAGR : 2016-2021
Agriculture / Plantation / Aquaculture	2,968	3,372	3,683	3,900	4,025	4,268	4,485	4,741	5,008	4,693	4,694	4,517	4,729	4.70	0.14
Automotive / Heavy Industry / Machinery	3,075	3,100	3,563	3,663	3,878	3,994	4,063	4,247	4,434	4,587	4,223	4,530	4,703	3.82	2.30
Banking	3,262	3,400	3,475	3,543	4,160	4,165	4,305	4,537	4,759	5,178	5,170	5,125	5,391	5.20	3.81
Contact Centre / IT-Enabled Services / BPO	2,925	3,225	3,225	3,400	3,874	3,913	4,027	4,244	4,451	4,268	4,653	4,773	4,988	4.52	3.70
Computer / Information Technology (Hardware)	2,963	3,002	3,100	3,213	3,350	3,421	3,529	3,649	3,762	3,852	3,847	5,034	5,198	3.26	8.53
Computer / Information Technology (Software)	2,750	3,025	3,063	3,275	3,900	3,947	4,074	4,343	4,606	4,303	4,242	5,150	5,424	5.33	5.28
Construction / Building / Engineering	2,675	2,900	2,950	3,152	3,352	3,424	3,494	3,644	3,785	4,369	4,186	4,579	4,780	4.39	6.21
Consulting (Business/Technical)	3,025	3,150	3,283	3,350	4,041	4,067	4,246	4,518	4,786	4,631	4,626	5,089	5,369	5.50	3.97
Education	2,175	2,523	2,575	2,888	3,150	3,288	3,434	3,664	3,891	3,857	3,819	4,724	4,998	5.80	7.51
Electrical & Electronics	2,725	3,113	3,228	3,229	3,513	3,582	3,675	3,831	3,989	4,556	4,524	4,950	5,167	4.38	6.94
Financial Services/Securities/ Insurance	3,262	3,400	3,479	3,543	4,160	4,165	4,306	4,538	4,760	4,983	5,144	5,456	5,730	5.02	5.34
Hotel/Restaurant/Food Service/ Hospitality	2,525	2,575	3,045	3,258	3,355	3,594	3,810	4,054	4,310	3,856	4,047	4,436	4,670	5.27	3.29
Manufacturing / Production	3,025	3,095	3,157	3,292	3,392	3,464	3,565	3,676	3,778	3,683	3,679	4,652	4,780	2.75	6.10
Oil / Gas / Petroleum	3,500	3,675	3,725	3,775	3,875	3,979	4,182	4,319	4,449	4,604	4,675	5,005	5,174	3.38	3.93
Printing / Publishing	2,699	2,790	2,950	3,215	3,215	3,375	3,521	3,678	3,829	4,389	4,753	4,220	4,431	4.98	3.97
Property / Real Estate	2,538	3,905	3,215	3,225	3,425	3,500	3,810	3,975	4,130	4,836	5,108	4,914	5,161	5.03	5.79
Science & Technology / Aerospace / Bio Technology	2,585	2,925	3,069	3,171	3,888	3,907	4,023	4,305	4,588	4,790	4,867	4,703	4,997	6.25	3.38
Semiconductor / Wafer Fabrication	3,160	3,700	3,753	3,753	3,963	4,094	4,297	4,481	4,668	4,586	4,586	5,176	5,371	3.77	4.09
Telecommunication	3,025	3,250	3,388	3,538	3,913	3,984	4,094	4,300	4,501	5,176	5,447	4,865	5,120	5.24	3.77
Transport/Storage/Freight/Shipping	2,964	3,098	3,100	3,638	3,763	3,884	3,965	4,166	4,344	4,170	4,146	4,761	4,951	3.98	4.02
Utilities	2,734	3,092	3,226	3,360	3,440	3,603	3,775	4,324	4,495	4,156	4,156	4,563	4,802	5.23	4.18
Wholesale/Retail/Trading	2,483	3,300	3,425	3,425	3,513	3,764	4,086	3,949	4,207	4,554	4,602	4,638	4,840	4.35	2.70

*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

Interestingly in the case of junior executives, the growth rates of salaries for most industries did not vary significantly with the highest growth rate of 6.25% in science & technology/aerospace/bio-technology and the lowest rate of 2.75% in the manufacturing/production industry clusters (See **TABLE 8**).

TABLE 9 also reveals structural changes in the growth rates of salaries when long-term AAGR (more than 10-year period) is compared against the short-term AAGR (2016-2021). Specifically, the AAGR 2016 – 2021 in the education industry declined from double digits to 7.51% but increased in the computer/IT (hardware) segment.

Similarly, the agriculture/plantation/aquaculture and automotive/heavy industry/machinery clusters show only marginal AAGR of 0.14% and 2.30% respectively, indicating digital professionals in the junior executive category did not enjoy better remuneration in the past.

Similar to junior executives, the growth rates of senior executive salaries in most industries in 2022 do not

Table 9: Average Monthly Salaries of Digital Professionals at Senior Executive Level by Industry (RM) 2010 - 2022

Industry	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022*	Y-o-Y 2021-2022	AAGR : 2016-2021
Agriculture / Plantation / Aquaculture	3,967	4,600	5,033	5,943	7,154	7,803	8,173	8,909	9,754	8,531	8,502	7,181	7,806	8.70	(2.43)
Automotive / Heavy Industry / Machinery	4,814	4,989	5,050	5,189	5,400	5,550	5,644	5,786	5,933	6,408	5,729	7,510	7,728	2.91	6.61
Banking	4,749	5,395	5,575	5,825	6,319	6,840	7,009	7,344	7,740	8,299	8,279	8,035	8,482	5.56	2.93
Contact Centre / IT-Enabled Services / BPO	4,428	4,556	4,750	5,054	6,125	6,160	6,423	6,850	7,280	6,790	7,290	7,546	7,985	5.81	3.50
Computer / Information Technology (Hardware)	4,577	4,769	4,835	5,110	5,410	6,038	6,056	6,269	6,544	6,575	6,550	8,095	8,468	4.61	6.73
Computer / Information Technology (Software)	4,505	4,769	5,160	5,400	5,999	6,612	6,672	7,004	7,416	6,989	6,842	8,588	9,041	5.27	5.74
Construction / Building / Engineering	4,250	4,500	4,575	4,700	5,322	5,364	5,553	5,813	6,071	6,941	6,511	7,442	7,812	4.97	6.80
Consulting (Business/Technical)	5,150	5,525	5,879	6,000	6,375	6,543	6,751	7,020	7,303	7,407	7,199	8,397	8,707	3.70	4.88
Education	3,225	4,100	4,100	4,165	4,475	4,913	5,127	5,383	5,696	5,692	5,573	7,644	8,061	5.46	9.82
Electrical & Electronics	3,915	4,750	5,119	5,233	5,800	6,095	6,490	6,910	7,375	7,804	7,804	8,101	8,626	6.49	4.96
Financial Services/Securities/ Insurance	4,749	5,261	5,450	5,825	6,319	6,938	7,046	7,387	7,798	8,044	8,305	7,665	8,099	5.65	1.76
Hotel/Restaurant/Food Service/ Hospitality	4,801	4,801	5,475	5,925	6,050	6,399	6,723	7,079	7,454	6,905	7,011	7,998	8,362	4.56	3.79
Manufacturing / Production	4,525	5,175	5,298	5,822	6,207	6,446	6,702	7,063	7,432	6,872	6,822	7,865	8,214	4.44	3.47
Oil / Gas / Petroleum	6,209	7,500	7,500	7,575	8,000	8,291	8,744	9,128	9,532	9,620	9,630	7,911	8,240	4.16	(1.91)
Printing / Publishing	4,000	4,150	4,154	4,550	4,800	4,851	4,896	5,060	5,212	6,348	6,542	6,600	6,877	4.20	6.96
Property / Real Estate	4,339	5,300	5,825	6,050	6,250	6,483	7,017	7,452	7,906	8,938	9,317	7,399	7,858	6.20	1.09
Science & Technology / Aerospace / Bio Technology	4,515	5,031	6,500	6,500	7,063	7,600	8,110	8,696	9,388	9,266	9,533	7,921	8,467	6.89	(0.47)
Semiconductor / Wafer Fabrication	5,563	5,685	5,810	5,875	6,225	6,303	6,414	6,576	6,738	7,070	6,757	8,437	8,667	2.73	6.31
Telecommunication	5,225	6,193	6,675	6,675	7,000	7,361	7,794	8,183	8,616	9,604	10,088	8,390	8,846	5.44	1.53
Transport/Storage/Freight/Shipping	5,229	5,400	5,610	6,320	6,730	6,943	7,183	7,559	7,927	7,524	7,352	7,774	8,117	4.41	1.65
Utilities	4,550	4,710	5,201	5,201	5,350	5,525	5,699	5,888	6,093	6,401	5,991	7,497	7,744	3.30	6.31
Wholesale/Retail/Trading	4,100	4,800	4,800	4,800	5,025	5,170	5,409	5,605	5,809	6,290	6,199	7,130	7,404	3.84	6.36

*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

differ significantly with the highest growth rate of 8.70% in agriculture/plantation/aquaculture and lowest rate of 2.73% in semiconductor/wafer fabrication.

Again, salaries of senior executives experienced the same structural changes in growth when long-term AAGR is compared against short-term AAGR (2016-2021). Specifically, the growth rates in education industry declined from double digits to 9.82% while in the automotive/heavy industry/machinery and utilities industries, the average rates increased to 6.1% and 6.31% respectively.

It can also be seen that industries such as agriculture/plantation/aquaculture, oil/gas/petroleum, science & technology/aerospace/bio-technology recorded negative growth rates or stagnation in recent years.

In the manager category, education followed by agriculture/plantation/aquaculture and construction/building/engineering are poised to register higher growth rates of 8.53%, 8.50% and 7.74% respectively in 2022 (See **TABLE 10**).

Again, printing and publishing appears to register the highest growth rate in salary of 15.7% over the past five years. This is followed by computer/IT software (12.12%), wholesale/retail/trading (11.82%%) and utilities (10.14%). Salaries in these industries have been registering double digit growth rates. On the other hand, industries such as

Table 10: Average Monthly Salaries of Digital Professionals at Manager Level by Industry (RM) 2010 - 2022

Industry	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022*	Y-o-Y 2021-2022	AAGR : 2016-2021
Agriculture / Plantation / Aquaculture	5,851	6,976	7,372	8,440	10,317	10,893	11,523	12,533	13,627	12,714	13,099	11,381	12,349	8.50	(0.25)
Automotive / Heavy Industry / Machinery	8,903	8,995	9,166	9,578	10,133	10,267	10,510	10,832	11,140	12,568	11,696	11,917	12,338	3.53	2.68
Banking	7,673	7,967	8,468	8,759	9,213	9,450	9,741	10,096	10,465	12,310	12,553	11,786	12,313	4.47	4.20
Contact Centre/ IT-Enabled Services / BPO	7,280	8,394	8,993	9,023	9,744	10,078	10,506	10,988	11,524	11,583	12,997	12,013	12,561	4.56	2.87
Computer / Information Technology (Hardware)	6,544	6,621	6,791	8,201	8,556	8,962	9,401	9,954	10,495	10,643	11,074	11,695	12,375	5.81	4.88
Computer / Information Technology (Software)	6,644	7,232	7,558	7,669	8,651	9,230	9,407	9,853	10,360	10,412	10,540	15,109	15,876	5.08	12.12
Construction / Building / Engineering	6,372	6,565	6,574	8,475	8,807	9,376	9,994	10,696	11,393	12,647	12,819	12,092	13,028	7.74	4.20
Consulting (Business/Technical)	7,655	7,995	8,594	8,908	10,064	10,444	10,820	11,398	12,016	12,415	12,695	13,385	14,115	5.46	4.74
Education	4,913	5,162	5,999	6,712	7,579	8,335	8,858	9,560	10,366	10,221	10,597	11,913	12,929	8.53	6.90
Electrical & Electronics	11,856	12,488	12,933	13,275	13,554	13,790	14,495	14,977	15,455	18,708	19,018	12,392	12,922	4.28	(2.90)
Financial Services/Securities/ Insurance	6,999	7,546	8,248	8,464	8,814	9,272	9,658	10,075	10,540	11,571	12,363	11,593	12,164	4.93	4.01
Hotel/Restaurant/Food Service/ Hospitality	7,081	7,281	8,019	8,415	8,725	8,933	9,479	9,959	10,413	10,287	10,801	12,482	13,027	4.37	6.34
Manufacturing / Production	7,264	8,286	8,342	8,701	9,009	9,384	9,944	10,380	10,836	10,589	11,001	12,246	12,759	4.19	4.63
Oil / Gas / Petroleum	9,157	11,373	10,985	10,758	11,537	11,574	12,328	12,841	13,317	14,337	14,835	14,649	15,231	3.98	3.77
Printing / Publishing	5,899	6,293	6,084	6,462	6,922	6,772	6,903	7,118	7,282	9,460	10,078	12,500	13,009	4.08	16.22
Property / Real Estate	6,399	8,037	8,532	8,592	9,013	9,050	9,893	10,484	11,045	13,322	14,354	11,964	12,689	6.06	4.19
Science & Technology / Aerospace / Bio Technology	6,659	7,629	9,521	9,231	10,185	10,609	11,434	12,233	13,114	13,804	14,686	11,667	12,451	6.72	0.41
Semiconductor / Wafer Fabrication	8,204	8,621	8,510	8,344	8,977	8,799	9,042	9,251	9,413	10,540	10,409	12,279	12,592	2.55	7.16
Telecommunication	7,931	8,507	8,684	9,082	9,410	9,667	10,001	10,344	10,692	13,273	14,238	13,293	13,924	4.75	6.58
Transport/Storage/Freight/Shipping	7,712	8,189	8,217	8,976	9,705	9,692	10,127	10,634	11,074	11,214	11,327	13,421	13,988	4.23	6.51
Utilities	6,710	7,143	7,618	7,386	7,715	7,713	8,035	8,283	8,512	9,542	9,228	12,110	12,488	3.12	10.14
Wholesale/Retail/Trading	6,047	7,279	7,031	6,817	7,246	7,217	7,626	7,885	8,115	9,374	9,549	12,134	12,579	3.67	11.82

*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

agriculture/plantation/aquaculture (-0.25%) and electrical & electronics (-2.90%) posted negative growth.

As shown in **TABLE 11** the average growth rates of senior manager salaries across the industries are poised to vary between the highest rate of 9.88% in education to 3.65% in semi-conductor/wafer fabrication between 2021 and 2022.

In terms of five-year AAGR, the analysis show that eight industries are growing above 10%, namely property and real estate (14.98%), printing and publishing (14.50%), telecommunication (13.87%), construction/building/ engineering (11.39%), science & technology/aerospace/ bio-technology (11.14%), electrical and electronics (11.05%), financial services/securities/insurance (11.05%) and banking (11.03%).

Notably, some of these industries have also shown double digit growth rates in the short term, namely banking (14.54%), construction/building/engineering (13.97%), financial services/securities/insurance (14.66%), science & technology/aerospace/bio-technology (15.95%), property and real estate (16.25%) and telecommunication (10.91%).

Table 11: Average Monthly Salaries of Digital Professionals at Senior Manager Level by Industry (RM) 2010 - 2022

Industry	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022*	Y-o-Y 2021-2022	AAGR : 2016-2021
Agriculture / Plantation / Aquaculture	8,145	9,646	10,120	12,209	14,834	15,317	16,528	18,096	19,771	20,716	21,081	23,150	25,423	9.82	8.01
Automotive / Heavy Industry / Machinery	12,395	12,438	12,582	13,855	14,570	14,437	15,076	15,640	16,163	20,479	18,811	19,690	20,610	4.67	6.12
Banking	10,203	11,887	13,961	13,961	14,700	15,820	17,095	18,169	19,436	23,544	24,639	26,526	28,558	7.66	11.03
Contact Centre / IT-Enabled Services / BPO	15,136	15,722	17,013	18,014	18,832	19,523	20,416	21,335	22,312	25,642	28,417	29,944	31,553	5.37	9.33
Computer / Information Technology (Hardware)	12,751	14,528	15,789	16,767	17,566	18,242	20,369	21,813	23,294	25,362	26,604	28,519	30,573	7.20	8.00
Computer / Information Technology (Software)	9,250	10,000	10,375	11,094	12,439	12,979	13,493	14,226	15,031	16,962	16,958	18,019	19,147	6.26	6.71
Construction / Building / Engineering	8,871	9,078	9,024	12,260	12,663	13,184	14,335	15,443	16,530	20,606	20,622	22,499	24,547	9.10	11.39
Consulting (Business/Technical)	11,196	11,516	12,098	12,942	14,047	15,415	15,429	16,061	16,855	20,317	20,550	21,808	23,143	6.12	8.27
Education	6,840	7,138	8,235	9,709	10,898	11,720	12,706	13,803	15,039	16,652	17,053	18,738	20,589	9.88	9.49
Electrical & Electronics	16,506	17,268	17,753	19,203	19,489	19,391	20,792	21,624	22,424	30,483	30,594	32,282	34,062	5.52	11.05
Financial Services/Securities/ Insurance	10,203	10,250	13,961	13,961	14,700	15,950	17,167	18,323	19,732	22,771	24,691	26,654	28,773	7.95	11.05
Hotel/Restaurant/Food Service/ Hospitality	9,858	10,067	11,008	12,172	12,545	12,561	13,596	14,380	15,108	16,761	17,385	18,342	19,352	5.50	6.98
Manufacturing / Production	10,750	13,550	14,150	14,195	14,838	15,737	16,966	17,887	18,919	20,292	21,103	22,319	23,606	5.76	6.31
Oil / Gas / Petroleum	12,749	15,727	15,080	15,562	16,588	16,275	17,683	18,541	19,321	23,363	23,876	25,106	26,399	5.15	8.40
Printing / Publishing	8,213	8,702	8,352	9,348	9,953	9,522	9,902	10,277	10,565	15,414	16,214	17,080	17,992	5.34	14.50
Property / Real Estate	8,903	11,113	11,712	12,429	12,959	12,726	14,190	15,137	16,025	21,707	23,100	24,815	26,658	7.43	14.98
Science & Technology / Aerospace / Bio Technology	9,271	10,549	13,069	13,354	14,645	14,918	16,401	17,662	19,028	22,488	23,633	25,532	27,584	8.04	11.14
Semiconductor / Wafer Fabrication	11,422	11,921	11,682	12,070	12,908	12,372	12,970	13,357	13,658	17,176	16,747	17,358	17,992	3.65	6.77
Telecommunication	11,042	11,763	11,921	13,138	13,530	13,593	14,345	14,935	15,512	21,626	22,909	24,291	25,757	6.03	13.87
Transport/Storage/Freight/Shipping	10,737	11,323	11,280	12,984	13,955	13,629	14,527	15,354	16,067	18,275	18,229	19,206	20,234	5.36	6.44
Utilities	9,342	9,876	10,457	10,685	11,093	10,845	11,525	11,959	12,350	15,550	14,844	15,475	16,134	4.25	6.86
Wholesale/Retail/Trading	8,418	10,065	9,651	9,861	10,419	10,148	10,939	11,385	11,774	15,275	15,366	16,113	16,896	4.86	9.46

*** Forecast**

Sources: **Jobstreet & PIKOM estimates**

CYBERSECURITY SALARY TRENDS IN MALAYSIA

Incidents of cybersecurity breaches and hacking have been on the rise in recent times, becoming especially rampant during the past two years as Covid-19 pandemic restrictions confined almost everyone to their homes and in many cases, in front of their computers and laptops.

