2019 / 2020

PENANG ECONOMIC AND DEVELOPMENT REPORT

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This report is prepared by PENANG INSTITUTE making ideas work for Penang state government

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This report is completed in August 2020.

Preface

The Penang Economic and Development Report 2019/2020 is a biennial report prepared by Penang Institute, and is commissioned by the Penang Economic Planning Division (BPEN). The report produces an overview of the Malaysia's economic performance and advancement, as well as a detailed analysis of Penang's current development across various social and economic sectors. The report also presents a comprehensive analysis of the state's current development in the sectors of manufacturing, services, construction and agriculture in relation to COVID-19. Environmental issues such as pollution and waste management are also discussed in depth. In addition, a thorough analysis of the state's public finance performance is included in this report.

Acknowledgements

We wish to extend our deepest gratitude to: Penang Economic Planning Division (BPEN), Penang Island City Council, (MBPP), Seberang Perai City Council (MBSP), State Finance Office, InvestPenang, Penang Global Tourism, Penang Centre of Medical Tourism (PMED), Penang Convention & Exhibition Bureau (PCEB), Penang Centre of Education Tourism (PCET), Penang Port, Penang Water Authority (PBA), Department of Statistics (DOSM), Department of Labour (Penang), Ministry of Health (MOH), Penang State Health Department, Ministry of Education (MOE), Ministry of Transport (MOT), Malaysia Airport Holdings Berhad (MAHB), Ministry of Tourism, Arts and Culture Malaysia, Malaysian Association of Hotels (Penang Chapter), National Property Information Centre (NAPIC), Malaysia Investment Development Authority (MIDA), Malaysia Digital Economy Corporation (MDEC), Malaysian Communications and Multimedia Commission (MCMC), Department of Environment (DOE), Malaysian Meteorological Department and the Global Business Services Focus Group (GFG) (Penang Chapter).

The writing of this report is capably led by Ms. Ong Wooi Leng, Head of Penang Institute's Socioeconomics and Statistics Programme, with the collaborative and dedicated efforts of her research team. The key members of her team are: Ms. Yeong Pey Jung, Dr. Negin Vaghefi and Ms. Ng Kar Yong, who specifically plays a central role in gathering the information and statistics that are vital towards the compilation of the report. The team also wishes to express appreciation towards the contributions of Dr. Lee Siu Ming, Mr. Timothy Choy and Mr. Darshan Joshi. Lastly, the team would like to thank Ms. Yap Jo-yee for her conscientious efforts in reviewing and editing sections of the report.

Message from
The Right Honourable Chief Minister of Penang

Salam Sejahtera and Salam Integriti,

I would like to express my heartiest congratulations to the State Economic Planning Division and Penang Institute for having successfully published the Penang State Economic and Development Report for 2019/2020.

Despite the odds facing us and challenges of the New Normal due to COVID-19, the state government will not be swayed from the **Penang2030** vision: **"A Family-Focused Green and Smart State that Inspires the Nation".** We are determined more than ever to realise this dynamic action plan which has an emphasis on improving Penang's liveability, the state of our economy, civil participation by all concerned citizens and a balanced development which benefits all stakeholders.

One of the four initiatives of **Penang2030** is to upgrade our economy to raise household incomes with a focus on local manufacturing industries towards the digital edge; diversifying sustainable agriculture and fostering an ecosystem that nurtures creative industries. Penang will continue to develop and achieve robust economic growth to drive the state economy forward to achieve a better livelihood for the people and even more so to recover from the ill-effects of the global COVID-19 pandemic.

I hope that this publication will provide much needed information, important input and relevant perspectives to all stakeholders in implementing strategies and formulating state development agenda in tandem with the **Penang2030** vision.

Diligent efforts and commitment by all parties to generate resources available in the state will enable all of us to improve on our economic performance while maintaining a positive economic growth momentum as in the previous year.

Thank You.

Chow Kon Yeow

Message from
The Honourable Deputy Chief Minister II of Penang

Salam sejahtera and salam integriti,

In line with the economic vision of Penang2030, the Penang State Government has continuously strived to advance and enhance the state's economy by developing various strategies and policies that are aimed at improving the household income of the people of Penang.

The development of Penang's key economic sectors such as manufacturing, services and agriculture, remains the State Government's main focus in vitalising and strengthening existing growth. The sustainability of growth in these economic sectors are prioritised, to ensure Penang's economic foundation will remain robust and resilient for decades to come.

In 2019, Penang's manufacturing sector was the second largest contributor to the sector at national level, recording a growth of 2.7%. Even in these economically challenging times of the COVID-19 pandemic, the aforementioned sector continues to command the confidence of both domestic and foreign investors. Between January to September this year, the sector managed to draw RM8.8 billion in foreign direct investment (FDI) for approved manufacturing projects, indicating that Penang had successfully attracted the second highest amount of FDI inflow. The total volume of investment came to be RM10.6 billion, placing Penang as the state with the third highest amount of investment after Sarawak and Sabah. With Penang being the second smallest state in Malaysia, this achievement is indeed one to be proud of.

At the same time, the State Government takes pride in its responsibility in ensuring welfare and development remains comprehensive and inclusive for all. In times of uncertainty, the wellbeing of the people will be one of the State Government's main priorities. This administration will endeavor to disburse assistance and aid in all forms, financial and otherwise, to all who are affected, and to formulate policies to serve and meet the needs of the people in these unprecedented times.

I wish to extend my sincerest congratulations to Penang Institute and the State Economic Planning Division on the completion and publication of this biennial report. I would also like to express my appreciation to the contribution of information by various state government departments and state agencies. I hope that all stakeholders will peruse this report in pursuing the vision of making Penang a regionally and globally competitive and dynamic economic powerhouse.

Prof. Dr. Ramasamy A/L Palanisamy
Deputy Chief Minister II of Penang

Message from
The Honourable State Secretary of Penang

Assalamualaikum WBT. and Salam Sejahtera.