Individuals, corporations and even governments have been the unwitting victims, with financial losses suffered running into the millions and other damages encompassing loss of valuable data and reputation.

The exposure and risks are so acute that Bank Negara Malaysia (BNM) has made it a mandatory requirement for banks and other financial institutions to conduct penetration testing and compromise assessments.

As stated in last year's edition, the pertinent questions are: "Do we have enough of the various types of cybersecurity talents here to help mitigate the risks of these potential attacks?"; and "Are our remuneration and compensation adequate or competitive enough to retain them in the country?"

It is for this reason we are continuing with our annual analysis of the salary landscape of cybersecurity talents to be incorporated into this publication. Since eCommerce continues to grow among industry and society, its processes such as business intelligence, data analytics, process automation and software development require an ever-increasing scope and scale of cybersecurity protection. Thus, making the demand for cybersecurity talents a priority.

For this section, we extracted data on key cybersecurity jobs and salaries from SalaryExpert. As with the previous year, we selected nine positions covering strategic, management, operational, and infrastructure since these areas cover most, if not all, the scope of cybersecurity functions and requirements.

It is important to note that some of these job roles and functions may overlap depending on the environment. For each job category, the study assessed two levels of salaries and derived an average salary from these two numbers. The first level entails at least three years of cybersecurity-related work experience and the second level entails at least seven years. A comparison between the top paying job in cybersecurity and the Chief Information Officer (CIO) in the IT or digital industry is also done to give a better perspective of the senior role in the cybersecurity industry.

Findings

Based on the nine jobs profiled, the average annual salaries of cybersecurity jobs ranged from RM108,072 to RM228,187, which work out to be between RM9,006 and RM19,016 per month for a Security Analyst and a Chief Information Security Officer (CISO) respectively (See **TABLE 12**).

Most of the jobs selected have an operational focus, which is critical and practical to cybersecurity. The CISO is followed in salary range by a Director of Cybersecurity, then the Engineer, Manager and Specialist for cybersecurity. In the bottom half of this salary list are the analysts and the Incident Handler.

Analysing the range in each job position, the experienced talent (>7 years) tends to earn almost double his or her counterpart with 1–3 years' experience. This is consistent all the way down the list.

According to SalaryExpert, the highest paid cybersecurity professional (CISO) earns an estimated 40% less than a CIO whose annual salary range is from around RM220,000–RM410,000 with an average of about RM320,000.

The average salaries depicted here are only a guide and we have at all times endeavoured to be as accurate as possible but the reader cannot rely on them alone without seeking other sources for further confirmation when making decisions.

To provide the reader with a more well-rounded benchmark, this section also includes the job description of each of the nine cybersecurity positions since nomenclature between the scope and scale of these jobs may vary from company to company, and also country to country.

Table 12: Average Annual Salaries of Digital Professionals in Cybersecurity (RM) 2022

Job Position	Average	1 – 3 Years	>7 Years
CISO	228,187	158,904	286,028
Director	192,373	133,373	241,529
Security Engineer	164,853	116,825	205,795
Security Manager	145,992	103,459	182,250
Security Specialist	144,163	102,163	179,967
Security Analyst	143,304	101,555	178,895
Intelligence Analyst	131,863	93,176	164,747
Incident Handler	128,049	90,744	159,851
Security Consultant	108,072	78,800	133,695

**As of 9 August, 2022*

Source: **SalaryExpert**

Description for Selected Cybersecurity Jobs

JOB POSITION	JOB DESCRIPTION
CISO	Oversees an organisation's information security and heads the management of the IT security risks of the organisation throughout the lifecycle of the data, utilizing the knowledge of the location of critical or vital data and information, what the organisation's risk threshold is if the data become compromised, and how to protect the data while supporting the organisation's business objectives. Defines, develops, and implements a risk management structure, strategies, and policies to reduce risk and to prevent and defend against information security attacks. Governs, evaluates, and responds to risks involving the organisation's protected data and interests; and assures all information systems concerning security policies are operating correctly and compliantly. Recognises the security challenges in the current and future state of business operations; and provides the organisation with the right tools, skills, resources, relationships, and capabilities to protect against growing information security risks. Determines information security policies and strategies; structures security initiatives with security programmes and business objectives; and oversees the development, implementation, and enforcement of information security standards and procedures.
Director	Oversees a company's Cyber and IT Security management functions and programmes, and directs the systems that keep company data safe from security breaches that can damage company finances and destroy client trust. Expands and coaches cyber and IT security personnel and teams, manages staff assignments and relationships, and directs the progression of the team activities. Collaborates with top management in the risk management decision-making process, providing input to technology, architecture, and strategy.
Security Engineer	Plans, develops, and implements proven high-tech solutions to increase security and defend against hacking, malware and ransomware, insider threats, and other types of cybercrimes. Oversees monitoring of computer networks, identifies security issues, and anticipates security breaches. Executes the installation and maintenance of security programmes, plans, and software, including firewalls and data encryption programmes.
Security Manager	Manages a team of IT security professionals; and plans, designs, manages, and implements programmes, networks, and systems that protect a company's information systems and computer networks from cyber attacks, intrusions, malware, and various types of data breaches; and assures the networks are kept running smoothly in order to protect all sensitive data and prevent loss of time and money. Identifies current security threats, predicts future attacks, and designs a security incident response programme with a documented plan of action to take if a security incident occurs. Remediates security incidents, and works with upper management to prepare for potential business repercussions.
Security Specialist	Identifies and resolves highly complex issues to prevent cyber attacks on information systems and to keep computer information systems secure from interruption of service, intellectual property theft, network viruses, data mining, financial theft, and theft of sensitive customer data, allowing business to continue as normal. Designs, installs, and manages security mechanisms that protect networks and information systems against hackers, breaches, viruses, and spyware. Responds to incidents, investigates violations, and recommends enhancements to plug potential security gaps.
Security Analyst	Plans and implements security measures to protect computer systems, networks, and data from loss and service interruptions. Analyses and documents security risks, breaches, and other cyber security incidents and the damage they cause. Develops and implements a network disaster recovery plan, and oversees the monitoring of the computer networks for security issues. Installs and operates security software and measures to protect systems and information infrastructure, including firewalls and data encryption programmes.
Intelligence Analyst	Maintains the security and integrity of cyber systems and networks. Identifies and acquires raw, primary, and secondary data for predictive and reactive analyses. Evaluates cyber threat operations and system vulnerabilities and develops assessments, threat profiles and custom detection capabilities.
Incident Handler	Solves computer incidents. Analyzes and evaluates network anomalies to ensure they are fixed and prevented from reoccurring. Develops procedures to identify cybersecurity incidents. Determines how to handle identified threats.
Security Consultant	Sets strategy for cyber security implementations and oversees them. Confirms customer support meets company standards. Designs security solutions that are easy to replicate and repeat. Heads IT quality assurance activities.

AI AND DATA SCIENCE SALARY TRENDS IN MALAYSIA

Artificial intelligence (AI) is fast becoming an integral part of everything we do. While most remain unaware, AI is already in use extensively: from financial services; manufacturing and production; retail, hospitality and travel; and many other industries.

At the individual level, AI is infused in many of the apps we use in our mobile phones, from autocorrect features to chatbots. It is a growing phenomenon that has the capability and capacity to change how we approach life and work now and into the future.

Existing research has highlighted the power of AI as having the potential to double economic growth in the next 15 years by enhancing existing processes via automation and in so doing, driving human work towards higher value-added tasks.

According to McKinsey, AI can create six million new jobs in Malaysia by 2030. Recognising this opportunity, the Malaysian Government has developed the 4IR (Fourth Industrial Revolution) blueprint, which targets to improve productivity across the board by at least 30%.

The Government has also identified talent development in the fields of AI and data science as critical to the success of its blueprint. Similar to cybersecurity, we are adding a new section on AI and data science salary trends to provide readers with a guide as to the employment opportunities in this cutting-edge technology area.

For this section, we extracted data on key AI and data science jobs and salaries from SalaryExpert. We selected eight positions relevant to the development and application of AI and data analytics in planning and processes.

As with the cybersecurity assessment, the study considered two levels of salaries and derived an average salary from these two sets. The first level covers at least three years of AI and data science work experience and the second level is for digital talents with at least seven years' experience.

Findings

Based on the eight jobs profiled, the average annual salaries for AI and data science jobs ranged from RM101,016 to RM154,419, which work out to be between RM8,418 and RM12,868 per month for a Data Analytics Developer and a Software Engineer Machine Learning respectively (See **TABLE 13**).

Given that this range of salaries are considerably lower than positions in cybersecurity, we can conclude that the market for AI and AI and data science in Malaysia appears to be in the early stages of maturity with most talents still lacking in expertise and experience.

For this field, the other top earners are the Data Scientist and AI Engineer. Down the list are specialists and various other data analytics positions. It is interesting to note that there are now positions for an Automation Analyst.

Similar to cybersecurity, the experienced talent (>7 years) tends to earn almost double his or her counterpart with 1–3 years' experience. And again, this is consistent all the way down the list.

The average salaries depicted here are only a guide and we have at all times endeavoured to be as accurate as possible but the reader cannot rely on them alone without seeking other sources for further confirmation when making decisions.

To provide the reader with a more well-rounded benchmark, this section also includes the job description of each of the seven AI and data science positions since nomenclature between the scope and scale of these jobs may vary from company to company, and also country to country.

Table 13: Average Annual Salaries of Digital Professionals in AI and Data Science (RM) 2022

Job Position	Average	1 – 3 Years	>7 Years
Software Engineer Machine Learning	154,419	108,799	193,087
Data Scientist	150,533	93,583	188,073
Engineer AI	138,315	97,594	172,950
AI Specialist	132,631	133,373	165,842
Data Analytics Engineer	129,382	92,351	161,250
Data Analyst	123,670	87,640	154,384
Analyst Automation	110,791	78,627	138,307
Data Analytics Developer	101,016	72,104	125,898

**As of 9 August, 2022*

Source: **SalaryExpert**

Description for Selected Cybersecurity Jobs

JOB POSITION	JOB DESCRIPTION
Software Engineer Machine Learning	Researches, develops, and implements machine learning algorithms for use in software and hardware applications. Maintains up-to-date knowledge of current technological standards, equipment, and practices. Identifies and suggests optimisations and features to improve hardware/software capabilities.
Data Scientist	Collects and analyses statistics and information from multiple sources to spot trends and to gain maximum insight that can give the company a competitive advantage, and communicates informed conclusions and recommendations across an organisation's leadership structure. Strategises and identifies unique opportunities to locate and collect new data, explores and mines data from many angles, and determines what it means. Communicates data findings to both business and IT leaders to influence how an organisation approaches and meets business challenges of an evolving customer base and changing marketplace, using strong business acumen. Finds and recommends new uses for existing data sources; designs, modifies, and builds new data processes; and builds large, complex data sets.
Engineer AI	Develops and utilises simulations and models. Evaluates tools, technologies, architectures, models, and test results. Heads meetings regarding AI with external parties and internal business-embedded innovation teams. Collaborates with lead engineers to define subsystem requirements and acceptance criteria.
AI Specialist	Develops artificial intelligence, machine learning, deep learning, and natural language processing algorithms. Designs artificial intelligence solutions to solve business problems.Implements complex data systems.
Data Analytics Engineer	Develops the data extraction and preparation processes. Runs data quality audits and identifies issues with data collection. Implements improvements and fixes to data collection processes. Oversees SQL databases that can be large and complex.
Data Analyst	Assesses complex data systems and programmes in support of ad-hoc and standing management or customer requests. Creates programmes, methodologies, and files for analysing and presenting data. Examines data quality, applications, and functions. Produces output and sustains operation. Researches new data sources and analytical tools. Contributes to new product development and improvement in product delivery and presentation. Develops awareness of and familiarity with issues and events affecting organisation, department, and/or customer. Uses and supports database applications and analytical tools. Uses timely and appropriate participation of users/customers in data collection and query systems.
Analyst Automation	Supports the development of a company's automation projects from both a technical perspective and through business intelligence and expertise. Analyses functional specifications and business requirements in an automated environment. Collaborates with the quality assurance staff to perform automation planning and application testing before, during, and after project implementation; and executes timely reporting of planning and testing efforts. Develops automation solutions using software or through traditional development methods, and supports and troubleshoots already-developed solutions.
Data Analytics Developer	Designs and maintains data models and structures. Develops scalable SQL queries that can be used repeatedly. Confirms data meets company data validation standards. Collaborates with management to define key metrics that the data team should aim for.

BENCHMARKING SALARY TRENDS AGAINST OTHER ECONOMIES

Table 1: Benchmarking Malaysian Digital Salaries by Position Levels Against Selected Countries in US$, 2022

	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
Technology positions	2.71	2.87	3.11	2.45	3.08	3.66	4.49	4.39	3.26	6.22	3.51
Managerial positions	2.31	2.35	2.85	2.23	2.68	2.61	3.25	3.05	2.45	4.29	2.82
C-Level positions	2.81	3.01	3.35	2.13	2.49	1.66	2.03	1.91	1.90	2.65	3.11
Overall	2.63	2.76	3.12	2.26	2.72	2.55	3.14	3.00	2.48	4.23	3.14

	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa	
Technology positions	1.00	1.33	0.50	0.65	2.98	3.53	0.58	2.55	1.63	1.52	
Managerial positions	1.00	1.33	0.48	0.75	2.19	2.54	0.69	1.91	1.42	1.47	
C-Level positions	1.00	1.63	0.44	0.75	1.65	1.60	0.74	2.05	1.48	1.17	
Overall	1.00	1.45	0.47	0.72	2.22	2.47	0.67	2.16	1.51	1.37	

Source: **Payscale**

Malaysia's long-standing brain drain of talents, particularly in the case of the younger generation, remains a pressing concern as human capital is a critical component for the growth and development of the economy.

Even more alarming, research in the past few years appear to indicate that this phenomenon is increasing at an exponential rate, with a recent report released by think tank Emir Research revealing that as many as 500,000 Malaysians are working overseas.

This situation is especially acute in the digital industry, where talents are vital for the sustained growth of the nation's digital economy and where digital adoption across business and industry is at a critical stage.

The industry has been losing talents to fully-developed economies such as Singapore, which offers significantly-higher salaries and even to fast-emerging ones like Thailand and Indonesia where digital opportunities are abundant.

For this reason, it is a useful exercise to benchmark salaries of local digital jobs with those offered by regional economies. Such insights enable Malaysian companies to package attractive benefits (remuneration or otherwise) in order to retain their digital talents. At the same time, it also provides digital talents with a greater insight into career prospects in the domestic as well as regional markets.

For this exercise, we sourced salary data from Payscale on:

- 61 digital jobs in three position levels; and
- from 21 economies including Malaysia.

Further details on the methodology are presented in the next **CHAPTER 4**: Digital Salary Trends in Selected Economies.

Benchmarking of Average Digital Salaries

USD Currency

TABLE 1 compares US$-denominated salaries of digital professionals in the selected economies against counterparts in Malaysia. The widest gap is in the US, where talents earn on average 4.23 times more, followed by Hong Kong and Australia (both 3.14) and Qatar (3.12).

Table 2: Benchmarking Malaysian Digital Salaries by Position Levels Against Selected Countries in PPP Currency, 2022

	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
Technology positions	1.76	1.94	1.97	2.00	1.80	1.47	1.62	1.61	1.41	2.20	1.61
Managerial positions	1.50	1.59	1.80	1.82	1.57	1.05	1.17	1.12	1.06	1.51	1.29
C-Level positions	1.83	2.04	2.12	1.74	1.46	0.67	0.73	0.70	0.82	0.94	1.42
Overall	1.71	1.87	1.98	1.84	1.59	1.02	1.13	1.10	1.07	1.49	1.44

	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa	
Technology positions	1.00	1.39	0.57	0.66	1.43	1.98	0.75	1.45	1.31	1.31	
Managerial positions	1.00	1.38	0.54	0.77	1.06	1.42	0.88	1.09	1.14	1.26	
C-Level positions	1.00	1.69	0.50	0.77	0.80	0.90	0.94	1.17	1.19	0.06	
Overall	1.00	1.50	0.54	0.73	1.07	1.38	0.86	1.23	1.21	1.18	

Source: **Payscale**

At the other end of the spectrum, digital professionals in economies like Indonesia, India and Philippines take home much lower salaries, respectively earning only 0.47, 0.67 and 0.72 times their contemporaries in Malaysia.

Other Southeast Asian economies such as Singapore and Thailand provide higher remuneration to their digital professionals. As expected, talents in Singapore earn on average 2.72 times and Thailand 1.45 times more than Malaysians. It is clear that Thailand, despite being less developed than Malaysia, is surging ahead in the digital economy with much higher average salaries for their digital professionals.

In technological positions, the US is the highest-paying economy with talents earning 6.22 times more than in Malaysia followed by Australia (4.49), Canada (4.39) and New Zealand (3.66). In the managerial category, the US is again the highest at 4.22 times in comparison to Malaysia. However, economies such as Qatar (3.35), Hong Kong (3.11) and Kuwait (3.01) offer the highest disparity in salaries against Malaysia for C-level positions.

International $PPP Currency

TABLE 2 takes into consideration purchasing power parity (PPP) adjustments in comparing salaries of digital professionals in the selected economies against counterparts in Malaysia. In this case, the US (1.49) is no longer the highest-paying economy when benchmarked against Malaysia.

On contrary, Qatar is the highest-paying by 1.98 times followed by Kuwait at 1.87 times and Saudi Arabia at 1.84 times. It is clear that the Arab region offer better salary deals for digital professionals than the rest of the world and would seem to constitute a more attractive destination for money-motivated labour migration.

Even with PPP adjustments, Indonesia, Philippines and India remain the lowest-paying economies with ratios of 0.54 times, 0.73 times and 0.86 times. In the technological and managerial positions, the US (2.20) offers the highest remuneration for technological position and Saudi Arabia (1.82) in the managerial category. For C-level positions, digital professionals in Qatar earn the most at 2.12 times the comparable salaries in Malaysia.

Table 3: Benchmarking Top 10% Malaysian Digital Salaries by Position Levels Against Selected Countries in US$, 2022

	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
Technology positions	2.92	2.49	2.39	2.36	3.03	2.76	3.47	3.32	2.78	4.98	3.76
Managerial positions	2.71	2.14	2.52	2.30	3.31	2.10	2.67	2.48	2.35	3.74	2.66
C-Level positions	2.51	2.94	2.58	2.24	2.27	1.28	1.75	1.47	1.63	2.14	2.76
Overall	2.71	2.52	2.50	2.30	2.87	2.05	2.63	2.42	2.25	3.62	3.06

	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa	
Technology positions	1.00	1.60	0.72	0.75	3.70	3.09	0.67	2.41	1.03	1.50	
Managerial positions	1.00	1.89	0.85	0.83	1.78	2.69	0.83	2.30	1.07	1.37	
C-Level positions	1.00	2.23	0.45	1.07	1.37	1.77	0.91	6.19	1.04	1.24	
Overall	1.00	1.91	0.67	0.88	2.28	2.52	0.80	3.63	1.05	1.37	

Source: **Payscale**

In the technology category, the US offer 2.20 times more than Malaysia, followed by Saudi Arabia (2.00) and Qatar (1.97). While in the managerial category, the Arab economies are the highest: Saudi Arabia (1.82 times); Qatar (1.80) and Kuwait (1.59).

In the C-Level positions, Qatar, Kuwait and the UAE again ranked as the top three digital salary paying nations, that is 2.12, 2.04 and 1.83 times in comparison to Malaysia.

Apart from these nations, Thailand seems to be emerging as a better-paying destination for digital professionals at 1.39 times for technology positions, 1.38 times under managerial and 1.69 times for C-Level positions compared to Malaysia respectively.

Surprisingly, the US was marginally lower at 0.94, indicating digital professionals in C-level positions in the US are comparable with Malaysian counterparts in terms of real monetary gains.

See **APPENDIX 1** for the average salaries of digital professionals by digital positions, by job positions and by country.

Benchmarking of Top 10% Digital Salaries

This section compares the top 10% earnings bracket, benchmarking other nations against Malaysia. Under US currency (See **TABLE 3**), Chinese digital professionals earn 3.63 times higher followed by the US at 3.62 times and Hong Kong at 3.06 times.

In technology positions, the top paying ratios worked out to be 4.98 times in the US and 3.76 times in Hong Kong. But, in the managerial category, the US and Singapore ranked top at 3.74 times and 3.31 times in comparison to Malaysia. In the C-Level job category, China recorded the highest ratio at 6.19 times.

Table 4: Benchmarking Top 10% Malaysian Digital Salaries by Position Levels Against Selected Countries in PPP Currency, 2022

	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
Technology positions	2.01	1.77	1.60	2.03	1.86	1.09	1.29	1.39	1.14	1.86	1.80
Managerial positions	1.86	1.52	1.68	1.99	2.03	0.83	0.99	1.04	0.96	1.40	1.27
C-Level positions	1.72	2.09	1.72	1.94	1.39	0.51	0.65	0.62	0.67	0.80	1.32
Overall	1.86	1.79	1.67	1.99	1.76	0.81	0.97	1.02	0.92	1.35	1.46

	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa	
Technology positions	1.00	1.52	0.84	0.71	1.46	1.41	0.84	1.49	0.84	1.33	
Managerial positions	1.00	1.79	0.98	0.79	0.70	1.28	1.04	1.42	0.87	1.21	
C-Level positions	1.00	2.11	0.52	1.01	0.54	0.85	1.14	3.81	0.84	1.09	
Overall	1.00	1.81	0.78	0.84	0.90	1.18	1.01	2.24	0.85	1.21	

Source: **Payscale**

In the case of international PPP currency as shown in **TABLE 4**, China offers higher average salaries by 2.24 times with the US at 1.35 times. Similarly, in the technological category, Saudi Arabia and the UAE were at the top at 2.03 times and 2.01 times respectively.

In the managerial category, Saudi Arabia and UAE were also the top paying nations in real monetary value at 1.99 times and 1.86 times respectively. Again, in C-Level positions, China was the highest at 3.81 times when benchmarked against Malaysia.

GUARDIANS OF THE CYBER WORLD

PURE PLAY & INDEPENDENT Cyber Security Experts

LGMS Berhad made its debut on the ACE Market of Bursa Malaysia on 8 June 2022. LGMS is also the first listed cyber security services company in Malaysia.

LGMS Berhad upholds uniqueness in providing independent cyber security professional services with an impartial approach. We concentrate our efforts and resources on building strong cyber security fundamentals and core proficiencies. As much as we are passionate about providing objective and unbiased cyber security consulting services, our drive comes from assuring precedence to client's interests.

Cyber Risk Management & Compliance | Cyber Risk Prevention | Cyber Threat & Incident Response

Cyber Security Company of The Year 2017 · PCI Security Standards Council Approved Scanning Vendor · PCI Security Standards Council Qualified Security Assessor · CREST · IDC 2019 Asia/Pacific Internet Of Things Security Landscape and Key Vendors · ISO 27001:2013 9001:2015 · ISO 17025 Accredited Laboratory · Celebrating 17 Years in Business

The Asian-Oceanian Computing Industry Organisation (ASOCIO) is an ICT federation organized by ICT associations representing 24 economies throughout the Asia Pacific.

ASOCIO's objective is to promote, encourage and foster relationships and trade among its members, and to develop the computing industry in the region.

aiia australian information industry association

ISA

NZTech

P@SHA

LICA

IBPAP

SGTECH

IFB InfoCom Federation Brunei

FITIS

PIKOM

ICT FEDERATION

CISA

ISIA

MOSA

ATCI

NASSCOM

MCIA

Federasi Teknologi Informasi Indonesia (FTII)

CNN Federation

vinasa

CHAPTER 4

Digital Salary Trends in Selected Economies

University of Nottingham
UK | CHINA | MALAYSIA

The AI Revolution is on the horizon.

Who will steer it for you?

As the first university in Malaysia to deploy NVIDIA DGX A100, an award-winning AI supercomputer, we equip our graduates with the know-how needed to lead at the frontiers of science.

With first-hand experience steering a powerful AI workload system, our graduates are primed to navigate even the most complex environments in data science and machine learning.

Secure the future of your business with our graduate network, today.

+6 (03) 8924 8000
nottingham.edu.my

Even before the Covid-19 pandemic upended traditions and conventions, the concepts of global relocation, cross-border mobility and digital migration were already seeding among the new generation workforce.

With the demand for capability and competency far outstripping supply across advanced and emerging economies, companies are increasingly sourcing and pinching talent not only within but also beyond national borders.

On their part, talents are banking on their skills capital to tap opportunities for better prospects. Invariably, the traffic tends to head towards higher income destinations particularly for individuals in developing regions.

This trend is especially acute in the case of digital talents given the pervasive digitalisation of processes and production at all levels of society, business, industry, and government following the exponential growth of the internet and subsequently, internet economy over the past two decades.

Then came the pandemic with its unprecedented restrictions on work and life. The 'workplace' all but disintegrated as a fixed permanent location. With work-from-home (WFH) and remote working becoming more prevalent and seemingly more convenient, the workplace is evolving into whichever site individuals decide to base themselves at any given point in time. Hence, the regularisation of the term 'digital nomad'.

For these reasons, many global recruitment and employment agencies see this growing inclination as the next frontier of talent acquisition and employment search.

In acknowledging this scenario, we are extending our exposition and presentation of salary trends of digital talents beyond Malaysia to include primarily member economies of the Asian-Oceanian Computing Organisation (ASOCIO) as well as other global destinations including at least one nation from each continent.

Through this section, it is hoped that digital professionals can develop a better understanding of the range of financial returns of employment in their respective economies. It should also be noted that our salary analysis do not compare between economies, but instead the salary gaps between different positions in the same nation.

Sourcing from Payscale, our analysis cover and benchmark salaries of 61 different digital jobs from three position levels in 21 separate economies worldwide. The benchmarking involves:

- salaries of digital professionals in different position levels or job categories against the economies' own national average of digital salaries; and
- top 10% salaries of digital professionals in different position levels or job categories against own national average of digital salaries.

METHODOLOGY

From the Payscale data, we curated salaries from 11 digital areas (See Box A), 61 digital jobs (Box B), three levels of positions (Box C) and 21 economies (Box D).

The salaries in national currencies were converted into US Dollars using the prevailing currency exchange rate between the greenback and the respective currency. In benchmarking Malaysia against other economies in the previous chapter, these salaries in US$ were also converted after taking into consideration the purchasing power parity (PPP) for each economy (See Box E).

Box A: Selection of Digital Aspect

Digital Aspect	No. of Jobs	Digital Aspect	No. of Jobs
Analytics	5	Programming	5
System Architecture	2	Quality Assurance	6
Data	6	Security	2
Database	2	Systems	2
Engineering	11	Technical Support	9
Managerial	11		

Box B: Selected Digital Jobs

TECHNOLOGY / OPERATIONAL POSITIONS		
.NET Software Developer / Programmer	Junior Software Engineer	Systems Administrator, Windows Server
Applications Engineer	Network Administrator	Systems Analyst
Business Analyst, IT	Network Engineer	Systems Engineer, IT
Business Intelligence (BI) Analyst	Network Technician	Technical Support Analyst, IT
Support Technician Computer / Network / IT	Quality Assurance (QA) Engineer	Technical Support Specialist
Cybersecurity Analyst	Network Security Engineer	Test QA Engineer (Computer Software)
Data Engineer	Software Developer	Data Analyst
Data Scientist	Software Engineer	QA Analyst
Database Administrator (DBA)	Software Engineer / Developer / Programmer	QA Analyst Software
Development Operations (DevOps) Engineer	Solutions Architect	Web Developer
Help Desk Technician	Support Technician, IT	
Java Developer	Systems Administrator, Computer / Network	
MANAGERIAL / TACTICAL POSITIONS		
IT Consultant	Senior Business Analyst	Senior Systems Administrator
IT Manager	Senior Data Scientist	Senior Systems Analyst
Project Manager, IT	Senior DBA	Senior Systems Engineer
QA Manager	Senior Project Manager, IT	Senior Web Developer
Data Manager	Senior Software Engineer	Senior Software Engineer/Developer/Programmer
eCommerce Manager	Senior Solutions Architect	Software QA Manager
C-LEVEL / STRATEGIC POSITIONS		
Director of Analytics	Chief Technology Officer	Chief Executive Officer
IT Director	Chief Information Officer	Chief Information Security Officer
Vice President, IT	Chief Operating Officer	Chief Financial Officer

All data used in international benchmarking are presented in **APPENDIX 3**. Missing data points are estimated using statistical techniques and discretions including the coefficient of correlation matrix and coefficient of variation.

Box C: Three Levels of Positions

Box D: Selected 21 Economies

Western / English-Speaking (5 Economies)	Africa / Latin America (2 Economies)	Arab Region (4 Economies)	Asia (10 Economies)
US	South Africa	UAE	Malaysia
UK	Brazil	Saudi Arabia	Singapore
Canada		Qatar	Thailand
Australia		Kuwait	Indonesia
New Zealand			Philippines
			India
			Hong Kong
			South Korea
			Japan
			China

Box E: Overview of Analytics Framework

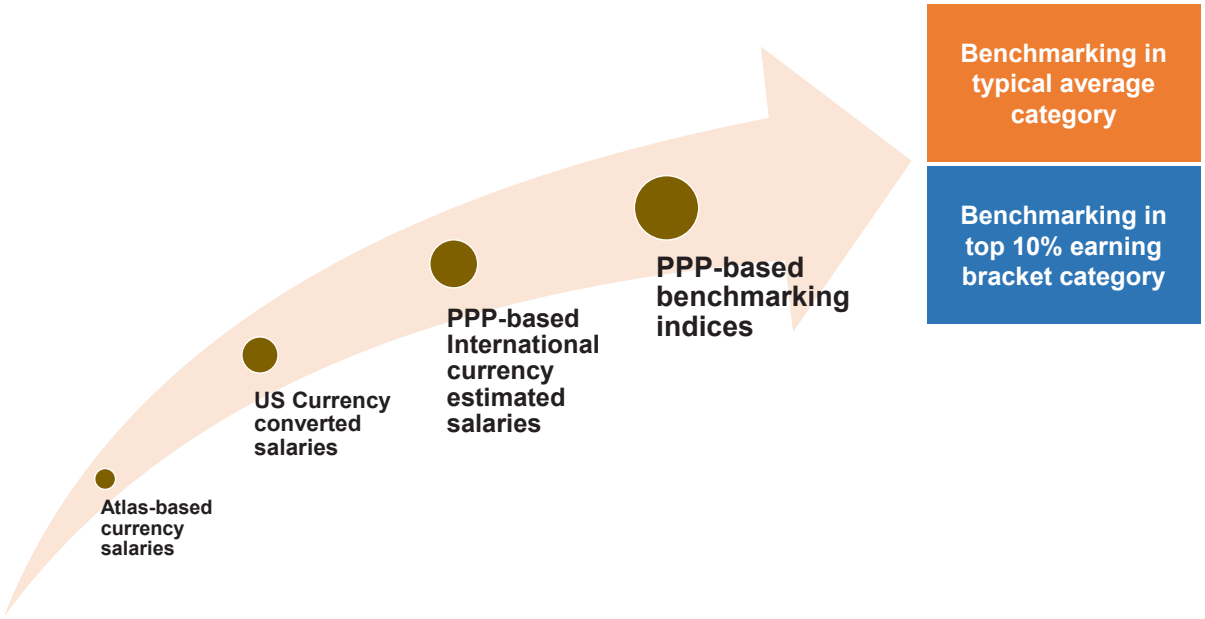


Table 1: Benchmarking Average Salaries in Job Categories against National Average of Digital Salaries (US$), 2022

	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
Technology positions	0.55	0.56	0.53	0.58	0.60	0.77	0.76	0.78	0.70	0.79	0.60
Managerial positions	0.93	0.89	0.96	1.04	1.05	1.09	1.10	1.08	1.05	1.08	0.96
C-Level positions	2.83	2.88	2.84	2.49	2.41	1.72	1.71	1.68	2.03	1.66	2.62
Overall	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Malaysia	**Thailand**	**Indonesia**	**Philippines**	**Japan**	**South Korea**	**India**	**China**	**Brazil**	**South Africa**	
Technology positions	0.53	0.49	0.57	0.48	0.72	0.76	0.46	0.63	0.58	0.59	
Managerial positions	1.08	0.99	1.08	1.13	1.06	1.10	1.09	0.95	1.02	1.17	
C-Level positions	2.64	2.97	2.47	2.75	1.97	1.72	2.88	2.52	2.59	2.27	
Overall	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

Source: **Payscale**

Table 2: Benchmarking Top 10% Salaries in Job Categories against National Average of Digital Salaries (US$), 2022

	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
Technology positions	0.60	0.53	0.53	0.58	0.59	0.78	0.76	0.79	0.71	0.80	0.68
Managerial positions	0.93	0.80	0.90	0.92	1.20	1.01	1.00	1.02	1.02	1.02	0.83
C-Level positions	2.62	3.20	2.89	2.75	2.21	1.81	1.91	1.75	2.04	1.72	2.58
Overall	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Malaysia	**Thailand**	**Indonesia**	**Philippines**	**Japan**	**South Korea**	**India**	**China**	**Brazil**	**South Africa**	
Technology positions	0.55	0.43	0.63	0.46	0.90	0.81	0.47	0.35	0.55	0.62	
Managerial positions	0.97	1.00	1.20	0.94	0.76	1.00	0.98	0.56	0.96	0.98	
C-Level positions	2.79	3.20	1.93	3.16	1.85	1.70	3.07	4.35	2.80	2.49	
Overall	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

Source: **Payscale**

Findings

TABLE 1 benchmarks average salaries of digital professionals in three position levels against the national average of digital salaries in 21 economies. These salaries have been converted to US Dollars.

As to be expected, the C-level salaries in all economies are well above their respective national averages. For instance, C-level digital professionals in Malaysia on the average earn 2.64 times more than the national average of digital salaries. For this position level, the highest ratios are in Thailand (2.97), Kuwait and India (both 2.88). The lowest disparities for C-level are found in the US (1.66), Canada (1.68) and Australia (1.71), indicating that salary gaps between digital talents of different experience are less pronounced in the developed west as they are in developing economies in Asia.

At the other end of the scale, digital professionals holding technology positions in India (0.46), the Philippines

(0.48) and Thailand (0.49) are paid considerably less than their respective national averages. In contrast, their counterparts in the US (0.79), Canada (0.78) and New Zealand (0.77) enjoy a smaller gap in salaries when compared to their national averages.

In other words, the US has the narrowest salary range of between 0.79 times less and 1.66 times more than its national average while Thailand has the widest margin of between 0.49 times less and 2.97 times more.