Thanks to the Divine Almighty Creator because the Penang State Economic and Development Report Book 2019/2020 can once again be published successfully.

The Penang State Economic and Development Report 2019/2020 provides a lot of in-depth information on the state's economy and development as well as current trends in Penang. It contains information on the economic situation, investment, development of economic activities and improvements on the state economy. In addition, there are articles on selected topics of current interest relevant to the state's economic management.

Continuous efforts are being mobilized to build a more competitive Penang. Several initiatives have been successfully implemented through the implementation of policies that are beneficial to the people as well as the investors. At the same time, many more programmes have been, or are being, planned and implemented to ease the increasing burden of the people.

The initiatives outlined are in line with the policies that have been implemented by the State Government. Achievements accomplished is proof of cooperation and support among stakeholders, the State Government and the people. This support is crucial as the country is facing challenges of the COVID-19 pandemic as well as the declining global economy. The State Government will continue planning towards higher achievements.

It is my hope that the report will be utilized by all parties for a more prosperous Penang.

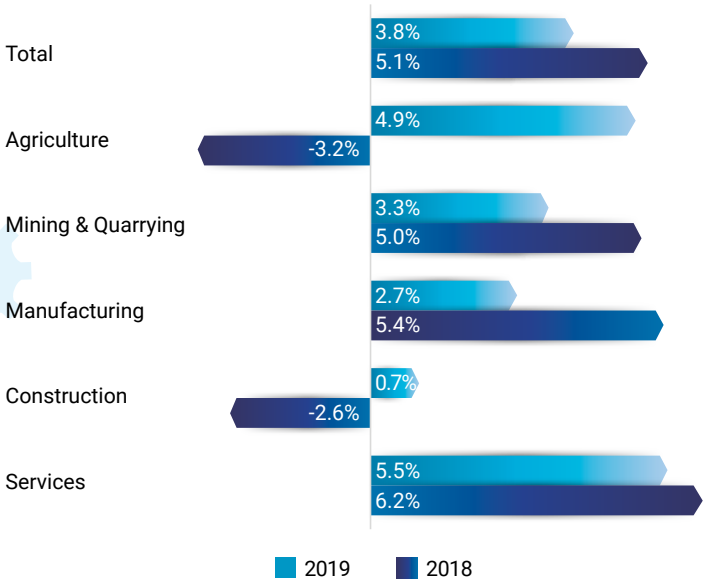
Wabilahhi taufik wal hidayah wassalamualaikum WBT.

DATO' ABDUL RAZAK BIN JAAFAR

Penang's Key Economic Highlights

GDP recorded a moderate growth

- GDP growth held back by slower growth in the manufacturing and services sectors
- Growth in manufacturing activities affected by reduced inflow of investment in previous year.
- Services sector spearheaded by a surge in tourism

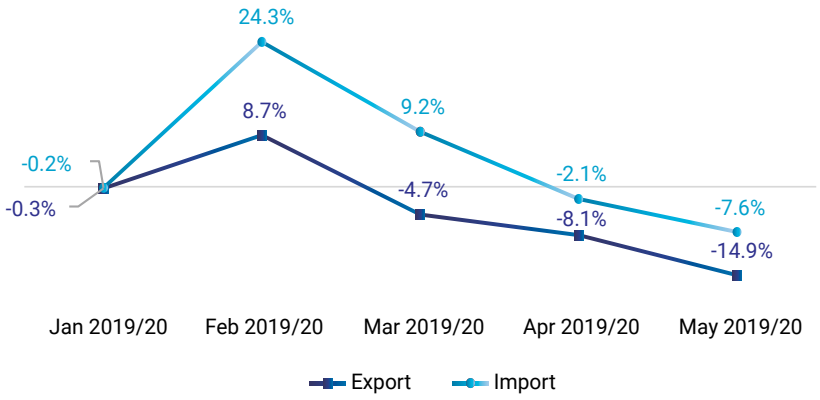


Source: Department of Statistics, Malaysia.

Huge hits to export and import

Severe decline in commodities trade performance due to:

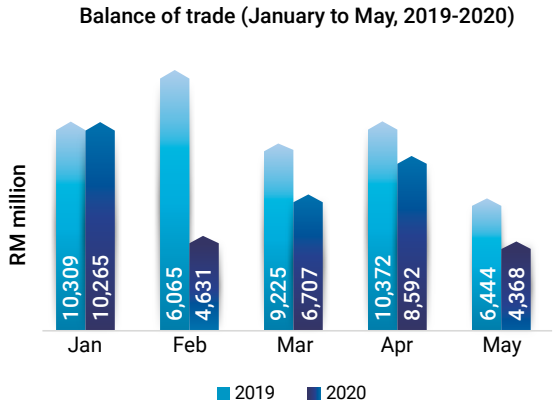
- Border closure and forced quarantines
- Supply chain disruptions
- Lower disposable household income
- Greater economic uncertainty
- Shift of spending away from durables to non-durables



Source: Department of Statistics, Malaysia.

Net Exports Remain Positive Albeit Lower

Penang's balance of trade remains positive despite the disruption caused by the COVID-19 pandemic.



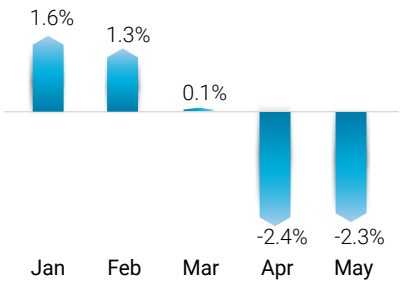
Source: Department of Statistics, Malaysia.

CPI dropped primarily due to the MCO

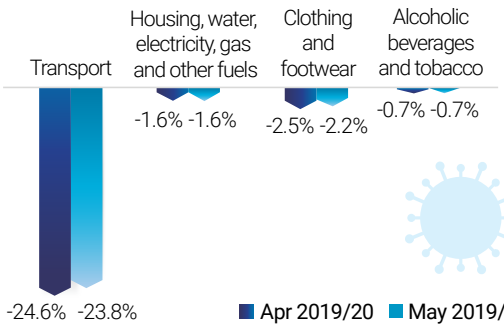
Spending opportunities and the purchasing power of the consumers greatly reduced during the period of MCO.