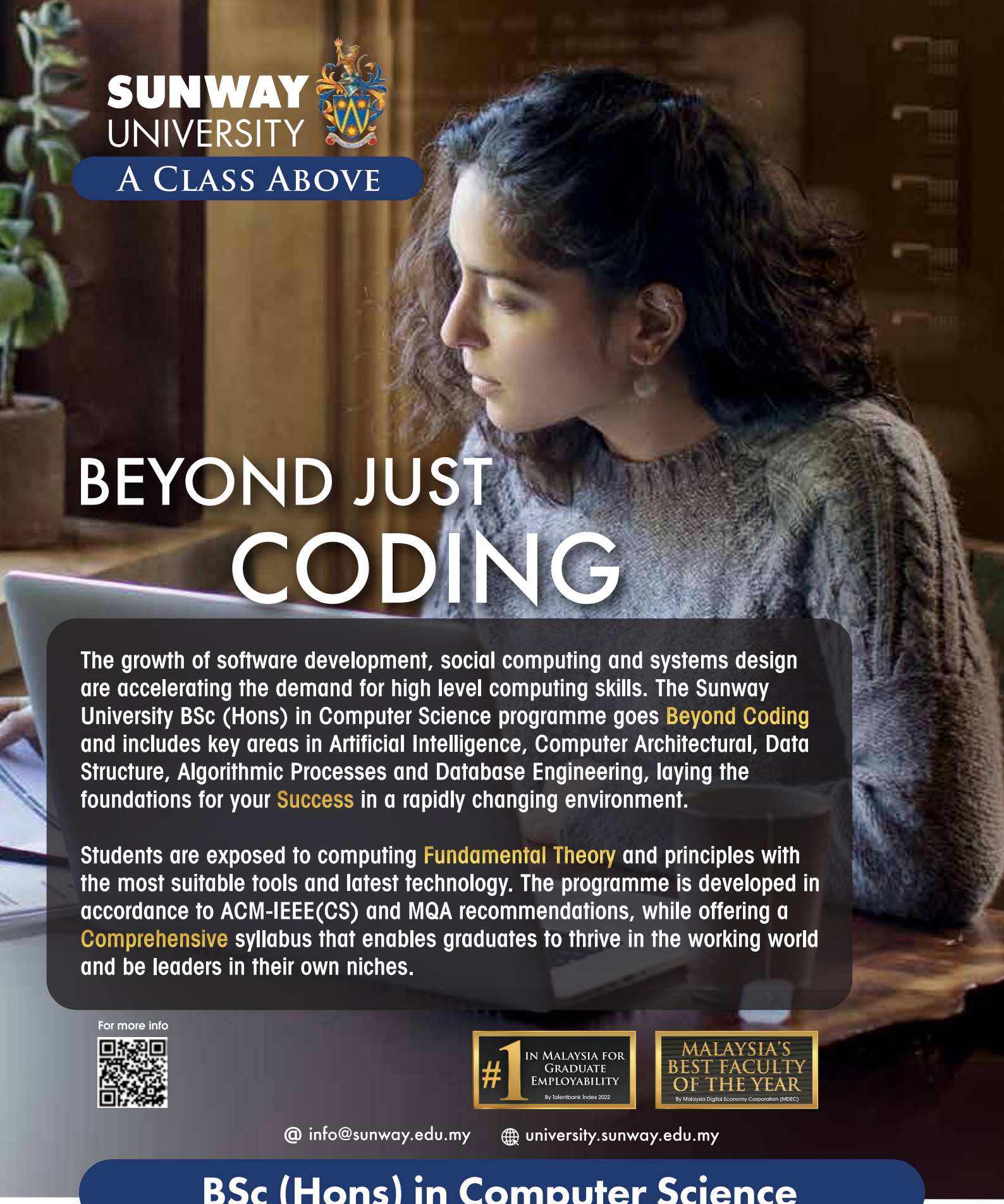
Whereas **TABLE 1** uses the average salaries in each position level or job category for the benchmarking against national averages of digital salaries, **TABLE 2** makes the comparison using the top 10% salaries in each level / category.

The highest-earning C-level digital professionals who are paid significantly more than their national average in China (4.35 times), followed by Kuwait and Thailand (both at 3.20).

In contrast, top-tier digital professionals in South Korea only earn 1.70 times more than the national average. The remuneration gap is also smaller in the US (1.72) and Canada (1.75) as compared against the other 18 economies.

Again, salary disparities in Asian economies apart from South Korea appear to be wider than high-income nations in the west.

The economies with the lowest ratio between top 10% salaries in technology positions and their national averages for digital salaries are Thailand (0.43), the Philippines (0.46) and India (0.47). This may indicate that the bulk of the digital professionals in these economies are in technology positions.



SUNWAY UNIVERSITY

A CLASS ABOVE

BEYOND JUST CODING

The growth of software development, social computing and systems design are accelerating the demand for high level computing skills. The Sunway University BSc (Hons) in Computer Science programme goes Beyond Coding and includes key areas in Artificial Intelligence, Computer Architectural, Data Structure, Algorithmic Processes and Database Engineering, laying the foundations for your Success in a rapidly changing environment.

Students are exposed to computing Fundamental Theory and principles with the most suitable tools and latest technology. The programme is developed in accordance to ACM-IEEE(CS) and MQA recommendations, while offering a Comprehensive syllabus that enables graduates to thrive in the working world and be leaders in their own niches.

For more info

#1 IN MALAYSIA FOR GRADUATE EMPLOYABILITY
By Talentbank Index 2022

MALAYSIA'S BEST FACULTY OF THE YEAR
By Malaysia Digital Economy Corporation (MDEC)

@ info@sunway.edu.my university.sunway.edu.my

BSc (Hons) in Computer Science

JPT/BPP(U)(R2/481/6/0058/FA0282)03/26

Speak to Wai Yee, one of our programme specialists to find out more.

+6019 664 7232

RM570million awarded in Scholarships & growing
jeffreycheah.foundation

Jeffrey Cheah Foundation
Nurturing the Seeds of Wisdom

SUNWAY UNIVERSITY DU 025 (B) A member of Sunway Education Group No. 5 Jalan Universiti, Bandar Sunway, 47500 Selangor Darul Ehsan.

OWNED AND GOVERNED BY THE JEFFREY CHEAH FOUNDATION Registration no : 200701042913 (800946-T)

APPENDIX

Know When Your M365 is Under Attack

Stop attackers from stealing your Microsoft 365 data

M365 apps are critical to business operations but with over 7,500 settings per user, how can you be sure that your users & data are secure? Find out what's hiding in your cloud.

- Security-led AI sees, prioritizes & stops attacks targeting your data
- Instant Investigations enable rapid response with zero query, one-click answers
- Attack prioritization reveals real incidents - even when they span M365, Azure AD & your network

Scan here & learn more about our platform

VECTRA®
SECURITY THAT THINKS.®

Appendix 1: Average Salary of Digital Professionals by Digital Jobs and by Country in International PPP Currency, 2022

Country	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	UK	USA	Hong Kong
Technology Positions											
.NET Software Developer / Programmer	37,052	49,846	50,537	36,878	59,125	44,240	49,518	54,477	42,215	69,872	40,793
Applications Engineer	123,437	173,888	158,190	91,902	53,065	44,024	46,800	54,696	39,387	70,659	63,825
Business Analyst, IT	79,804	68,440	56,096	71,389	68,375	47,700	51,919	55,238	45,903	67,408	50,404
Business Intelligence (BI) Analyst	72,302	29,331	44,095	56,116	65,300	45,144	52,050	53,298	39,654	67,567	41,429
Support Technician Computer / Network / IT	23,768	20,749	21,503	21,073	36,196	30,522	35,430	40,310	26,007	45,937	32,906
Cyber Security Analyst	56,013	61,455	70,120	77,338	55,299	43,014	49,693	54,298	39,396	73,363	44,502
Data Engineer	80,661	78,215	51,249	56,172	68,100	54,308	62,942	67,421	50,448	88,702	56,593
Data Scientist	83,457	216,817	235,603	102,473	78,250	45,029	58,829	65,890	50,478	92,421	64,344
Database Administrator (DBA)	85,504	37,896	79,469	66,732	52,518	40,012	46,297	55,351	37,882	70,684	75,695
Development Operations (DevOps) Engineer	84,020	37,238	44,877	109,171	82,589	54,017	64,173	69,426	54,951	93,765	89,325
Help Desk Technician	25,306	26,485	19,196	21,439	32,640	30,550	32,187	36,690	23,856	41,120	34,149
Java Developer	35,665	68,987	64,525	70,905	59,517	44,204	51,946	58,175	47,111	74,973	43,574
Junior Software Engineer	57,666	58,516	57,447	42,495	46,932	33,389	37,687	44,949	30,921	60,415	42,567
Network Administrator	38,225	44,877	65,480	48,437	48,764	34,934	47,386	49,767	33,662	58,358	27,813
Network Engineer	34,543	36,177	39,267	53,572	53,975	43,932	50,313	59,960	38,505	72,655	48,608
Network Technician	22,801	23,864	17,296	19,317	30,111	33,747	41,861	40,310	24,734	46,847	47,413
Quality Assurance (QA) Engineer	52,005	46,467	93,493	45,658	53,436	43,402	47,590	53,802	39,136	69,073	47,083
Network Security Engineer	66,132	60,716	62,895	70,244	49,490	54,078	67,031	59,526	40,921	91,722	66,443
Software Developer	46,998	40,125	51,421	56,505	56,598	41,108	45,288	56,415	38,730	70,126	44,907
Software Engineer	57,745	55,730	57,447	64,742	64,761	45,137	51,151	64,843	48,043	84,280	51,295
Software Engineer / Developer / Programmer	47,177	49,277	41,174	46,403	59,587	42,473	47,470	58,982	43,203	76,572	37,266
Solutions Architect	142,537	109,001	145,849	170,732	119,008	76,293	85,863	87,506	74,352	115,268	92,307
Support Technician, IT	24,180	26,428	14,268	25,012	36,196	30,522	35,430	39,593	26,007	45,604	32,906
System Administrator, Computer / Network	33,608	31,678	12,173	35,968	46,237	39,075	44,523	49,732	33,419	59,319	47,161
System Administrator, Windows Server	38,513	82,128	16,277	48,094	41,123	43,342	50,035	53,312	38,280	64,838	36,362
Systems Analyst	44,110	45,469	28,821	57,904	55,617	41,915	48,501	52,886	37,274	64,512	66,949
Systems Engineer, IT	45,087	26,428	34,882	68,532	48,394	43,426	47,681	60,989	37,611	73,000	45,758
Technical Support Analyst, IT	56,013	79,828	75,169	56,195	56,876	32,364	41,177	44,681	30,733	49,458	49,086
Technical Support Specialist	46,109	90,341	10,493	41,329	65,425	33,554	42,774	42,245	35,629	50,816	45,410
Test / Quality Assurance (QA) Engineer (Computer Software)	47,955	46,467	93,493	59,553	51,477	38,038	44,950	50,036	34,547	60,177	33,758
Data Analyst	48,715	61,455	93,493	56,172	57,266	39,077	46,513	48,367	34,965	60,018	43,258
Quality Assurance (QA) Analyst	37,052	44,269	18,699	105,366	36,821	39,508	42,784	46,159	30,365	55,241	47,083
Quality Assurance (QA) Analyst Software	38,892	46,467	93,493	110,597	40,148	39,508	42,784	47,400	45,062	57,983	33,758
Web Developer	33,402	48,397	44,097	34,926	39,176	35,436	39,811	44,861	32,545	57,699	36,563
Average	54,307	59,513	60,664	61,745	54,953	41,971	48,541	53,576	38,998	67,661	48,862
Geometric Mean (GM)	49,045	51,152	46,857	55,031	52,832	41,199	47,641	52,697	37,923	65,907	46,868
Max	142,537	216,817	235,603	170,732	119,008	76,293	85,863	87,506	74,352	115,268	92,307
Min	22,801	20,749	10,493	19,317	30,111	30,522	32,187	36,690	23,856	41,120	27,813
Std Deviation	27,059	40,374	46,677	31,077	16,725	8,787	10,153	10,186	9,795	16,057	15,341
CV%	49.8	67.8	76.9	50.3	30.4	20.9	20.9	19.0	25.1	23.7	31.4

Country	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	UK	USA	Hong Kong
Managerial Positions											
Information Technology (IT) Consultant	87,889	107,423	122,289	118,417	78,443	55,652	55,560	62,263	55,711	76,858	57,116
Information Technology (IT) Manager	88,169	98,553	112,192	87,002	94,662	60,697	67,280	72,017	50,983	84,652	91,179
Project Manager, IT	106,644	113,336	139,118	118,300	89,512	55,042	69,467	69,499	54,342	84,283	82,956
Quality Assurance Manager	34,202	84,639	81,892	63,505	75,911	51,381	53,404	64,858	48,048	54,966	73,503
Data Manager	64,603	77,601	77,974	85,463	135,313	45,150	65,225	63,813	42,747	63,774	80,563
eCommerce Manager	53,731	34,556	68,250	38,985	91,388	40,663	45,162	51,116	41,275	61,701	64,388
Senior Business Analyst	93,931	113,336	123,411	112,364	93,454	64,418	76,216	67,986	63,039	90,685	74,044
Senior Data Scientist	171,009	175,425	218,774	209,608	107,037	67,833	87,893	89,560	73,887	121,411	77,260
Senior Database Administrator (DBA)	97,199	87,994	71,338	113,832	90,081	61,264	71,350	76,281	60,860	106,043	78,347
Senior Project Manager, IT	151,920	144,310	140,240	138,315	133,387	80,208	93,625	86,492	74,780	110,693	131,942
Senior Software Engineer	83,880	61,203	88,819	107,076	89,585	64,984	76,546	84,447	65,987	115,265	71,120
Senior Solutions Architect	142,537	109,001	153,703	187,317	137,574	85,140	100,081	104,685	95,327	131,477	113,692
Senior Systems Administrator	89,178	70,295	93,493	77,268	61,560	50,441	58,188	66,692	46,993	82,617	78,414
Senior Systems Analyst	85,504	97,797	91,997	111,219	67,878	59,984	68,052	68,641	50,961	85,334	84,216
Senior Systems Engineer	89,178	105,593	91,997	75,603	75,175	54,523	70,431	80,142	56,894	104,274	64,083
Senior Web Developer	56,704	82,159	97,559	77,268	71,597	55,227	57,480	63,675	49,765	83,459	58,043
Sr. Software Engineer / Developer / Programmer	82,827	97,568	114,436	90,251	87,615	62,374	69,648	77,791	61,980	104,256	62,879
Software Quality Assurance (SQA) Manager	66,666	76,261	93,493	189,585	122,674	52,154	63,839	77,100	50,327	99,392	54,082
Average	91,432	96,503	110,054	111,188	94,602	59,285	69,414	73,725	57,995	92,286	77,657
GM	85,469	91,536	105,300	102,813	92,011	58,364	68,122	72,777	56,719	89,919	75,646
Max	171,009	175,425	218,774	209,608	137,574	85,140	100,081	104,685	95,327	131,477	131,942
Min	34,202	34,556	68,250	38,985	61,560	40,663	45,162	51,116	41,275	54,966	54,082
Std Deviation	34,564	31,062	36,549	45,524	23,522	11,015	13,996	12,396	13,325	21,006	19,589
CV%	37.8	32.2	33.2	40.9	24.9	18.6	20.2	16.8	23.0	22.8	25.2
C-Level Positions											
Director of Analytics	193,643	146,803	367,428	137,104	176,177	74,567	109,491	103,601	118,762	122,915	133,626
IT Director	203,481	266,094	280,480	228,868	206,478	91,582	103,984	101,297	106,188	116,124	171,458
Vice President (VP), IT	292,965	135,863	296,371	188,780	166,290	91,582	111,627	121,936	106,914	145,635	169,909
Chief Technology Officer	227,782	302,406	241,212	237,953	201,578	91,433	105,035	108,959	113,996	158,306	245,953
Chief Information Officer	319,059	645,023	403,891	356,422	242,002	110,075	128,269	134,667	125,455	160,523	287,554
Chief Operating Officer	246,648	498,633	43,105	245,853	216,228	91,806	102,060	107,999	104,649	137,150	240,411
Chief Executive Officer	374,482	344,937	314,137	397,217	278,374	92,770	101,297	120,368	94,367	148,344	279,521
Chief Information Security Officer	394,254	182,617	640,968	389,033	225,756	111,958	116,682	128,274	120,551	162,098	192,840
Chief Financial Officer	256,232	253,857	320,471	205,963	263,401	95,130	100,157	112,799	122,704	133,373	208,719
Average	278,727	308,470	323,118	265,244	219,587	94,545	108,734	115,545	112,621	142,719	214,443
GM	270,787	272,388	272,468	250,837	216,756	93,963	108,412	115,051	112,195	141,838	208,500
Max	394,254	645,023	640,968	397,217	278,374	111,958	128,269	134,667	125,455	162,098	287,554
Min	193,643	135,863	43,105	137,104	166,290	74,567	100,157	101,297	94,367	116,124	133,626
Std Deviation	71,917	168,576	157,025	93,058	37,331	11,078	9,106	11,431	10,244	16,559	52,571
CV%	25.8	54.6	48.6	35.1	17.0	11.7	8.4	9.9	9.1	11.6	24.5
Overall											
Average	361,276	33,018	414,818	398,847	126,902	89,470	93,811	89,111	46,730	86,001	642,021
GM	273,032	23,950	280,830	310,409	106,941	84,131	88,191	84,408	42,224	80,882	528,106
Max	1,447,897	198,742	2,333,125	1,489,562	388,443	182,666	189,257	174,766	105,697	162,098	2,257,225
Min	83,737	6,393	38,195	72,439	42,017	49,798	47,491	47,615	20,098	41,120	218,329
Std Deviation	316,448	34,253	415,671	318,077	85,072	33,811	35,148	31,372	23,267	31,438	488,059
CV%	87.6	103.7	100.2	79.7	67.0	37.8	37.5	35.2	49.8	36.6	76.0

Appendix 1 (Cont'd): Average Salary of Digital Professionals by Digital Jobs and by Country in International PPP Currency, 2022