The main attributer of deflation was lower transport prices coupled with the price war over fuel early 2020.

Inflation rate, Jan-May 2019/20



Drivers of deflation

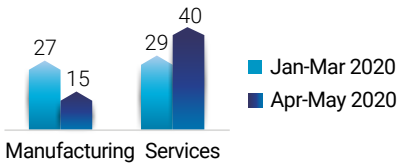


Source: Department of Statistics, Malaysia.

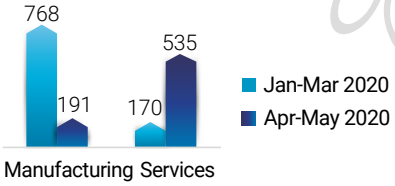
Increased retrenchments

- More retrenchments in services sector than manufacturing sector after MCO
- Supply chain disruptions due to border closures and lockdowns
- Weak global demand
- Steep decline in revenue for the tourism sector

Employers involved in retrenchment



Number of retrenchments



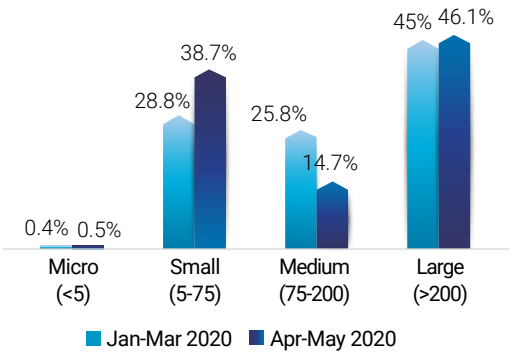
Source: State Labour Department, Penang.

MSMEs bear the brunt of recession

- The bulk of retrenchments in manufacturing and services sectors are contributed by MSMEs
- Retrenchments in large firms from services sector are an anomaly because of the unprecedented MCO

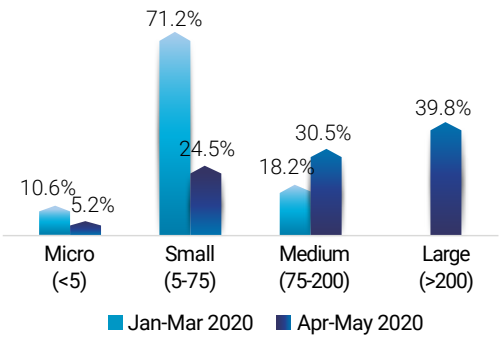
Retrenchment in manufacturing, by firm size

Total retrenchment for Jan-Mar 2020: 718 & Apr-May 2020: 191



Retrenchment in services, by firm size

Total retrenchment for Jan-Mar 2020: 170 & Apr-May 2020: 485



Note: Discrepancy in total retrenchment may be due to the unavailable information related to firm size.
Source: State Labour Department, Penang.

Penang: Key Statistical Tables

Area (Square kilometers)					
Penang	**Timur Laut**	**Barat Daya**	**Seberang Perai Utara**	**Seberang Perai Tengah**	**Seberang Perai Selatan**
1,049	126	175	268	238	242

	2017		2018		2019	
	'000	% change	'000	% change	'000	% change
POPULATION	**1,746.7**	***1.2***	**1,767.2**	***1.2***	**1,787.1**	***1.1***
Timur Laut	572.5	*1.0*	577.9	0.9	583.2	*0.9*
Barat Daya	228.0	*1.4*	231.1	*1.4*	234.1	*1.3*
Seberang Perai Utara	331.9	*1.4*	336.3	*1.3*	340.6	*1.3*
Seberang Perai Tengah	422.9	*1.3*	428.2	*1.3*	433.4	*1.2*
Seberang Perai Selatan	191.4	*1.2*	193.7	*1.2*	195.8	*1.1*
Total Malaysians	**1,602.7**	***1.1***	**1,620.6**	***1.1***	**1,624.7**	***0.3***
Bumiputera	730.6	*1.7*	743.1	*1.7*	759.1	*2.2*
Chinese	698.0	*0.5*	701.6	*0.5*	693.8	*-1.1*
Indian	168.5	*1.0*	170.1	*0.9*	167.0	*-1.8*
Others	5.6	*3.7*	5.8	*3.6*	4.8	*-17.2*
Non-Malaysians	**144.0**	***2.1***	**146.6**	***1.8***	**148.9**	***1.6***

	RM million	% change	RM million	% change	RM million	% change
DOMESTIC PRODUCTION						
Gross Domestic Product (GDP) (constant 2010 prices)	**86,768**	***5.2***	**91,226**	***5.1***	**94,663**	***3.8%***
Agriculture	2,034	*2.3*	1,969	*-3.2*	2,066	*4.9%*
Mining and quarrying	144	*6.2*	151	*5.0*	156	*3.3%*
Manufacturing	37,426	*5.7*	39,458	*5.4*	40,531	*2.7%*
Construction	2,689	*-9.9*	2,619	*-2.6*	2,638	*0.7%*
Services	43,458	*5.6*	46,134	*6.2*	48,673	*5.5%*
GDP per capita (current prices, RM)	**51,130**	***5.1***	**52,923**	***3.5***	**55,062**	***4.0***
STATE GOVERNMENT FINANCE						
Operating revenue	757.01	*-26.5*	503.76	*-33.5*	505.50	*0.3*
Operating expenditure	705.85	*-25.0*	1,252.30	*77.4*	901.19	-28.0
Operating balance	**51.16**	**-**	**-748.54**	**-**	**-395.69**	**-**
Development revenue	311.93	*-1.7*	684.97	*119.6*	306.38	*-55.3*
Development expenditure	301.38	*-2.0*	684.97	*127.3*	306.38	*-55.3*
Development balance	**10.55**	**-**	**0.00**	**-**	**0.00**	**-**
Overall balance (surplus/deficit)	***61.70***	**-**	***-748.54***	**-**	***-395.69***	**-**

Note:
The population is the revised projection based on the adjusted 2010 Population and Housing Census, Malaysia.
State government finances in 2018 and 2019 are budget estimates.

	2017		2018		2019	
	RM million	% change	RM million	% change	RM million	% change
EXTERNAL TRADE						
Gross exports	**233,493**	***20.7***	**288,838**	***23.7***	**289,522**	***0.2***
of which:						
Machinery and transport equipment	161,453	*17.4*	213,291	*32.1*	214,306	*0.5*
Miscellaneous manufactured articles	42,400	*28.6*	47,544	*12.1*	49,578	*4.3*
Manufactured goods	8,702	*10.4*	9,246	*6.2*	9,172	*-0.8*
Chemicals	9,036	*22.4*	9,252	*2.4*	8,609	*-7.0*
Crude materials, inedible	4,411	*64.9*	3,648	*-17.3*	3,071	*-15.8*
Food	2,698	*6.6*	2,568	*-4.8*	2,688	*4.7*
Gross imports	**196,427**	***18.2***	**193,268**	***-1.6***	**184,144**	***-4.7***
of which:						
Machinery and transport equipment	128,473	*17.5*	123,223	*-4.1*	119,393	*-3.1*
Miscellaneous manufactured articles	13,224	*9.6*	15,184	*14.8*	15,328	*0.9*
Manufactured goods	13,319	*10.7*	14,787	*11.0*	13,379	*-9.5*
Chemicals	11,526	*18.4*	12,266	*6.4*	11,060	*-9.8*
Miscellaneous transactions and commodities	9,669	*35.4*	8,317	*-14.0*	6,887	*-17.2*
Food	7,449	*5.6*	6,289	*-15.6*	6,210	*-1.3*
Total trade	**429,920**	***19.5***	**482,106**	***12.1***	**473,666**	***-1.8***
Trade balance (surplus/deficit)	***37,065***	***36.3***	***95,570***	***157.8***	***105,377***	***10.3***
PRICES						
Consumer price index (2010 = 100)	120.9	*4.0*	122.0	*0.9*	123.3	*1.1*
House price index (2010 = 100)	189.8	*5.0*	191.7	*1.0*	195.4	*1.9*
LABOUR FORCE						
Labour force ('000)	839.5	*-0.7*	849.4	*1.2*	852.3	*0.3*
Labour force participation rate (%)	67.5	-	67.7	-	67.3	-
Female labour force participation (%)	55.7	-	55.9	-	54.1	-
Male labour force participation (%)	79.2	-	79.5	-	80.5	-
Employed ('000)	822.2	*-0.6*	830.8	*1.0*	835.6	*0.6*
Unemployed ('000)	17.3	*-4.4*	18.6	*7.5*	16.7	*-10.2*
Unemployment rate (%)	2.1	-	2.2	-	2.0	-
Youth unemployment rate (15–24 years old: %)	6.9	-	7.4	-	6.6	-

	2017		2018		2019	
	RM million	% change	RM million	% change	RM million	% change
APPROVED MANUFACTURING INVESTMENT						
Total investment	**10,811.9**	***151.8***	**5,781.0**	***-46.5***	**16,855.4**	***768.1***
Domestic investment	2,271.4	*83.6*	2,087.6	*-8.1*	1,854.9	*-14.3*
Foreign investment	8,540.5	*179.4*	3,693.4	*-56.8*	15,000.4	*1,359.6*
Number of employment (persons)	13,553	*25.3*	9,499	*-29.9*	18,886	*911.3*
Total investment by major industry						
Electronics and electrical products	6,710.1	*286.6*	1,483.3	*-77.9*	9,895.1	*567.1*
Scientific and measuring equipment	1,769.3	*79.9*	214.7	*-87.9*	2,453.2	*1042.7*
Machinery and equipment	423.9	*118.2*	1,277.5	*201.4*	2,394.3	*87.4*
Non-metallic mineral products	0.0	*-100.0*	82.1	-	442.8	*439.0*
Chemical and chemical products	796.0	*1404.4*	58.6	*-92.6*	431.9	*637.6*
Fabricated metal products	225.5	*40.2*	317.3	*40.7*	361.3	*13.9*
Plastic products	125.4	*2.5*	408.1	*225.4*	248.4	*-39.1*
Transport equipment	173.0	*-73.2*	457.6	*164.5*	221.6	*-51.6*

	2016	2019	*Compounded annual growth rate (%)*
HOUSEHOLD INCOME			
Number of household ('000)	**430.7**	**448.7**	***1.4***
Median monthly household income (RM)	**5,409**	**6,169**	***4.5***
Timur Laut	5,964	6,902	*5.0*
Barat Daya	5,844	6,576	*4.0*
Seberang Perai Utara	4,753	5,566	*5.4*
Seberang Perai Tengah	5,172	5,849	*4.2*
Seberang Perai Selatan	4,872	5,797	*6.0*

	2016			2019		
Percentage of household (%)	**T20**	**M40**	**B40**	**T20**	**M40**	**B40**
Timur Laut	45.9	37.5	31.9	40.0	37.1	30.2
Barat Daya	14.8	14.9	10.8	15.9	13.1	12.0
Seberang Perai Utara	13.2	15.1	20.1	13.1	17.4	21.0
Seberang Perai Tengah	19.6	22.2	24.7	21.3	21.4	23.8
Seberang Perai Selatan	6.6	10.3	12.7	9.7	11.0	13.0

Note:

Household income threshold for Penang (RM)	***2016***	***2019***
T20	*≥ 9,200*	*≥ 10,680*
M40	*4,640 – 9,199*	*5,310 – 10,679*
B40	*< 4,640*	*< 5,310*