Country	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa
Technology Positions										
.NET Software Developer / Programmer	26,361	36,840	21,673	17,883	31,308	56,264	18,178	63,282	49,791	43,642
Applications Engineer	42,658	19,206	15,662	15,424	35,935	54,576	24,768	48,009	51,567	48,327
Business Analyst, IT	31,965	47,844	21,535	21,332	36,236	59,825	24,739	69,797	55,630	51,332
Business Intelligence (BI) Analyst	31,499	30,700	20,045	23,814	33,066	58,282	24,265	44,235	54,809	51,134
Support Technician Computer / Network / IT	18,941	34,687	13,004	7,844	27,539	39,541	8,220	32,059	29,264	20,168
Cyber Security Analyst	23,508	62,530	24,235	13,655	42,853	55,588	23,499	45,928	43,163	32,062
Data Engineer	30,139	59,805	20,376	23,568	40,155	70,299	34,770	56,977	39,444	61,199
Data Scientist	48,470	32,450	23,074	26,980	35,552	62,079	35,255	88,409	37,775	53,112
Database Administrator (DBA)	28,038	40,465	11,172	25,134	40,584	51,750	20,680	47,812	36,317	27,071
Development Operations (DevOps) Engineer	42,507	48,014	23,610	28,770	34,865	70,818	31,396	74,450	35,207	55,303
Help Desk Technician	24,985	24,813	14,659	10,427	22,368	37,707	10,695	29,925	25,737	15,253
Java Developer	25,788	35,883	13,950	25,435	23,191	57,627	19,714	41,878	54,742	51,564
Junior Software Engineer	20,384	40,003	11,688	12,002	26,090	42,643	12,011	34,615	36,412	30,646
Network Administrator	32,053	32,017	11,822	12,907	26,942	49,158	15,306	53,976	39,184	30,211
Network Engineer	26,263	15,948	14,628	15,271	27,467	56,523	14,332	41,878	36,738	35,864
Network Technician	28,762	34,687	13,004	7,085	27,539	45,253	8,507	37,013	30,182	17,014
Quality Assurance (QA) Engineer	22,084	31,896	26,008	14,923	34,915	54,633	16,641	43,687	50,097	45,584
Network Security Engineer	23,293	15,948	24,235	21,405	60,151	72,487	22,308	62,228	36,738	33,039
Software Developer	25,312	33,501	17,978	15,722	30,049	51,867	21,538	37,082	46,039	40,485
Software Engineer	27,690	40,003	23,992	19,456	35,564	57,765	24,237	50,972	37,830	49,645
Software Engineer / Developer / Programmer	25,390	27,909	13,004	16,357	30,347	53,977	20,366	27,919	22,647	43,110
Solutions Architect	79,751	67,069	23,644	54,389	72,471	97,296	79,994	54,797	55,471	89,911
Support Technician, IT	17,168	34,687	13,004	7,844	27,539	39,541	13,488	32,059	28,754	19,233
System Administrator, Computer / Network	28,647	32,893	10,541	14,907	26,959	50,144	12,581	53,976	21,813	30,735
System Administrator, Windows Server	23,867	24,013	14,570	19,959	31,309	55,991	17,005	41,886	45,452	35,917
Systems Analyst	28,287	61,807	22,525	21,100	34,531	54,212	26,712	46,195	24,875	56,157
Systems Engineer, IT	22,501	27,245	23,644	15,283	24,939	54,701	15,507	40,864	47,080	39,994
Technical Support Analyst, IT	25,864	34,687	7,290	18,189	27,539	43,987	21,954	27,919	16,073	19,233
Technical Support Specialist	32,395	78,145	21,279	11,851	35,496	45,652	21,565	33,712	48,219	39,173
Test / Quality Assurance (QA) Engineer (Computer Software)	28,388	39,056	11,617	15,204	34,915	49,732	16,524	37,225	15,307	34,557
Data Analyst	24,501	31,649	21,126	14,944	33,398	51,281	18,865	28,404	44,298	37,789
Quality Assurance (QA) Analyst	24,209	24,013	12,020	13,915	29,628	49,425	16,400	54,868	37,704	27,271
Quality Assurance (QA) Analyst Software	28,388	26,414	9,457	17,172	57,977	49,425	21,944	37,225	44,453	39,647
Web Developer	21,071	25,916	11,476	12,709	21,547	45,152	13,146	32,572	34,304	24,656
Average	29,151	36,845	17,104.31	18,025	34,146	54,271	21,386	45,701	38,621	39,119
Geometric Mean (GM)	27,821	34,393	16,210.72	16,590	32,862	53,290	19,306	43,788	36,783	36,345
Max	79,751	78,145	26,008.06	54,389	72,471	97,296	79,994	88,409	55,630	89,911
Min	17,168	15,948	7,290.14	7,085	21,547	37,707	8,220	27,919	15,307	15,253
Std Deviation	11,068	14,512	5,480.71	8,425	10,789	11,253	12,262	14,186	11,178	15,171
CV%	38.0	39.4	32.04	46.7	31.6	20.7	57.3	31.0	28.9	38.8

Country	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa
Managerial Positions										
IT Consultant	35,427	48,282	29,173	24,780	40,584	66,935	40,103	51,301	45,840	31,543
IT Manager	53,264	80,042	36,424	37,359	48,440	76,819	54,373	64,803	70,966	65,058
Project Manager, IT	50,798	47,213	29,889	41,932	58,975	74,488	64,701	65,232	66,451	58,753
Quality Assurance Manager	24,209	117,583	35,466	28,531	63,775	63,001	49,456	37,225	55,956	49,239
Data Manager	88,730	63,233	34,239	51,653	41,822	65,807	35,984	55,950	57,660	49,987
eCommerce Manager	40,343	37,611	35,242	23,286	32,914	51,514	18,976	153,565	45,922	46,137
Senior Business Analyst	48,373	53,027	39,560	34,012	63,012	84,275	41,106	55,837	42,861	87,888
Senior Data Scientist	69,259	79,740	20,376	27,067	54,354	93,102	79,605	72,649	93,871	93,263
Senior Database Administrator (DBA)	59,961	99,675	32,782	48,000	48,004	79,501	46,693	64,220	79,566	78,555
Senior Project Manager, IT	110,958	103,662	29,889	86,239	56,165	104,205	85,109	58,104	76,537	106,599
Senior Software Engineer	51,870	88,279	46,443	35,756	51,709	84,821	41,193	69,788	55,056	91,430
Senior Solutions Architect	115,217	67,069	68,113	120,231	65,224	111,012	108,984	129,080	123,682	132,754
Senior Systems Administrator	49,513	41,769	10,541	33,493	41,220	65,138	28,191	55,145	58,468	52,035
Senior Systems Analyst	45,314	61,807	23,676	25,316	53,017	76,808	37,782	65,033	79,349	80,438
Senior Systems Engineer	45,330	41,769	16,787	32,222	43,645	74,710	23,387	46,531	47,836	68,486
Senior Web Developer	41,976	47,778	18,305	24,323	28,989	67,763	28,909	50,305	64,790	61,404
Sr. Software Engineer / Developer / Programmer	52,726	65,637	31,641	33,864	47,053	79,231	39,700	83,756	46,405	86,207
Software Quality Assurance (SQA) Manager	55,927	166,125	42,559	35,915	57,977	69,448	72,614	46,923	89,164	104,667
Average	57,733	72,794	32,283.44	41,332	49,827	77,143	49,826	68,080	66,688	74,691
GM	53,730	67,006	29,834.28	37,089	48,719	75,894	45,021	63,860	63,927	70,416
Max	115,217	166,125	68,113.00	120,231	65,224	111,012	108,984	153,565	123,682	132,754
Min	24,209	37,611	10,541.14	23,286	28,989	51,514	18,976	37,225	42,861	31,543
Std Deviation	24,256	32,956	12,899.10	24,538	10,361	14,649	23,817	29,071	21,057	25,757
CV%	42.0	45.3	39.96	59.4	20.8	19.0	47.8	42.7	31.6	34.5
C-Level Positions										
Director of Analytics	161,409	107,680	88,664	122,784	79,718	109,693	156,076	95,845	132,410	106,041
IT Director	148,817	186,060	106,397	101,424	86,966	117,316	142,613	169,733	154,988	152,953
Vice President (VP), IT	119,926	15,948	61,921	155,656	110,595	121,679	145,650	115,331	95,672	194,790
Chief Technology Officer	105,806	199,350	96,805	107,471	62,975	117,822	120,812	231,185	113,658	130,301
Chief Information Officer	208,695	398,700	107,815	103,170	86,960	142,883	180,260	136,462	248,747	183,156
Chief Operating Officer	124,376	398,700	106,397	84,388	65,696	116,360	108,196	255,921	306,150	130,036
Chief Executive Officer	169,226	273,605	27,387	97,903	144,943	116,534	119,118	348,984	222,566	154,910
Chief Information Security Officer	104,104	164,086	44,437	54,918	65,693	137,459	90,449	88,409	139,004	138,448
Chief Financial Officer	156,378	258,822	27,190	100,573	141,452	117,376	139,755	201,048	142,122	152,886
Average	144,304	222,550	74,112.52	103,143	93,889	121,902	133,659	182,547	172,813	149,280
GM	140,834	169,851	65,258.37	99,784	89,582	121,493	131,179	165,660	161,495	147,049
Max	208,695	398,700	107,815.22	155,656	144,943	142,883	180,260	348,984	306,150	194,790
Min	104,104	15,948	27,190.24	54,918	62,975	109,693	90,449	88,409	95,672	106,041
Std Deviation	34,124	126,069	34,207.58	27,103	31,603	10,892	26,989	85,862	70,272	27,373
CV%	23.6	56.6	46.16	26.3	33.7	8.9	20.2	47.0	40.7	18.3
Overall										
Average	242,407	2,714,802	450,165,708	2,103,166	6,569,240	92,874,992	3,695,869	487,867	359,703	1,116,170
GM	190,632	1,922,241	357,719,667	1,538,903	5,907,908	87,380,692	2,622,525	400,835	290,455	920,051
Max	926,973	14,460,369	1,618,123,438	8,738,950	20,008,666	186,908,979	14,375,852	2,348,539	1,650,973	3,300,792
Min	76,255	578,415	109,412,586	397,773	2,974,400	49,325,861	655,564	187,883	82,549	258,475
Std Deviation	196,961	2,954,230	369,878,527	1,923,035	3,527,742	34,729,296	3,421,620	401,668	294,805	736,084
CV%	81.3	108.8	82.2	91.4	53.7	37.4	92.6	82.3	82.0	65.9

Appendix 2: Average Digital Salaries in Top 10% Bracket by Digital Jobs and Countries under International PPP Currency, 2022

	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
Technology Positions											
.NET Software Developer / Programmer	105,455	217,052	79,116	96,000	123,789	60,131	68,308	76,310	63,071	100,496	120,680
Applications Engineer	138,232	124,865	25,243	148,683	95,909	51,541	61,924	68,925	58,124	102,392	122,997
Business Analyst, IT	162,933	82,128	119,204	121,171	109,291	58,290	71,499	72,207	66,781	94,808	92,712
Business Intelligence (BI) Analyst	119,706	102,376	103,648	124,683	94,794	57,677	74,691	68,105	56,887	92,912	76,487
Support Technician Computer / Network / IT	47,977	23,465	21,503	52,098	36,802	39,269	47,879	53,335	38,337	64,469	77,414
Cyber Security Analyst	151,533	141,012	117,666	141,073	103,715	84,674	72,776	74,669	68,017	109,977	95,802
Data Engineer	174,334	168,691	96,639	116,488	113,752	74,857	84,906	95,183	80,384	126,094	112,336
Data Scientist	170,059	163,501	230,314	272,780	266,537	175,484	199,177	221,546	187,976	294,852	262,683
Database Administrator (DBA)	195,710	35,198	79,469	95,415	90,333	61,358	70,861	78,772	65,544	105,237	117,435
Development Operations (DevOps) Engineer	181,934	177,917	265,360	313,756	126,020	74,857	84,906	97,644	87,804	135,575	154,519
Help Desk Technician	88,830	64,893	27,048	35,122	39,033	36,201	42,134	48,412	32,154	56,885	34,149
Java Developer	90,255	66,623	93,134	112,390	97,024	58,904	78,522	76,310	74,201	109,977	463,558
Junior Software Engineer	106,406	86,229	33,055	42,146	68,028	41,110	45,964	56,617	40,810	77,742	42,493
Network Administrator	82,179	46,930	69,603	84,878	68,028	46,632	58,732	65,643	50,704	81,535	80,350
Network Engineer	104,980	82,128	97,700	122,927	104,830	61,972	71,499	80,413	60,597	104,289	86,531
Network Technician	22,801	23,465	38,062	48,000	30,111	41,723	59,370	55,797	39,574	72,054	76,178
Quality Assurance (QA) Engineer	116,381	82,128	96,298	115,902	79,180	60,744	65,754	69,746	55,651	95,756	71,079
Network Security Engineer	123,031	106,412	139,695	166,829	130,480	59,517	97,673	100,926	89,041	133,679	102,446
Software Developer	86,930	123,192	137,435	124,683	98,139	57,677	65,116	75,490	61,834	102,392	94,257
Software Engineer	139,182	205,319	234,668	127,024	105,946	61,358	73,415	86,157	77,911	123,250	88,694
Software Engineer / Developer / Programmer	113,531	99,727	125,281	124,683	105,946	60,131	68,946	77,131	70,491	113,769	68,607
Solutions Architect	252,713	111,459	61,706	295,609	192,933	92,651	110,441	114,876	111,301	154,537	154,519
Support Technician, IT	47,977	41,064	35,060	54,439	82,526	38,656	46,602	51,694	35,864	66,365	75,560
System Administrator, Computer / Network	68,404	228,784	36,462	72,585	81,411	53,995	61,285	66,464	50,704	84,379	71,079
System Administrator, Windows Server	88,355	82,128	96,639	116,488	72,489	46,019	69,584	71,387	56,887	91,015	36,312
Systems Analyst	111,631	46,930	99,643	120,000	92,563	53,995	70,223	73,849	56,887	91,015	92,712
Systems Engineer, IT	104,980	41,064	84,144	108,293	78,065	55,836	70,223	78,772	56,887	103,340	77,260
Technical Support Analyst, IT	99,755	78,156	47,574	59,122	107,061	42,951	51,709	54,156	50,704	72,054	53,927
Technical Support Specialist	124,931	205,319	75,111	91,317	112,637	51,541	63,200	59,079	56,887	76,794	66,289
Test / Quality Assurance (QA) Engineer (Computer Software)	97,380	46,930	93,493	136,390	89,217	53,382	64,477	68,925	54,414	96,704	79,577
Data Analyst	85,029	70,395	62,173	101,854	88,102	52,154	60,008	67,284	49,467	84,379	65,362
Quality Assurance (QA) Analyst	45,127	11,841	87,126	105,366	184,011	52,768	58,732	60,720	50,704	77,742	57,636
Quality Assurance (QA) Analyst Software	129,207	113,909	41,567	52,098	91,448	60,744	62,562	63,182	53,177	83,431	50,991
Web Developer	70,304	46,930	56,096	86,634	72,489	50,314	54,901	62,361	48,231	85,327	52,228
Average	113,182	98,475	91,380	117,262	100,960	59,680	70,824	76,238	63,471	101,918	99,260
Geometric Mean (GM)	102,869	80,141	76,097	103,309	92,844	56,833	67,741	72,863	59,664	96,923	84,903
Max	252,713	228,784	265,360	313,756	266,537	175,484	199,177	221,546	187,976	294,852	463,558
Min	22,801	11,841	21,503	35,122	30,111	36,201	42,134	48,412	32,154	56,885	34,149
Std Deviation	47,282	59,668	58,213	64,755	44,182	23,846	26,611	29,545	27,400	40,387	76,929
CV%	41.8	60.6	63.7	55.2	43.8	40.0	37.6	38.8	43.2	39.6	77.5

	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
Managerial Positions											
IT Consultant	194,760	93,860	260,846	217,171	122,674	81,606	90,013	91,900	95,224	122,302	103,373
IT Manager	200,460	170,122	453,442	207,805	160,591	84,061	96,397	98,465	81,621	127,042	128,560
Project Manager, IT	193,335	117,325	142,577	233,561	150,554	75,470	95,120	92,721	90,278	122,302	139,685
Quality Assurance Manager	76,954	50,477	150,710	179,707	68,028	67,494	63,839	70,566	58,124	93,860	30,904
Data Manager	107,356	87,383	70,104	85,463	1,107,411	86,515	95,758	98,465	70,491	112,821	98,120
eCommerce Manager	193,335	191,757	68,250	39,219	139,402	69,335	70,861	69,746	59,361	92,912	112,954
Senior Business Analyst	156,283	146,778	96,639	116,488	117,098	60,744	92,566	87,798	140,982	119,458	145,248
Senior Data Scientist	235,137	242,503	176,243	209,561	157,246	93,878	103,419	109,952	101,408	153,589	151,429
Senior Database Administrator (DBA)	168,634	123,192	186,986	159,219	120,444	78,538	90,651	95,183	87,804	133,679	114,344
Senior Project Manager, IT	250,338	152,523	168,288	340,683	195,163	94,491	112,995	111,593	107,591	144,108	154,519
Senior Software Engineer	142,982	275,715	112,192	173,268	134,941	80,993	95,120	110,773	101,408	152,641	122,379
Senior Solutions Architect	235,137	242,503	251,842	297,951	181,780	103,082	127,678	137,030	131,088	165,914	154,519
Senior Systems Administrator	164,834	82,128	93,493	199,610	259,846	61,972	72,138	81,233	66,781	111,873	95,647
Senior Systems Analyst	146,308	99,727	205,782	244,097	100,370	68,721	87,459	85,336	71,728	115,666	105,073
Senior Systems Engineer	176,234	105,593	37,865	183,219	118,213	69,948	93,843	98,465	79,148	142,212	127,015
Senior Web Developer	107,356	87,383	114,662	137,561	136,057	68,107	78,522	82,874	75,438	116,614	85,295
Sr. Software Engineer / Developer / Programmer	168,634	93,860	114,529	153,366	132,711	79,152	91,928	101,747	93,988	140,316	130,878
Software Quality Assurance (SQA) Manager	250,338	260,956	191,763	227,707	243,117	80,993	115,548	132,107	123,668	174,446	162,709
Average	176,023	145,766	160,901	189,203	202,536	78,061	92,992	97,553	90,896	130,097	120,147
GM	168,595	131,116	138,192	172,668	159,524	77,265	91,701	96,018	88,082	128,233	114,153
Max	250,338	275,715	453,442	340,683	1,107,411	103,082	127,678	137,030	140,982	174,446	162,709
Min	76,954	50,477	37,865	39,219	68,028	60,744	63,839	69,746	58,124	92,912	30,904
Std Deviation	49,364	69,457	95,645	71,398	230,681	11,607	15,867	18,128	23,804	22,662	31,865
CV%	28.0	47.7	59.4	37.7	113.9	14.9	17.1	18.6	26.2	17.4	26.5
C-Level Positions											
Director of Analytics	335,842	364,753	403,040	474,731	287,726	133,147	137,892	140,312	178,082	167,810	310,738
IT Director	372,419	70,395	280,480	526,243	327,874	151,554	144,276	130,466	149,638	166,862	309,039
Vice President (VP), IT	475,025	533,713	158,720	189,073	256,500	118,421	286,636	157,544	147,165	195,304	309,039
Chief Technology Officer	458,399	393,040	453,606	533,853	393,672	123,330	155,128	164,108	184,266	237,019	309,039
Chief Information Officer	475,025	533,713	448,767	578,341	382,520	149,714	201,092	193,647	218,893	239,864	463,558
Chief Operating Officer	475,025	1,155,655	497,664	585,365	369,137	130,079	160,874	164,108	181,792	232,279	309,039
Chief Executive Officer	950,049	997,266	934,932	1,170,731	581,028	157,690	188,963	210,058	195,396	291,060	772,596
Chief Information Security Officer	399,021	709,818	345,965	408,000	397,017	134,988	164,704	181,339	181,792	219,006	309,039
Chief Financial Officer	474,550	569,028	934,932	573,073	434,935	149,714	157,043	168,211	196,632	218,058	309,039
Average	490,595	591,931	495,345	559,934	381,157	138,737	177,401	167,755	181,517	218,585	377,903
GM	469,363	479,428	434,300	510,064	371,552	138,117	173,147	166,126	180,249	215,535	358,145
Max	950,049	1,155,655	934,932	1,170,731	581,028	157,690	286,636	210,058	218,893	291,060	772,596
Min	335,842	70,395	158,720	189,073	256,500	118,421	137,892	130,466	147,165	166,862	309,039
Std Deviation	180,076	329,099	269,423	260,751	93,877	13,851	45,594	24,797	22,455	38,776	156,559
CV%	36.7	55.6	54.4	46.6	24.6	10.0	25.7	14.8	12.4	17.7	41.4
Overall											
Average	688,259	57,074	624,245	764,262	240,391	125,252	137,350	124,624	74,966	127,447	1,150,263
GM	546,791	37,177	427,103	570,575	186,499	115,734	125,523	115,845	66,382	118,444	899,391
Max	3,489,056	356,076	3,403,152	4,390,240	1,545,282	286,313	422,922	287,514	184,418	294,852	6,064,692
Min	83,737	3,648	78,272	131,707	42,017	59,065	62,167	62,827	27,090	56,885	242,588
Std Deviation	559,294	67,017	666,595	712,977	229,404	54,566	67,375	52,708	40,361	53,483	1,002,671
CV%	81.3	117.4	106.8	93.3	95.4	43.6	49.1	42.3	53.8	42.0	87.2