Contents

Abbreviations

ABIM	Malaysian Islamic Youth Movement
ACC	Ambulatory Care Centre
AFTA	ASEAN Free Trade Area
AI	Artificial intelligence
ALOS	Average length of stay
AMMI	Association of Malaysian Medical Industries
AN	Ammonia nitrogen
APAC	Asia Pacific
API	Air Pollution Index
ASEAN	Association of South East Asian Nations
BJKS	Bimbingan Jalinan Kasih Schools
BLFIZ	Bayan Lepas Free Industrial Zone
BL-LRT	Bayan Lepas light rail transport
BNM	Bank Negara Malaysia
BOD	Biochemical oxygen demand
BOR	Bed occupancy rates
BOT	Balance of trade
BPN	Bantuan Prihatin Nasional
BPO	Business processing outsourcing
BRT	Bus rapid transit
BSH	Bantuan Sara Hidup
BWCT	Butterworth Deepwater Wharves
CAGR	Compounded annual growth rate
CAT	Competency, accountability and transparency
CCC	Certificate of Completion and Compliance
CCTV	Closed-circuit television
CMQIP	China-Malaysia Qinzhou Industrial Park
CO	Carbon monoxide
COD	Chemical oxygen demand
CoE	Centres of excellence
COVID-19	Coronavirus disease 2019
CPI	Consumer Price Index
CSR	Corporate Social Responsibility
DHPI	Detached House Price Index
DO	Dissolved oxygen
DOA	Department of Agriculture
DOF	Department of Fisheries
DOSM	Department of Statistics Malaysia
DVS	Department of Veterinary Services
E&E	Electrical and electronics
EEI	Estimated economic impact
EFTA	European Free Trade Association
EPF	Employees Provident Fund
EU	European Union
FAMA	Federal Agricultural Marketing Authority
FCL	Full Container Load
FCZ	Free Commercial Zone
FDI	Foreign direct investment

FEEL	Freedom and governance, environmental sustainability, economic well-being, liveability, and social well-being
FHTP	Forum on Harmful Tax Practices
GARS	Government-aided religious school
GBS	Global business services
GDP	Gross domestic product
GDVT	German Dual Vocational Training Programme
GFG	Global Business Services Focus Group
GP	General Practice
GST	Goods and Services Tax
GTWHI	George Town World Heritage Incorporated
HHPI	High-rise House Price Index
HIP	Happiness in Penang
HIV	Human Immunodeficiency Virus
HPI	House Price Index
IATA	International Air Transport Association
ICT	Information, communication and technology
IHL	Institutes of higher learning
IMF	International Monetary Fund
IPTS	Institut pengajian tinggi swasta
ISP	Internet service provider
IT	Information technology
ITC	International Trade Centre
JAIN	State Religious Department
JCC	Joint Cooperation Committee
JUPEM	Department of Survey and Mapping Malaysia
KEMAS	Ministry of Rural and Regional Development
KLIA	Kuala Lumpur International Airport
LAIA	Latin American Integration Association
Lao PDR	Lao People's Democratic Republic
LCE	Lim Chong Eu
LFPR	Labour force participation rate
LPPKN	National Population and Family Development Board
LRT	Light rail transit
LSS	Large scale solar
MAHB	Malaysia Airport Holdings Berhad
MATRADE	Malaysia External Trade Development Corporation
MBPP	Penang Island City Council
MBSP	Seberang Jaya City Council
MCKIP	Malaysia-China Kuantan Industrial Park
MCMC	Malaysian Communications and Multimedia Commission
MCO	Movement Control Order
MDEC	Malaysia Digital Economy Corporation
MICE	Meetings, Incentives, Conferences, and Exhibitions
MIDA	Malaysian Investment Development Authority
MITI	Ministry of International Trade and Industry
MNC	Multinational corporation
MOE	Ministry of Education
MOF	Ministry of Finance
MP	Malaysia Plan
MPSP	Seberang Perai Municipal Council (currently known as MBSP)

MSAP	Mandatory Standard on Access Pricing
MSC	Multimedia super corridor
MSME	Micro, small and medium enterprise
MSW	Municipal solid waste
MTHC	The Malaysia Healthcare Travel Council
MW	Megawatt
MWQI	Marine Water Quality Index
NAFTA	North American Free Trade Agreement
NAPIC	National Property Information Centre
NBCT	North Butterworth Container Terminal
NCIA	Northern Corridor Implementation Authority
NESDC	National Economic and Social Development Council
NFCP	National Fiberisation and Connectivity Plan
NH_3	Unionised ammonia
NO_2	Nitrogen dioxide
NO_3	Nitrate
NOAA	National Oceanic and Atmospheric Administration (United States)
O&G	Oil and grease
O_3	Ozone
OECD	Organisation for Economic Cooperation and Development
OEM	Original equipment manufacturer
PBAPP	Penang Water Supply Corporation
PBO	Purpose-built office
PCC	Per capita consumption
PCEB	Penang Convention and Exhibition Bureau
PCET	Penang Centre of Education Tourism
PDC	The Penang Development Corporation
PEKA	Penang Aid Package
PGT	Penang Global Tourism
PHL	Post-harvest loss
PHT	Penang Heritage Trust
PIA	Penang International Airport
PIL	Pan Island Link
PKE	Palm Kernel Expeller
PLI	Poverty Line Income
PM_{10}	Particulate matter of less than 10 microns in size
$PM_{2.5}$	Particulate matter of less than 2.5 microns in size
PMED	Penang Centre of Medical Tourism
PO_4	Phosphate
PPC	Penang Port Commission
PPE	Personal protective equipment
PPP	Public-private partnership
PRF	Permanent Reserved Forests
PSR	Penang South Reclamation
PTMP	Penang Transport Master Plan
PTP	Port of Tanjung Pelepas
PUI	Persons under investigation
RI	Rental index
RM	Ringgit Malaysia
RPA	Robotic process automation
SAARC	South Asian Association for Regional Cooperation

SAP	Systems, Applications, and Products
SARS	Severe Acute Respiratory Syndrome
SDG	Sustainable Development Goals
SITC	Standard International Trade Classification
SME	Small-medium enterprise
SMI	Small-medium industry
SO_2	Sulphur dioxide
SOHO	Small office-home office
SOP	Standard operating procedure
SSL	Self-sufficiency level
SST	Sales and Services Tax
TBC	To be confirmed
TEU	Twenty-foot equivalent unit
THPI	Terrace House Price Index
TNB	Tenaga Nasional Berhad
TSS	Total suspended solids
TVET	Technical and Vocational Education and Training
UK	United Kingdom
UNESCO	The United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
UOW	University of Wollongong
US	United States
USD	United States dollar
USM	Universiti Sains Malaysia
VSS	Voluntary separation scheme
WHO	World Health Organisation
WQI	Water Quality Index
WTO	World Trade Organisation
YAB	The Right Honourable

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Executive Summary

Recent economic developments and outlook

The global economy is riding on a rollercoaster year in 2020 as a result of the coronavirus disease 2019 (COVID-19) pandemic. As a state with a high reliance on external demand, Penang's economy will be affected by the health crisis; all economic activities are expected to experience a significant slowdown. Tourism-related services in particular have been severely affected, and the post-lockdown effect will likely be the longest among all of the economic activities. Retail businesses of non-essential goods and services for SMEs including micro-businesses are facing challenges in maintaining their operating costs. The global manufacturing supply chain has been disrupted. A U- or W-shaped recovery in the state's economy is being projected, with the latter being more critical if the state or country is to tackle a second wave of the pandemic.

Based on the latest GDP data, Penang's economy registered a slower growth rate in 2019, undermined by the challenging global trade environment. The state's GDP grew at 3.8% compared with 5.1% in 2018. Despite the fact that agriculture and construction experienced negative growth rates in 2018, all economic sectors turned out to record positive growth rates in 2019. The services sector remained as the main growth driver to Penang's economy, expanding moderately at 5.5%. This is supported by utility, transport, storage and information and communication growing at 6.9%, and wholesale and retail trade, and food and beverage and accommodation growing at 6.4%. Growth in the manufacturing sector has moderated to 2.7%, with petroleum, chemical, rubber, and plastics products having the largest growth rate, while electrical and electronics (E&E), and optical products are responsible for the largest share of Penang's manufacturing industry. The agriculture sector, on the other hand, rebounded to 4.9%, surpassing the national growth rate of 2% because of improved weather conditions. As Malaysia's largest GDP per capita state (excluding federal territories), Penang's manufacturing sector remained the second-largest contributor to the national GDP after Selangor, underpinned by continued and robust capital investments.

As Malaysia's major export-oriented manufacturing hub, Penang's trade surplus continued to expand along with improved global export demand amid the US-China trade war. This is because Penang has a strong manufacturing ecosystem, which enables the state to weather global uncertainties. Machinery and transport equipment and miscellaneous manufactured articles remained the core exported products connecting to the global value chain, largely from the E&E and medical devices industries. Bayan Lepas airport continued to handle the largest export value in Malaysia. With the implementation of the Movement Control Order (MCO) as a result of the COVID-19 pandemic, the exports handled at Bayan Lepas airport was the least impacted compared with goods handled through sea and land transports in the first five months of 2020. Trade surplus is expected to persist in 2020, albeit at a lower value, and imports rising as a result of the subdued global demand.

Based on the recently released 2019 Household Income and Expenditure Survey, Penang's median monthly household income continued to expand at a faster pace than its annual median household expenditure during 2016–19. Households in Seberang Perai Selatan recorded the largest income growth at 5.8%, coinciding with the new development at Batu Kawan. Households in Seberang Perai Selatan are also saving more owing to their low household consumption expenditure, and registered the largest net income across five districts in Penang. Moving forward, households in Seberang Perai Selatan will continue to benefit from the continued development in industrial park, commercial, and education services provided in Batu Kawan. During the global pandemic, household income may see a slower growth with the rise in unemployment, and households will be more cautious in spending on non-essential and durable items compared with essential and non-durable items.

As the ninth-most-populated state in Malaysia, Penang gained the fourth-largest share of T20 households, trailing Selangor, Kuala Lumpur, and Johor. The state has a relatively lower share of B40 households in the country. Penang made up 5.8% of Malaysia's household share for the T20 group; 7.2% for the M40 group; and 5.3% for the B40 group in

2019. In tandem with population distribution, Timur Laut had the highest share of the state's income. In 2019, the district saw a drop in income share of 4.2% compared with 42.3% in 2016 owing to the decrease in the percentage share of households, while all other districts registered a surge in income share. Among the three income groups, Seberang Perai Selatan recorded an increase of 3.1% in T20 households, while the T20 group in Timur Laut declined by 5.9%.

The state's income gap has relatively widened, with the Gini coefficient soaring from 0.356 in 2016 to 0.359 in 2019. This increase was attributed to the increase in the income gap in Barat Daya, Seberang Perai Utara, and Seberang Perai Tengah. With the latest recalibration of Malaysia's poverty line income, Penang's absolute poverty rate shrank by a marginal 0.3% from 2.2% in 2016 to 1.9% in 2019, strengthened by the level of the median household income for all districts except Barat Daya and Seberang Perai Utara. Incidence of relative poverty, on the other hand, increased across all districts except Seberang Perai Selatan. Penang's incidence of relative poverty rose from 11.3% in 2016 to 13.2% in 2019.

Penang's labour market remains cautiously optimistic amid global uncertainties brought about by the global pandemic in 2020. The unemployment rate will be high as a result of weak demand for products, causing a hike in retrenchment activities in the form of voluntary separation schemes (VSS), layoffs, and pay cuts—affecting the services sector in particular. Despite the surge in unemployment, Penang's economy is projected to still have full employment status, with its unemployment rate hovering below a 4% trajectory, similar to the 1998 Asian financial crisis and 2009 global recession. According to historical trends, workforce with secondary education will continue to register a higher unemployment rate compared with other educational levels, ceteris paribus. However, during the COVID-19 crisis, youth and graduate unemployment are expected to increase owing to the freeze in labour recruitment.