Appendix 2 (Cont'd): Average Digital Salaries in Top 10% Bracket by Digital Jobs and Countries under International PPP Currency, 2022

Country	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa
Technology Positions										
.NET Software Developer / Programmer	46,362	63,128	32,313	38,903	76,134	84,076	40,129	63,282	43,244	91,848
Applications Engineer	46,934	62,264	64,626	38,388	65,224	69,791	80,259	52,115	50,897	93,962
Business Analyst, IT	69,829	66,450	48,667	42,940	65,224	79,694	40,129	98,181	78,068	82,333
Business Intelligence (BI) Analyst	68,112	66,450	65,808	42,940	61,231	75,720	40,129	80,999	38,269	85,637
Support Technician Computer / Network / IT	31,480	32,893	20,097	21,169	61,544	41,317	19,784	81,946	20,876	41,365
Cyber Security Analyst	59,527	41,199	23,841	26,494	72,471	87,055	80,259	41,645	62,761	81,275
Data Engineer	85,856	132,900	61,868	85,879	72,471	91,172	80,259	57,001	76,155	104,403
Data Scientist	75,553	66,450	70,931	85,879	124,020	213,733	80,259	159,369	78,962	108,103
Database Administrator (DBA)	68,685	46,781	68,961	42,940	75,040	74,184	40,129	71,193	36,355	66,606
Development Operations (DevOps) Engineer	91,007	72,763	106,791	42,940	43,483	95,261	80,259	111,675	81,512	110,878
Help Desk Technician	61,244	35,750	20,097	21,083	46,954	39,122	19,984	24,680	40,313	33,567
Java Developer	51,513	47,844	46,105	42,940	191,759	78,150	40,129	61,654	66,588	91,451
Junior Software Engineer	28,046	66,450	12,216	17,992	49,768	51,701	21,068	30,687	23,344	45,594
Network Administrator	70,402	40,535	69,631	34,438	72,471	57,797	39,808	57,931	37,149	61,452
Network Engineer	52,658	41,332	63,247	35,125	115,954	79,434	36,157	58,164	75,389	68,060
Network Technician	57,810	33,624	20,097	28,555	86,966	43,735	16,533	51,205	8,897	40,043
Quality Assurance (QA) Engineer	46,934	66,450	48,273	39,204	57,977	68,560	38,926	120,507	48,219	81,011
Network Security Engineer	69,829	72,763	47,287	42,940	28,989	95,890	80,259	173,700	56,586	84,051
Software Developer	51,513	66,450	38,618	38,903	67,224	73,644	40,129	114,932	53,959	74,271
Software Engineer	54,948	66,450	58,715	42,940	65,224	80,239	80,259	116,328	68,118	90,526
Software Engineer / Developer / Programmer	61,816	66,450	33,101	36,713	58,574	78,341	40,129	47,927	72,711	88,412
Solutions Architect	135,652	132,900	105,806	128,819	86,966	132,008	120,388	179,145	108,301	132,155
Support Technician, IT	31,480	66,051	23,644	22,200	50,730	55,928	36,117	87,602	17,986	35,682
System Administrator, Computer / Network	51,513	100,938	48,470	33,922	50,730	65,564	39,367	63,050	21,813	54,844
System Administrator, Windows Server	47,507	127,783	45,505	42,940	47,684	62,697	36,959	75,148	40,087	64,756
Systems Analyst	60,099	66,450	45,514	42,940	72,471	72,260	40,129	191,867	60,465	88,015
Systems Engineer, IT	45,217	33,823	74,478	42,940	253,650	68,041	27,770	40,249	47,998	69,910
Technical Support Analyst, IT	35,487	26,779	23,644	33,965	65,224	67,240	39,528	28,094	12,246	54,844
Technical Support Specialist	76,125	66,450	63,050	24,905	57,792	75,793	80,259	41,413	48,219	93,566
Test / Quality Assurance (QA) Engineer (Computer Software)	49,224	332,250	39,209	32,377	86,966	69,025	36,759	47,229	32,528	59,866
Data Analyst	41,783	65,055	40,588	28,813	86,966	66,755	40,129	189,382	69,649	58,941
Quality Assurance (QA) Analyst	37,777	59,141	46,893	26,193	54,874	98,504	34,391	47,229	18,369	47,444
Quality Assurance (QA) Analyst Software	48,652	332,250	39,209	40,149	52,634	71,585	40,129	62,817	18,369	59,206
Web Developer	39,494	66,450	23,841	28,083	53,051	59,235	31,662	41,878	22,961	57,620
Average	57,355	80,344	48,269	40,516	75,836	77,154	48,193	81,477	48,158	73,579
Geometric Mean (GM)	54,329	66,223	43,002	37,051	68,890	73,205	43,187	69,912	41,327	69,790
Max	135,652	332,250	106,791	128,819	253,650	213,733	120,388	191,867	108,301	132,155
Min	28,046	26,779	12,216	17,992	28,989	39,122	16,533	24,680	8,897	33,567
Std Deviation	20,602	69,006	22,726	21,243	42,540	30,006	24,100	48,193	24,207	23,448
CV%	35.9	85.9	47.1	52.4	56.1	38.9	50.0	59.1	50.3	31.9

Country	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa
Managerial Positions										
IT Consultant	79,560	66,450	135,163	85,879	70,298	98,098	80,259	113,303	65,057	85,240
IT Manager	109,895	132,900	119,007	85,879	50,730	113,683	120,388	156,810	110,214	127,662
Project Manager, IT	105,316	132,900	73,887	85,879	65,224	107,048	120,388	161,696	47,071	113,786
Quality Assurance Manager	78,415	132,900	94,772	42,940	65,224	66,454	120,388	93,295	34,663	57,752
Data Manager	121,915	265,800	65,020	85,879	57,977	429,895	120,388	296,212	49,128	132,155
eCommerce Manager	75,553	44,654	64,626	34,180	86,966	93,199	80,259	465,312	90,036	100,306
Senior Business Analyst	92,724	132,900	83,738	31,260	108,707	90,136	120,388	96,087	72,407	113,389
Senior Data Scientist	144,238	547,615	106,397	128,819	72,471	118,181	120,388	100,176	109,926	132,155
Senior Database Administrator (DBA)	87,573	166,125	137,922	85,879	28,989	96,544	80,259	75,718	74,624	124,490
Senior Project Manager, IT	171,139	132,900	119,992	171,759	87,545	134,216	120,388	102,180	113,658	132,155
Senior Software Engineer	87,573	132,900	86,694	85,879	76,707	103,685	80,259	116,328	97,968	132,155
Senior Solutions Architect	186,021	332,250	145,093	214,699	43,483	137,513	160,518	146,879	116,720	132,155
Senior Systems Administrator	81,849	132,900	77,000	42,940	67,693	131,318	40,129	90,873	76,476	79,954
Senior Systems Analyst	64,678	132,900	48,982	42,940	43,483	85,517	80,259	99,933	98,733	111,803
Senior Systems Engineer	68,112	265,800	23,841	85,879	78,270	94,001	80,259	87,246	47,836	117,750
Senior Web Developer	72,119	64,324	60,429	42,940	50,730	94,229	80,259	58,589	49,128	89,866
Sr. Software Engineer / Developer / Programmer	94,441	132,900	102,653	85,879	50,730	101,264	80,259	47,229	117,102	129,776
Software Quality Assurance (SQA) Manager	78,415	265,800	153,980	42,940	50,730	146,553	120,388	58,716	117,158	132,155
Average	99,974	178,607	94,400	82,358	64,220	124,530	100,324	131,477	82,661	113,595
GM	95,272	149,557	86,622	71,166	61,391	113,145	96,107	110,518	77,306	111,073
Max	186,021	547,615	153,980	214,699	108,707	429,895	160,518	465,312	117,158	132,155
Min	64,678	44,654	23,841	31,260	28,989	66,454	40,129	47,229	34,663	57,752
Std Deviation	34,924	120,079	35,965	48,789	19,374	78,916	28,376	100,264	28,796	22,308
CV%	34.9	67.2	38.1	59.2	30.2	63.4	28.3	76.3	34.8	19.6
C-Level Positions										
Director of Analytics	344,911	332,250	189,347	171,759	140,225	106,100	240,777	232,656	157,841	264,310
IT Director	278,745	398,700	159,595	214,699	43,483	106,100	240,777	232,656	177,950	264,310
Vice President (VP), IT	287,903	478,440	160,580	257,638	57,977	79,321	240,777	232,656	224,063	264,310
Chief Technology Officer	201,475	598,051	142,059	429,397	139,652	84,354	321,036	465,312	118,633	264,310
Chief Information Officer	286,186	1,262,551	130,769	214,699	191,759	86,627	401,295	697,967	353,603	264,310
Chief Operating Officer	348,002	664,501	197,031	300,578	159,437	86,701	321,036	1,628,591	344,419	264,310
Chief Executive Officer	431,568	730,951	143,832	429,397	369,604	86,569	441,424	2,791,869	382,687	396,465
Chief Information Security Officer	169,422	391,125	91,540	218,950	139,652	87,059	280,906	2,442,886	187,901	396,465
Chief Financial Officer	279,890	465,150	118,810	257,638	159,437	87,377	361,165	465,312	248,364	264,310
Average	292,011	591,302	148,174	277,195	155,692	90,023	316,577	1,021,100	243,940	293,678
GM	282,244	544,812	144,685	264,689	132,304	89,609	309,230	651,474	227,368	289,231
Max	431,568	1,262,551	197,031	429,397	369,604	106,100	441,424	2,791,869	382,687	396,465
Min	169,422	332,250	91,540	171,759	43,483	79,321	240,777	232,656	118,633	264,310
Std Deviation	78,269	284,694	33,157	93,517	93,528	9,446	73,571	1,007,056	95,130	58,275
CV%	26.8	48.1	22.4	33.7	60.1	10.5	23.2	98.6	39.0	19.8
Overall										
Average	464,397	6,699,813	1,149,954,597	4,928,353	11,622,115	93,033	8,228,171	1,580,553	470,378	1,997,191
GM	363,199	4,168,446	949,101,577	3,370,769	10,121,007	85,762	5,830,909	748,601	344,788	1,672,993
Max	1,916,920	45,791,168	2,957,096,923	24,107,449	51,022,099	429,895	35,203,932	18,788,313	2,063,717	6,718,244
Min	124,574	971,255	183,340,009	1,010,102	4,001,733	39,122	1,318,547	166,089	47,979	568,811
Std Deviation	395,679	7,986,723	690,290,677	5,250,171	7,801,771	52,091	7,901,289	3,355,469	428,674	1,381,804
CV%	85.2	119.2	60.0	106.5	67.1	56.0	96.0	212.3	91.1	69.2

Appendix 3: Benchmarking Top 10% Digital Salaries against Average Digital Salaries by Digital Jobs by Countries, 2022

Country	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
International Currency $PPP											
Technology Positions											
.NET Software Developer / Programmer	2.85	4.35	1.57	2.60	2.09	1.36	1.38	1.40	1.49	1.44	2.96
Applications Engineer	1.12	0.72	0.16	1.62	1.81	1.17	1.32	1.26	1.48	1.45	1.93
Business Analyst, IT	2.04	1.20	2.13	1.70	1.60	1.22	1.38	1.31	1.45	1.41	1.84
Business Intelligence (BI) Analyst	1.66	3.49	2.35	2.22	1.45	1.28	1.43	1.28	1.43	1.38	1.85
Support Technician Computer / Network / IT	2.02	1.13	1.00	2.47	1.02	1.29	1.35	1.32	1.47	1.40	2.35
Cyber Security Analyst	2.71	2.29	1.68	1.82	1.88	1.97	1.46	1.38	1.73	1.50	2.15
Data Engineer	2.16	2.16	1.89	2.07	1.67	1.38	1.35	1.41	1.59	1.42	1.98
Data Scientist	2.04	0.75	0.98	2.66	3.41	3.90	3.39	3.36	3.72	3.19	4.08
Database Administrator (DBA)	2.29	0.93	1.00	1.43	1.72	1.53	1.53	1.42	1.73	1.49	1.55
Development Operations (DevOps) Engineer	2.17	4.78	5.91	2.87	1.53	1.39	1.32	1.41	1.60	1.45	1.73
Help Desk Technician	3.51	2.45	1.41	1.64	1.20	1.18	1.31	1.32	1.35	1.38	1.00
Java Developer	2.53	0.97	1.44	1.59	1.63	1.33	1.51	1.31	1.58	1.47	10.64
Junior Software Engineer	1.85	1.47	0.58	0.99	1.45	1.23	1.22	1.26	1.32	1.29	1.00
Network Administrator	2.15	1.05	1.06	1.75	1.40	1.33	1.24	1.32	1.51	1.40	2.89
Network Engineer	3.04	2.27	2.49	2.29	1.94	1.41	1.42	1.34	1.57	1.44	1.78
Network Technician	1.00	0.98	2.20	2.48	1.00	1.24	1.42	1.38	1.60	1.54	1.61
Quality Assurance (QA) Engineer	2.24	1.77	1.03	2.54	1.48	1.40	1.38	1.30	1.42	1.39	1.51
Network Security Engineer	1.86	1.75	2.22	2.38	2.64	1.10	1.46	1.70	2.18	1.46	1.54
Software Developer	1.85	3.07	2.67	2.21	1.73	1.40	1.44	1.34	1.60	1.46	2.10
Software Engineer	2.41	3.68	4.08	1.96	1.64	1.36	1.44	1.33	1.62	1.46	1.73
Software Engineer / Developer / Programmer	2.41	2.02	3.04	2.69	1.78	1.42	1.45	1.31	1.63	1.49	1.84
Solutions Architect	1.77	1.02	0.42	1.73	1.62	1.21	1.29	1.31	1.50	1.34	1.67
Support Technician, IT	1.98	1.55	2.46	2.18	2.28	1.27	1.32	1.31	1.38	1.46	2.30
System Administrator, Computer / Network	2.04	7.22	3.00	2.02	1.76	1.38	1.38	1.34	1.52	1.42	1.51
System Administrator, Windows Server	2.29	1.00	5.94	2.42	1.76	1.06	1.39	1.34	1.49	1.40	1.00
Systems Analyst	2.53	1.03	3.46	2.07	1.66	1.29	1.45	1.40	1.53	1.41	1.38
Systems Engineer, IT	2.33	1.55	2.41	1.58	1.61	1.29	1.47	1.29	1.51	1.42	1.69
Technical Support Analyst, IT	1.78	0.98	0.63	1.05	1.88	1.33	1.26	1.21	1.65	1.46	1.10
Technical Support Specialist	2.71	2.27	7.16	2.21	1.72	1.54	1.48	1.40	1.60	1.51	1.46
Test / Quality Assurance (QA) Engineer (Computer Software)	2.03	1.01	1.00	2.29	1.73	1.40	1.43	1.38	1.58	1.61	2.36
Data Analyst	1.75	1.15	0.67	1.81	1.54	1.33	1.29	1.39	1.41	1.41	1.51
Quality Assurance (QA) Analyst	1.22	0.27	4.66	1.00	5.00	1.34	1.37	1.32	1.67	1.41	1.22
Quality Assurance (QA) Analyst Software	3.32	2.45	0.44	0.47	2.28	1.54	1.46	1.33	1.18	1.44	1.51
Web Developer	2.10	0.97	1.27	2.48	1.85	1.42	1.38	1.39	1.48	1.48	1.43
Average Technology Level	2.08	1.65	1.51	1.90	1.84	1.42	1.46	1.42	1.63	1.51	2.03
Managerial Positions											
IT Manager	2.27	1.73	4.04	2.39	1.70	1.38	1.43	1.37	1.60	1.50	1.41
Project Manager, IT	1.81	1.04	1.02	1.97	1.68	1.37	1.37	1.33	1.66	1.45	1.68
Quality Assurance Manager	2.25	0.60	1.84	2.83	0.90	1.31	1.20	1.09	1.21	1.71	0.42
Data Manager	1.66	1.13	0.90	1.00	8.18	1.92	1.47	1.54	1.65	1.77	1.22
eCommerce Manager	3.60	5.55	1.00	1.01	1.53	1.71	1.57	1.36	1.44	1.51	1.75
Senior Business Analyst	1.66	1.30	0.78	1.04	1.25	0.94	1.21	1.29	2.24	1.32	1.96
Senior Data Scientist	1.38	1.38	0.81	1.00	1.47	1.38	1.18	1.23	1.37	1.27	1.96
Senior Database Administrator (DBA)	1.73	1.40	2.62	1.40	1.34	1.28	1.27	1.25	1.44	1.26	1.46
Senior Project Manager, IT	1.65	1.06	1.20	2.46	1.46	1.18	1.21	1.29	1.44	1.30	1.17
Senior Software Engineer	1.70	4.50	1.26	1.62	1.51	1.25	1.24	1.31	1.54	1.32	1.72