Labour demand remains weak. Job hiring has slowed down as employers become cautious about their business prospects, and some employers have downsized their organisations in response to the pandemic. Despite a subdued hiring market, digital-related positions will continue to experience exponential growth as a result of movement restrictions. On the national front, JobStreet Malaysia saw a spike in job searches related to information technology roles, particularly during the MCO. Network engineers, IT project managers, and helpdesk analysts were among the roles employers have been looking to fill. However, according to JobsMalaysia, Penang had 21,172 job vacancies posted by private sector as of 17 July 2020, with the majority of them being low-skill employment.

Manufacturing sector

Penang's manufacturing activities continued to be responsible for over 40% of its total GDP—the highest share in comparison with other manufacturing-leading states like Selangor, Johor, and Sarawak. With a subdued growth of 2.7% in 2019, the sector is estimated to remain cautiously optimistic in 2020 owing to the global supply-chain disruptions brought about by the pandemic, along with the implementation of planned investments.

Penang's approved investment projects have surged significantly, recording the highest-ever capital investment in 2019. As the national's largest share of foreign capital investment, the state seeks to create about 18,000 employments from both domestic and foreign investment projects, centering on E&E, scientific and measuring equipment, and machinery and equipment industries. This is a potential impact of the US-China trade tension, where US offshore plants are being set up outside China. The United States remained as the top investor in Penang (57.7%), followed by Singapore (12.3%) and the United Kingdom (10.1%).

In terms of value creation, Penang ranked second in total value created by the manufacturing industries. Although Penang has a smaller value created compared with Selangor, Penang recorded the highest value created per employee across the high-tech-manufacturing-leading states (such as Selangor, Johor, and Kedah) in Malaysia. This reflects Penang's linkages in relatively high-value-added operations. The state also led in average value created per firm, suggesting that Penang's manufacturing industries are considered high value, are more capital- and knowledge-intensive, and feature less low-skilled labour comparatively.

The manufacturing sector was heavily impacted

by the implementation of the MCO. Global supply chain disruptions led to significant delays in order deliveries, resulting in Penang-based manufacturing firms (including foreign firms) sourcing raw materials from local suppliers. With a quick reopening of business operations, Penang's manufacturing firms will experience a gradual recovery in the semiconductor, precision machining, measuring and test, and medical devices industries. In contrast, textile and garment manufacturers will take longer to recover owing to poor retail performance. The approved investment for the first quarter of 2020 shows that Penang still led in attracting foreign investment, and ranked second in total investments after Sabah. The manufacturing sector is projected to grow moderately in 2020.

Services sector

Business services, tourism, and logistics activities are the main growth drivers for Penang's services sector and account for 39% of the state's GDP in 2019. Utility, transport, and storage, and information and communication—proxies for the logistics sub-sector—grew at the fastest rate (6.9%) over the previous year, followed by wholesale and retail trade, food and beverage, and accommodation—which are closely related to tourism industry—at 6.4%. Finance and insurance, real estate, and business services grew at 5.4%. The share of wholesale and retail trade, food and beverage, and accommodation has consistently contributed the highest share in the services sector at 16.8%.

Responsible for 12.4% of the state's GDP, the logistics sub-sector benefits from the close proximity of the industrial parks to Penang's seaport and airport. As previously mentioned, Penang International Airport is responsible for the largest trade value in the country, accounting for approximately one-fifth of the total trade value and two-thirds of the trade value through air channels in Malaysia. While total trade volume handled through air cargo decreased by 7.8% in the first four months of 2020, the total trade value handled at airport increased by 4.3%. This indicates that a higher value of products is being shipped through the airport. This trend is projected to continue in spite of the challenging global macroeconomic environment along with the state's development focus on high-tech and high-value-added industries. Though the Penang seaport is a feeder port providing ancillary cruise services, the port handles bulk cargo from Southern Thailand—primarily rubber and rubber products.

Priority projects under the Penang Transport Master Plan (PTMP) are expected to ease traffic bottlenecks and improve accessibility. The Light Rail Transit (LRT) is designed to cover a distance of 29.5km, connecting the north of Penang Island to the Penang South Reclamation Smart City, along with monorail services to be developed in smaller areas. The George Town-Butterworth LRT and Penang Third Link are also set to increase connectivity between Butterworth and Penang Island. In a state with more cars than inhabitants, PTMP projects play an important role in increasing traffic efficiency, which will benefit the local population, business community, and tourists.

The digital revolution has advanced business services by leveraging modern technologies into their operations. Artificial intelligence (AI), robotic process automation (RPA), cloud storage, big data, and block chain are seamlessly turning business operation models into a connected ecosystem for maximum value across the value chain. Coupled with tax incentives for new Global Business Services (GBS) companies in Malaysia, conditions for Multimedia Super Corridor (MSC) status have been revised to incentivise new GBS companies that have adopted modern digital technology to establish a presence in Malaysia. In Penang, high demand for talent equipped with high proficiency in the latest software still persists. Foreign knowledge workers play an important role in knowledge transfers. The state imported 1,725 foreign workers in 2019, an increase of 16.9% from 1,476 persons recorded in 2018. Of this, about 89% worked in GBS. According to InvestPenang, Penang ranked second after Kuala Lumpur for its GBS investment hub creating approximately 12,000 high-value jobs. ICT and software development, and creative multimedia are two other advanced services that recently gained international investment traction in Penang.