Country	UAE	Kuwait	Qatar	Saudi Arabia	Singapore	New Zealand	Australia	Canada	United Kingdom	USA	Hong Kong
Senior Solutions Architect	1.65	2.22	1.64	1.59	1.32	1.21	1.28	1.31	1.38	1.26	1.36
Senior Systems Administrator	1.85	1.17	1.00	2.58	4.22	1.23	1.24	1.22	1.42	1.35	1.22
Senior Systems Analyst	1.71	1.02	2.24	2.19	1.48	1.15	1.29	1.24	1.41	1.36	1.25
Senior Systems Engineer	1.98	1.00	0.41	2.42	1.57	1.28	1.33	1.23	1.39	1.36	1.98
Senior Web Developer	1.89	1.06	1.18	1.78	1.90	1.23	1.37	1.30	1.52	1.40	1.47
Sr. Software Engineer / Developer / Programmer	2.04	0.96	1.00	1.70	1.51	1.27	1.32	1.31	1.52	1.35	2.08
Software Quality Assurance (SQA) Manager	3.76	3.42	2.05	1.20	1.98	1.55	1.81	1.71	2.46	1.76	3.01
Average Managerial Level	1.93	1.51	1.46	1.70	2.14	1.32	1.34	1.32	1.57	1.41	1.55
C-Level Positions											
Director of Analytics	1.73	2.48	1.10	3.46	1.63	1.79	1.26	1.35	1.50	1.37	2.33
IT Director	1.83	0.26	1.00	2.30	1.59	1.65	1.39	1.29	1.41	1.44	1.80
Vice President (VP), IT	1.62	3.93	0.54	1.00	1.54	1.29	2.57	1.29	1.38	1.34	1.82
Chief Technology Officer	2.01	1.30	1.88	2.24	1.95	1.35	1.48	1.51	1.62	1.50	1.26
Chief Information Officer	1.49	0.83	1.11	1.62	1.58	1.36	1.57	1.44	1.74	1.49	1.61
Chief Operating Officer	1.93	2.32	11.55	2.38	1.71	1.42	1.58	1.52	1.74	1.69	1.29
Chief Executive Officer	2.54	2.89	2.98	2.95	2.09	1.70	1.87	1.75	2.07	1.96	2.76
Chief Information Security Officer	1.01	3.89	0.54	1.05	1.76	1.21	1.41	1.41	1.51	1.35	1.60
Chief Financial Officer	1.85	2.24	2.92	2.78	1.65	1.57	1.57	1.49	1.60	1.63	1.48
AverageC-Level	1.76	1.92	1.53	2.11	1.74	1.47	1.63	1.45	1.61	1.53	1.76
Overall at Country Level	1.92	1.69	1.50	1.90	1.90	1.40	1.48	1.40	1.60	1.48	1.78

Appendix 3 (Cont'd): Benchmarking Top 10% Digital Salaries against Average Digital Salaries by Digital Jobs by Countries, 2022

Country	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa
International Currency $PPP										
Technology Positions										
.NET Software Developer / Programmer	1.76	1.71	1.49	2.18	2.43	1.49	2.21	1.00	0.87	2.10
Applications Engineer	1.10	3.24	4.13	2.49	1.82	1.28	3.24	1.09	0.99	1.94
Business Analyst, IT	2.18	1.39	2.26	2.01	1.80	1.33	1.62	1.41	1.40	1.60
Business Intelligence (BI) Analyst	2.16	2.16	3.28	1.80	1.85	1.30	1.65	1.83	0.70	1.67
Support Technician Computer / Network / IT	1.66	0.95	1.55	2.70	2.23	1.04	2.41	2.56	0.71	2.05
Cyber Security Analyst	2.53	0.66	0.98	1.94	1.69	1.57	3.42	0.91	1.45	2.53
Data Engineer	2.85	2.22	3.04	3.64	1.80	1.30	2.31	1.00	1.93	1.71
Data Scientist	1.56	2.05	3.07	3.18	3.49	3.44	2.28	1.80	2.09	2.04
Database Administrator (DBA)	2.45	1.16	6.17	1.71	1.85	1.43	1.94	1.49	1.00	2.46
Development Operations (DevOps) Engineer	2.14	1.52	4.52	1.49	1.25	1.35	2.56	1.50	2.32	2.00
Help Desk Technician	2.45	1.44	1.37	2.02	2.10	1.04	1.87	0.82	1.57	2.20
Java Developer	2.00	1.33	3.31	1.69	8.27	1.36	2.04	1.47	1.22	1.77
Junior Software Engineer	1.38	1.66	1.05	1.50	1.91	1.21	1.75	0.89	0.64	1.49
Network Administrator	2.20	1.27	5.89	2.67	2.69	1.18	2.60	1.07	0.95	2.03
Network Engineer	2.01	2.59	4.32	2.30	4.22	1.41	2.52	1.39	2.05	1.90
Network Technician	2.01	0.97	1.55	4.03	3.16	0.97	1.94	1.38	0.29	2.35
Quality Assurance (QA) Engineer	2.13	2.08	1.86	2.63	1.66	1.25	2.34	2.76	0.96	1.78
Network Security Engineer	3.00	4.56	1.95	2.01	0.48	1.32	3.60	2.79	1.54	2.54
Software Developer	2.04	1.98	2.15	2.47	2.24	1.42	1.86	3.10	1.17	1.83
Software Engineer	1.98	1.66	2.45	2.21	1.83	1.39	3.31	2.28	1.80	1.82
Software Engineer / Developer / Programmer	2.43	2.38	2.55	2.24	1.93	1.45	1.97	1.72	3.21	2.05
Solutions Architect	1.70	1.98	4.48	2.37	1.20	1.36	1.50	3.27	1.95	1.47
Support Technician, IT	1.83	1.90	1.82	2.83	1.84	1.41	2.68	2.73	0.63	1.86
System Administrator, Computer / Network	1.80	3.07	4.60	2.28	1.88	1.31	3.13	1.17	1.00	1.78
System Administrator, Windows Server	1.99	5.32	3.12	2.15	1.52	1.12	2.17	1.79	0.88	1.80
Systems Analyst	2.12	1.08	2.02	2.04	2.10	1.33	1.50	4.15	2.43	1.57
Systems Engineer, IT	2.01	1.24	3.15	2.81	10.17	1.24	1.79	0.98	1.02	1.75
Technical Support Analyst, IT	1.37	0.77	3.24	1.87	2.37	1.53	1.80	1.01	0.76	2.85
Technical Support Specialist	2.35	0.85	2.96	2.10	1.63	1.66	3.72	1.23	1.00	2.39
Test / Quality Assurance (QA) Engineer (Computer Software)	1.73	8.51	3.38	2.13	2.49	1.39	2.22	1.27	2.13	1.73
Data Analyst	1.71	2.06	1.92	1.93	2.60	1.30	2.13	6.67	1.57	1.56
Quality Assurance (QA) Analyst	1.56	2.46	3.90	1.88	1.85	1.99	2.10	0.86	0.49	1.74
Quality Assurance (QA) Analyst Software	1.71	12.58	4.15	2.34	0.91	1.45	1.83	1.69	0.41	1.49
Web Developer	1.87	2.56	2.08	2.21	2.46	1.31	2.41	1.29	0.67	2.34
Average TechnologyLevel	1.97	2.18	2.82	2.25	2.22	1.42	2.25	1.78	1.25	1.88
Managerial Positions										
IT Consultant	2.25	1.38	4.63	3.47	1.73	1.47	2.00	2.21	1.42	2.70
IT Manager	2.06	1.66	3.27	2.30	1.05	1.48	2.21	2.42	1.55	1.96
Project Manager, IT	2.07	2.81	2.47	2.05	1.11	1.44	1.86	2.48	0.71	1.94
Quality AssuranceManager	3.24	1.13	2.67	1.51	1.02	1.05	2.43	2.51	0.62	1.17
Data Manager	1.37	4.20	1.90	1.66	1.39	6.53	3.35	5.29	0.85	2.64
eCommerce Manager	1.87	1.19	1.83	1.47	2.64	1.81	4.23	3.03	1.96	2.17
Senior Business Analyst	1.92	2.51	2.12	0.92	1.73	1.07	2.93	1.72	1.69	1.29
Senior Data Scientist	2.08	6.87	5.22	4.76	1.33	1.27	1.51	1.38	1.17	1.42
Senior Database Administrator (DBA)	1.46	1.67	4.21	1.79	0.60	1.21	1.72	1.18	0.94	1.58
Senior Project Manager, IT	1.54	1.28	4.01	1.99	1.56	1.29	1.41	1.76	1.49	1.24

Country	Malaysia	Thailand	Indonesia	Philippines	Japan	South Korea	India	China	Brazil	South Africa
Senior Software Engineer	1.69	1.51	1.87	2.40	1.48	1.22	1.95	1.67	1.78	1.45
Senior Solutions Architect	1.61	4.95	2.13	1.79	0.67	1.24	1.47	1.14	0.94	1.00
Senior Systems Administrator	1.65	3.18	7.30	1.28	1.64	2.02	1.42	1.65	1.31	1.54
Senior Systems Analyst	1.43	2.15	2.07	1.70	0.82	1.11	2.12	1.54	1.24	1.39
Senior Systems Engineer	1.50	6.36	1.42	2.67	1.79	1.26	3.43	1.88	1.00	1.72
Senior Web Developer	1.72	1.35	3.30	1.77	1.75	1.39	2.78	1.16	0.76	1.46
Sr. Software Engineer / Developer / Programmer	1.79	2.02	3.24	2.54	1.08	1.28	2.02	0.56	2.52	1.51
Software Quality Assurance (SQA) Manager	1.40	1.60	3.62	1.20	0.88	2.11	1.66	1.25	1.31	1.26
AverageManagerial Level	1.73	2.45	2.92	1.99	1.29	1.61	2.01	1.93	1.24	1.52
C-Level Positions										
Director of Analytics	2.14	3.09	2.14	1.40	1.76	0.97	1.54	2.43	1.19	2.49
IT Director	1.87	2.14	1.50	2.12	0.50	0.90	1.69	1.37	1.15	1.73
Vice President (VP), IT	2.40	30.00	2.59	1.66	0.52	0.65	1.65	2.02	2.34	1.36
Chief Technology Officer	1.90	3.00	1.47	4.00	2.22	0.72	2.66	2.01	1.04	2.03
Chief Information Officer	1.37	3.17	1.21	2.08	2.21	0.61	2.23	5.11	1.42	1.44
Chief Operating Officer	2.80	1.67	1.85	3.56	2.43	0.75	2.97	6.36	1.13	2.03
Chief Executive Officer	2.55	2.67	5.25	4.39	2.55	0.74	3.71	8.00	1.72	2.56
Chief Information Security Officer	1.63	2.38	2.06	3.99	2.13	0.63	3.11	27.63	1.35	2.86
Chief Financial Officer	1.79	1.80	4.37	2.56	1.13	0.74	2.58	2.31	1.75	1.73
Average : C-Level	2.02	2.66	2.00	2.69	1.66	0.74	2.37	5.59	1.41	1.97
Overall at Country Level	1.91	2.43	2.58	2.31	1.72	1.26	2.21	3.10	1.30	1.79

BRIEF JOB PROFILE DESCRIPTIONS

	Job Position	Job Description
1	.NET Software Developer / Programmer	A .NET Software Engineer will typically write code to generate web pages, access databases and business logic servers. They write, modify and debug software for web sites. A .NET Software Developer must have experience using databases, systems and programming languages that develop software applications with the .NET framework. They test and document software for web sites, and work with designers and content producers.
2	Applications Engineer	Applications engineers work in many different industries and create, implement and maintain computer applications and software tailored to an organisation's or customer's needs. This can be done by either modifying current software or completely designing a new project. Application engineers' work environments are generally in an office setting with much of their time spent in front of a computer testing and writing software.
3	Business Analyst, ITS	A business analyst, ITS focuses on improving operations that involve information technology within a company. The business analyst offers consultation to management in an effort to help the company become more effective. The IT business analyst will analyse the hardware, software, and IT services that are being employed in a company. Analyses will have to be carried out in order to determine areas that need improvement. It is also important to have strong research skills in order to determine the latest trends and solutions.
4	Business Intelligence (BI) Analyst	Business intelligence (BI) analysts help guide and improve the way that businesses' management staff foster collaboration within and between departments. Minimum educational requirements generally include a bachelor's degree in business administration or computer engineering. Additionally, individuals should have at least 1-2 years' experience in a supervisory or administrative role within an organisation.
5	Support Technician, IT	Support technicians in the information technology field are required to maintain the computers, network servers and phone technology in business settings. They often work daily with the hardware, repairing or replacing defective equipment. They may be required to install new or upgraded software and conduct testing on new or current software. IT support technicians may be responsible for diagnosing problems in computer hardware and may be called upon to troubleshoot problems for users, and may work in a help desk or on-call position.
6	Security Analyst	Aspiring security analysts should be experienced in cybersecurity and able to succeed in a fast-paced, constantly-changing work environment, as security analysts work to maintain the integrity of company networks, as well as diagnose and quickly resolve network problems as they arise. They must be able to proactively identify risks to the network and promptly address and neutralise these threats, and knowledge of security log fundamentals is essential. Prior experience with escalation patterns, hardening systems, firewalls, anti-virus, anti-spam, secure electronic data transmission, and anti-malware is also important.
7	Data Engineer	Data engineers typically work in an indoor office setting, and a college degree in computer science, engineering, or a related field is often a minimum requirement for this position. Computer skills, particularly with Linux systems, and three to five years of prior work experience may also be required, and applicants should have knowledge of algorithms, data structures, and performance optimism and experience with processing and interpreting data sets.
8	Data Analytics Engineer	Data analytics engineers write programmes to extract data from sources and transform it so that it can be manipulated and analysed. They also optimise and maintain data pipelines. They provide clean data sets to end users, modeling data in a way that empowers end users to answer their own questions.
9	Data Analyst	A data analyst spends their time analyzing data, including reviewing data to identify key insights into business environment and ways the data can be used to solve problems or enhance the outcomes
10	Machine Learning Engineer	Machine Learning Engineers are part software engineers and part data scientists, utilising their coding and programming skills to collect, process, and analyse data. It's Machine Learning Engineers who create algorithms and predictive models utilising machine learning to help organise data.
11	Data Analytics Developer	A Data analytics developer provides SAS/SQL/R/Python programming, in the execution of data analysis that will contribute to the final project deliverables.
12	AI Engineer	An artificial intelligence engineer is an individual who works with traditional machine learning techniques like natural language processing and neural networks to build models that power AI–based applications.

	Job Position	Job Description
13	Data Scientist	Data scientists build machine learning models meant to support business decision making. They are often looking at the business from a higher strategic point than an AI engineer typically would. Hence business appreciations and acumen are important in this role.
14	AI Specialist	An artificial intelligence specialist is someone who understands the various types of technology and tools available in the AI area including their usages in the business environment. They work with companies and other organisations to discover new and innovative methods of implementing this type of tech into their daily operations. Understanding and appreciating the business are equally required in this role.
15	Automation Analyst	An automation analyst is an information technology expert specialising in developing quality control procedures for systems and software. Their responsibilities typically include developing test structures to ensure the quality and efficiency of systems, generating codes and scripts, assessing existing programs to identify its strengths and weaknesses, implementing solutions in problem areas, and developing new programmes.
16	Database Administrator (DBA)	A database administrator (DBA) is an IT professional who ensures that the software used to manage a database is properly maintained to allow rapid access when needed. Because constant access, searches, traffic are likely to have a damaging effect on any company database, the DBA works to maintain the efficiency of the servers. He or she also will typically work to ensure data security, coordinating with an IT security professional or team in larger companies to help maintain the integrity of sensitive business data.
17	Development Operations (DevOps) Engineer	Development operations (DevOps) engineers typically work full-time in a company's headquarters and are responsible for the production and ongoing maintenance of a website platform. They also manage cloud infrastructure and system administration and work with teams to identify and repair issues on an as-needed basis, so strong communication skills are important in this position. They are generally expected to work well under pressure with tight deadlines for certain tasks, and a proactive demeanor and friendly disposition are also helpful.
18	Help Desk Technician	Help desk technicians are needed by virtually every company that produces or uses sophisticated computer equipment. When either customers or colleagues run into technical problems, the help desk technician identifies, troubleshoots, and resolves the issue. They typically field calls or emails from end users who are having trouble with some aspect of a sophisticated system. By listening to a description of the problem and accessing information about the specific system or application the user is trying to operate, the technician endeavors to guide him or her resolve the problem.
19	Java Developer	Java developers create complex web-based applications. Some examples include animated drop-down menus, images that change as a mouse moves over them, and sounds that play when clicked. Java is used extensively on e-commerce sites to collect data and validate user information.
20	Junior Software Engineer	A junior software engineer designs codes for new software and also modifies current software. They are responsible for correcting defects and debugging software as a peer review and during meetings.
21	Network Administrator	Network administrators are responsible for the upkeep of computer hardware and software systems. They usually focus on the network components within their company. In some cases, it is the responsibility of network administrators to design and implement new networks. Although some of the responsibilities for network administrators may vary depending on the size and locations of the company they work for, there are still some common responsibilities that all administrators will share.
22	Network Engineer	The work of network engineers revolves around their employers' computer network designs and implementations, and they are salaried instead of paid on an hourly basis. They generally work in offices to troubleshoot problems related to their company's enterprise-wide network, and they must ensure that their systems' security and firewall software is up-to-date.
23	Computer / Network Support Technician	A Computer/Network Support Technician's main responsibility is to provide technical support to the computer and network operations. This includes initially receiving problem calls from users either online or by telephone and troubleshooting the problem until it is resolved. It also involves updating the system log by creating a problem ticket and entering the details of the problem such as the caller name, the application programme affected, the root cause of the problem, etc.
24	Quality Assurance (QA) Engineer	A quality assurance engineer creates tests to find any problems with software before the product is launched. They identify and analyse any bugs found during testing and document them. They also must to pay very close attention to detail and coach their team on managing testing tools, reporting results, and motivating process improvement.

	Job Position	Job Description
25	Network Security Engineer	A network security engineer is an essential part of any large (and many mid-sized) business' overall technology team. A network security engineer is involved in the provisioning, deployment, configuration, and administration of many different pieces of network- and security-related hardware and software.
26	Software Developer	Software developers develop computer applications that allow users to perform specific tasks on computers or other devices. They may also develop or customise existing systems that run devices or control networks. Most of the time, software developers work in an office. A bachelor's degree in software engineering, computer science, information technology, or other relevant majors is often required. They are required to have relevant job experience.
27	Software Engineer	In the world of software design and development, a software engineer plays a key role. The engineer is typically the person who helps to develop the ways that software functions created by a software design team will work. The software engineer will work with designers to help consolidate disparate programme functions into a unified whole. The engineer also works with programmers and coders to help map out various programming tasks and smaller functions, which are then combined into larger, functioning programmes or new features for existing software.
28	Software Engineer / Developer / Programmer	Software engineer/developer/programmers may work in one major industry or in a vast array of different industries. Some may work for companies that produce and sell exactly what they work with. Many others work in other types of industries that do not sell these products but make use of their own. So, one could work for Microsoft designing computer programmes to sell, while another may work for a large business and be responsible for designing the private computer programmes that employees use within their office.
29	Solutions Architect	Solutions architects are in charge of creating, designing, and implementing arrangements within a business. They help to build new systems needed by the company and must be able to identify the business' current problems and future technological goals. They are also in charge of communicating with other departments to implement new plans and goals. Solutions architects can work in the fields of business development, business planning, mentoring, management, or quality assurance. In some cases, they are also recruited to teach and guide.
30	Support Technician, IT	Support technicians in the information technology field are required to maintain the computers, network servers and phone technology in business settings. They often work daily with the hardware, repairing or replacing defective equipment. They may be required to install new or upgraded software and conduct testing on new or current software. IT support technicians may be responsible for diagnosing problems in computer hardware and may be called upon to troubleshoot problems for users, and may work in a help desk or on-call position.
31	System Administrator, Computer / Networks	A computer/network system administrator is responsible for the maintenance of the technological systems of an organisation. The position typically requires a B.A. in a field such as computer science or information technology, and related engineering certifications (for example by Microsoft or Cisco) are also preferred.
32	System Administrator, Windows Servers	A Windows system administrator provides daily support and assistance for computer systems using the Windows platform. They may work for a business providing troubleshooting for other employees, work online or over the phone for a technical-support service, or work as part of a team of administrators.
33	Systems Analyst	People who wish to work as systems analysts must be able to think outside the box, finding effective solutions for businesses and other clients. They must be adept at investigating problems and fixing them in the most efficient way possible. Systems analysts must be knowledgeable in programming languages, operating systems and hardware. Those hoping to work in this field must be educated in technology, and they must be able to keep up with the quickly changing world of software.
34	Systems Engineer, ITS	A systems engineer (IT) is in charge of creating computer systems for clients and a system to debug systems with glitches or problems. Systems engineers (IT) also are in charge of creating the most efficient programme for each client; in some cases, they will work on robotic machinery and computer chips. They are also in charge of working on all hardware and software systems. A systems engineer is also in charge of creating or managing power systems; that may include creating power grid layouts that help supply electricity to businesses or other organisations.
35	Technical Support Analyst	A technical support analyst typically has several responsibilities within their company's information technology (IT) department. Often, they handle the installation and maintenance of software and equipment to workstations. This may include testing applications, documenting and receiving approval for installations or changes, and troubleshooting and solving IT problems. Technical support analysts may also support end users; in this case, they may work over the phone or online providing technical support and educating customers when they are setting up or experiencing trouble with software or equipment.

	Job Position	Job Description
36	Technical Support Specialist	A technical support specialist consults with other employees and identifies technology problems; they then propose or collaborate on solutions. In some companies, this position requires the specialist to write programmes to improve the efficiency and productivity of the systems already in place. As technology is constantly changing, individuals in this position must be aware of and able to respond to changes in technology. The technical support specialist must be technologically savvy and focused on finding solutions to issues with media technology and information integration. Often, the position is located within a computer lab or sometimes a classroom. If the position is within a school, an understanding of educational technology is a must.
37	Test / Quality Assurance (QA) Engineer (Computer Software)	Some Test/Quality Assurance (QA) Engineers work with computer science-related applications. A lot of what they do involves making sure that software does what it's supposed to do. On a day-to-day basis, they create test plans and test cases to determine whether certain parts of the programme function as written. When problems arise, they are responsible for finding and debugging rough spots in the code. QA Software Engineers also review user interfaces to ensure functionality and uniform design. They're present for every step of the software development process, interpreting and reporting testing results to their superiors and the rest of the software team.
38	Data Analyst	A data analyst uses data to acquire information about specific topics. This usually starts with the survey process, in which data analysts find survey participants and gather the needed information. The data is then interpreted and presented in forms such as charts or reports. Data analysts may also put their survey data in online databases.
39	Quality Assurance Analyst	Quality assurance analysts are typically tasked with testing products to ensure that they meet the standards that a company is looking for. This means that the product is reliable, functional, and user-friendly. Quality assurance analysts can work at software companies, manufacturing plants, and any other service facilities or corporations where checking the quality of a product is important.
40	Test / Quality Assurance (QA) Analyst, (Computer Software)	Test/quality assurance (QA) analysts of computer software perform many tasks related to software development and release to ensure that the user experience is consistent, appropriate, and that the company's software is easy to understand and use. They are ultimately responsible for the success of the testing process. They may plan and develop testing strategy, as well execute tests. They may also log issues, work to resolve problems, or report them to the appropriate group for resolution.
41	IT Consultant	IT consultants work for various organisations. Their job is to advise clients on how to use information technology, in order to meet their business objectives effectively and efficiently. They must be able to build and improve their clients' IT structure. They must be able to analyse and solve various IT problems. They must be familiar with desktop and server issues. They install and troubleshoot clients' IT hardware and software.
42	IT Manager	An IT manager supervises their company's computer infrastructure and related areas of concern. He or she may oversee teams that manage network technology, IT security and the software platforms used by the company. The IT manager may help establish data storage infrastructure and access protocols and rules within the company as well. The main focus of an IT manager's job may depend on their employer; for instance, companies with a customer-facing online presence may require the IT manager to oversee this web space's efficient operation and the security of customer data.
43	Quality Assurance Manager	Quality assurance managers are responsible for ensuring that products or services meet established standards. As these products and services vary greatly from industry to industry, so do the specifications of particular quality standards. Generally, quality assurance managers are concerned with maintaining minimum requirements for accessibility, reliability, and performance.
	Quality Assurance Manager	Quality assurance managers are responsible for ensuring that products or services meet established standards. As these products and services vary greatly from industry to industry, so do the specifications of particular quality standards. Generally, quality assurance managers are concerned with maintaining minimum requirements for accessibility, reliability, and performance.
44	Data Manager	Data managers are responsible for handling database systems, and they develop policies, ideas, procedures, and (as needed) assign tasks to other employees. Data managers interact with a number of individuals within the company, from data entry clerks to corporate executives. Their responsibilities typically include supervising assistants in data management, supervising data collection systems, managing data entry, ensuring data system is operational, troubleshooting data submission errors, preparing data reports, and overseeing general activity involving data.
45	eCommerce Manager	E-commerce managers are responsible for managing online businesses on platforms such as Shopify and are accountable for a brand's overall reach. The e-commerce manager is the one who creates a company's online business strategy and is in charge of achieving its business goals through customer acquisition and customer retention.

	Job Position	Job Description
46	Senior Business Analyst	Senior business analysts have a variety of responsibilities that can often be very complex depending on a myriad of issues. They are required to do several things that require a great business mind and the ability to comprehend and process a vast amount of information related to the needs of their organisation. They need to quickly understand the data challenges of a client's company and organisation, as this is a crucial part of being successful on the job and helping a company thrive.
47	Senior Data Scientist	Senior data scientists use data to shape the direction in which companies grow. Given the size of this undertaking, Senior data scientists direct and employ the efforts of junior staff as they spearhead various data-driven projects
48	Senior Database Administrator (DBA)	Senior database administrators work as team leaders with computer engineering teams in order to create database architecture to accomplish the necessary goals of specialised computer software. Senior database administrators have very clear educational goals: they need a bachelor's degree in computer science or in similar fields. They will also need certification for database administration from an accredited board, such as Oracle.
49	Senior Project Manager, ITS	Senior project managers must be well organised, extremely responsible, and capable of working with a wide variety of other people. Senior IT project managers work in a fast paced and frequently changing industry, and must work very hard to keep up with the responsibilities they are tasked with. They must also be proficient at working with a number of technologies and at keeping up with the ever-changing field of information technology. They must also be educated, generally holding at least a bachelor's degree in an IT related field.
50	Senior Solutions Architect	The position of a senior solutions architect demands leadership and exceptional mentoring abilities, as they work closely with teams of developers and junior solution architects in order to deliver high-quality products and services. Senior solutions architects work primarily indoors and are responsible for technical pre-sales support, achieving sales goals, and providing input regarding solutions, structure, and growth.
51	Senior Systems Administrator	Senior system administrators manage a team of system administrators as well as other employees of the IT department. They are responsible for designing, planning, putting into place, and having the highest level of performance as an expert in the system administration for computers and their complex operating systems. With this, senior system administrators research and select upgrades, software and other necessities for their company's computer systems.
52	Senior Systems Engineer	The senior systems engineer tends to involve more design and build-out work than a standard systems administrator position. While both jobs contain responsibilities for day-to-day administration and upkeep of servers and storage, a senior systems engineer will also have been the one who original designed the solution; this can range anywhere from choosing a server platform to details related to processors, RAM and network cards.
53	Senior Web Developer	Senior web developers are employed in a variety of industries, including pharmaceuticals and information technology (IT). Most employers prefer candidates who have at least a bachelor's degree in computer technology, although some companies may allow experience to compensate for formal education. Most employers also prefer applicants who have at least 4 years of experience in web design, web software management, and/or technical web support.
54	Senior Software Engineer / Developer / Programmer	Senior software engineers/developers/programmers re in charge of a team of computer professionals who develop the different software programs sold by software companies or used by various businesses. As the head of this department, they must be able to solve problems that even the intelligent people whom they work with may not be able to handle. Their job is to lead a team in developing products that make work and everyday life easier for the general public or for business employees.
55	Quality Assurance Manager	Quality assurance managers are responsible for ensuring that products or services meet established standards. As these products and services vary greatly from industry to industry, so do the specifications of particular quality standards. Generally, quality assurance managers are concerned with maintaining minimum requirements for accessibility, reliability, and performance.
56	Director of Analytics	Directors of analytics supervise a team that provides analytical expertise for their organisation. They are in charge of coordinating efforts and provide coaching to staff members in their department. Directors of analytics spend a large portion of their time performing statistical analysis based on market knowledge and research expertise. They identify patterns based on aggregate data to find risks or opportunities, as well as make performance change recommendations. Directors of analytics create forecasts using analytical information and results, compare sets of data to optimise resource allocation, and support business development through their use of complex data.

	Job Position	Job Description
57	IT Director	Information technology (IT) directors are responsible for managing and directing IT operations for their companies and providing leadership and technical advice to lead their departments. They may also be responsible for developing effective strategies for deploying technology and software, testing hardware devices and applications before introducing them to management, and managing schedules and deployment contracts.
58	Vice President (VP), IT	The vice president of information technology (IT) is a high-level position that oversees an organization's technology initiatives, as well as IT changes and updates to all projects. The vice president assesses IT systems and makes decisions on investments and implementation of future technology. They must achieve IT department goals within the context of the organisation's vision and values. They also help develop policies, standards, and objectives, in addition to participating in training sessions and helping recruit new talent. One of the most important functions of this position is the helping create budgets and authorise purchases, with help from other executives and managers.
59	Web Developer	Most of the time, web developers work in an office. Web developers build the backbone of websites. Employers often require candidates to have a bachelor's degree in computer science, programming, informational technology, or another relevant fields. However, some companies will accept candidates with enough years of experience in lieu of bachelor's degree requirements.
60	Chief Technology Officer (CTO)	A chief technology officer is part of an executive team in a company. He or she leads the efforts of the technology development within the company. This is usually the highest position related to technology within a company. Leadership skills are needed, as the CTO will often lead teams of people in the information technology department.
61	Chief Information Officer (CIO)	In the 21st century, one of the most important operational aspects to any large enterprise is their ability to construct, maintain, and upgrade their information technology framework. This accounts for a large amount of expense, and it usually requires teams of skilled professionals to work together. In organisations that are large enough, these information systems operations are all managed by a high-level executive officer called the chief information officer (CIO).
62	Chief Operating Officer (COO)	A chief operating officer (COO) is usually the second-highest ranking executive in a corporation. The chief operating officer is in charge of executing daily operations for the company, and is second in responsibility only to the chief executive officer (CEO). The COO's job is to help set standards for the company and work with directors and middle managers to ensure that processes, training, and quality of output of goods and services reflect these standards. They may receive constant data-based reports and overviews which include snapshots of revenues, efficiency, and even waste that can be acted upon to improve the company's performance.
63	Chief Executive Officer (CEO	A chief executive officer (CEO) is someone who is in charge of an organisation and normally makes the vast majority of all business-related executive decisions. In order to succeed at the position, a CEO must have great social skills, possess the ability to be an effective leader and not shy away from making big decisions. The specific job duties that are required from a CEO will vary depending on what type of organisation they happen to be the leader of, as there could be a wide range of job responsibilities that may differ from one another. A CEO shoulders the large burden of having the majority of accountability when it comes to the success or failure of an organisation, as one major decision can often take a large toll on a company whether it is good or bad.
64	Chief Information Security Officer (CISO)	Chief information security officers oversee information systems and company security for their organisation. This person is expected to evaluate, report on, and suggest new ideas related to any security threats that the company currently faces, helping protect vital information and strategies.
65	Chief Financial Officer (CFO)	Chief financial officers (CFOs) oversee the financial operations of their companies and provide leadership and focus to accounting and finance departments to ensure that they operate efficiently and comply with applicable laws and company policies. Their work is essential to project a favorable company image while saving money in every way possible.

Note: *Job profiles here have been extracted from the public web and depict a brief description; and may differ from company to company.*

IP SERVERONE MADE THE CLOUD EASY

WE HELP YOUR BUSINESS
STEP INTO THE NEXT HORIZON- THE CLOUD

At IP ServerOne, we understand the challenges of sustaining while growing your business through IT. Let us take care of IT and simplify the process for you, so you can focus on what matters the most for your business growth: future-ready and continuity. Whether you need a simple or powerful and robust solution, we are here to help.

IP ServerOne connects you to these FEATURES to amplify your cloud experience:

- **Customized Cloud Solutions**
- **Expert Assistance**
- **Infrastructure and Network Support**
- **ISO-certified Technology & Industry Practices**

OUR SERVICES

- Managed Cloud Hosting
- Data Center Colocation
- Backup as a Service
- Public & Private Cloud
- Bare Metal Server
- Disaster Recovery as a Service

Talk to us now!

Simplify Your Cloud Journey, Amplify Your Cloud Experience

Tel: +6603 - 2026 1688
www.**ipserverone**.com

IP ServerOne is compliant-ready in making data protection our No.1 priority.

ISO27001, ISO27017 *
PCI-DSS
SOC 2 Type II *
Tier III Data Center *
CSA STAR Level 1 *

* Applicable to Data Center Malaysia

IP ServerOne Solutions Sdn. Bhd. (800140-T)
Office: A-1-1 & A-1-2, Block A, Glomac Damansara, Jalan Damansara, 60000 Kuala Lumpur. | **Data Center Malaysia:** CJ1 Centre, Jalan Cyber Point 4, Cyber 8, 63000 Cyberjaya, Selangor | **Data Center Singapore:** Equinix Data Center SG1, 20 Ayer Rajah Crescent, Singapore 139964 | **Data Center Hong Kong:** Equinix HK1, 17/F, Global Gateway (hong Kong), 168 Yeung Uk Road, Tsuen Wan, Hong Kong

Email: marketing@ipserverone.com

ASOCIO

Reimagining the Digital Era

The Asian-Oceanian Computing Industry Organization (ASOCIO)

www.asocio.org

Persatuan Industri Komputer Dan Multimedia Malaysia
The National Tech Industry Association of Malaysia

E1, Empire Damansara,
No. 2, Jalan PJU 8/8a, Damansara Perdana
47820 Petaling Jaya, Selangor

T : +(603) 7622 0079 F : +(603) 7622 4879
E+ : info@pikom.org.my W+ : www.pikom.org.my

PIKOM, the National Tech Industry Association of Malaysia, is a not-for-profit organisation. It is the largest association representing information and communications technology (ICT) players in Malaysia. Since its inception in 1986, PIKOM has come of age as the voice of the Tech industry. It has become an ICT referral centre for government and industry players, as well as international organisations. In this regard, PIKOM takes on the responsibility to publish ICT-relevant information in a periodic manner.

Editorial and design services by: MJLAIKC INFOWORKS | Tel: 6012 5050 862 | E: mjlaikc@gmail.com
Printed by: WS Bintang Sdn Bhd | Tel: 603 8948 7244 | E: wengsing.andy@gmail.com