The tourism sector was impacted the hardest by the COVID-19 pandemic. The first quarter of 2020 saw a significant decrease in domestic and international travellers. Passengers carried through airplanes dropped drastically during the MCO period, with international arrivals decreasing by 38.8%. In April,

there were only 35 international departures and zero arrivals due to the border closure. Travellers are expected to return in phases, but this is dependent on the global containment situation. Passenger volumes will remain weak in the short term compared with pre-COVID-19 levels. Hotel businesses have been severely impacted, resulting in the temporary and permanent closures of some hotels. Although domestic tourism is heavily promoted in the state, a relatively higher occupancy rate has only been observed during weekends. This rebound is a far cry from the pre-MCO period.

According to Penang Tourist Survey (2018), experiencing local food continued to be the top reason for international and domestic tourists to visit Penang. For international visitors, sightseeing in the city, visiting historical sites, and visiting national parks/hiking/trekking were their favourite activities in contrast with domestic tourists. Both international and domestic tourists spent the most on food and beverage, followed by accommodation and shopping and entertainment.

As the main driver for the tourism sector, Penang has gained a significant multiplier effect from medical tourism. With its fully equipped hospital facilities in the private sector, Penang is the most popular destination for medical tourists in the country, accounting for over half of Malaysia's total medical tourists, along with the highest revenue collected (followed by Kuala Lumpur). Indonesians accounted for more than 95% of Penang's medical tourists. Foreign tourists visited Penang's hospitals largely for medical treatments in the areas of oncology, orthopaedics, and paediatrics. Aesthetic procedures are also becoming increasingly popular. With the lockdown and the growing number of COVID-19 cases in Indonesia, Penang's private hospitals will experience a significant negative impact on their business revenue, and the path to recovery will be slow.

Penang's health services created the highest growth in gross output annually, superseding the annual growth rate recorded in Selangor, Johor, and Kuala Lumpur—the most developed states in Malaysia. Being one of the smallest states in Malaysia, Penang remained as the third-largest value-added state in the country. As the largest public hospital, Penang General Hospital collected the highest amount of revenue, followed by Seberang Jaya Hospital and Bukit Mertajam Hospital. Interestingly, Penang's private hospitals have a higher rate of admissions compared with public hospitals, reflecting the significant contribution of international medical tourists. In public hospitals, general medicine and obstetrics and gynecology (O&G) are the most popular departments with the highest number of admissions (28,752 in 2018). However, the paediatrics department saw the biggest increase in admissions in 2018 (22%). Dengue fever remained the most prevalent communicable disease in Penang, while cases of hand, foot, and mouth disease saw an increase of more than threefold in 2018. Meanwhile, the biggest cause of death in Penang were diseases related to respiratory system (e.g. acute pneumonia and asthma) followed by circulatory system (e.g. hypertension, heart failure, and stroke).

Private and public hospitals are working closely to detect COVID-19 cases. In Penang, testing is made available in selected private hospitals and public hospitals and clinics. However, all patients with positive COVID-19 must be referred to Penang General Hospital for treatment. While the number of COVID-19 cases are still on the rise globally, the situation in Penang is still under control, with the lowest prevalence rate in the country. (As of 13 September, Penang has the lowest prevalence rate at 7.8 confirmed cases per 10,000 population.) Seberang Perai Tengah recorded the highest number of COVID-19 cases, followed by Timur Laut.

Construction sector

Accounting for 2.8% of the state's GDP, growth in the construction sector improved to a positive rate of 0.7% in 2019, but the sector will contract in 2020 owing to weak demand for houses and slow business developments brought about by the COVID-19 pandemic. With the implementation of the MCO, the value generated from construction activities has been significantly affected, with new properties launches postponed. In near to medium term, consumers are likely to defer buying new properties, and more overhang units are expected. For existing properties, the rental market is projected to be sluggish, particularly in retail businesses. Poor demand for houses resulting from the pandemic will put further downward pressure on house prices.

In the first half of 2019, new completions of residential stock were largely concentrated in Seberang Perai Selatan and Seberang Perai Tengah. Terraced houses, semi-detached, and condominiums and apartments contributed the most to development in Seberang Perai Selatan. While landed properties have always been popular in mainland Penang, high-rise development projects are on the rise, outpacing the construction of landed properties. Demand for houses remains low. Overhang residential units continue to center on higher-price properties. More than two-thirds of these were condominiums and apartments, with a majority located in Timur Laut and Barat Daya.

Agriculture sector

In 2019, Penang's agriculture sector rebounded to 4.9% while contributing the same share as in the previous year (2.2%). The total crop land use shrank by an average of 2.1% per year during 2014–18. As a staple food for the country, rice production experienced stable growth, featuring the highest rice yield in the country. Penang also recorded a high self-sufficiency level (SSL) for rice, fulfilling over 70% of domestic demand. However, challenges persist. Land conversion will be a threat to the rice industry and food security; farmers need to adopt modern farming technologies to sustain rice production. Additionally, an overdependence on a single source of water can be a risk to Penang, either for consumption or agricultural use. While durians and pineapples are Penang's main fruit production, the planted area has also decreased sharply in recent years. In the vegetable industry, the planted area increased by 6.1% annually on average from 2009 to 2018.

In the livestock industry, while the size of farmers declined by about 10% annually from 2015 to 2018, the livestock population increased marginally at 0.6%, fuelled by the increase in sheep and pig populations. Chicken farming remained the largest livestock production in Penang, followed by pork and duck. Chicken meat and pork had a higher SSL compared with the production of eggs, fresh milk, and cow meat. Due to the increased price of chicken feed, the production of eggs has been on a decline, leading to a decrease in the SSL for eggs in domestic consumption. In contrast, the production of beef rose sharply from 2015 to 2019 owing to a significant increase in the cow population. Shortage of land and labour, high feed costs, and the lack of private investments continue to be challenges in the face of rising demand for livestock products.

Penang's fisheries industry remains competitive. Production of the food fish sub-sector (i.e., marine capture fisheries, aquaculture fisheries, and inland fisheries) has moderated in the past five years. As the main source of income for coastal villages, marine-capture fisheries are responsible for nearly two-thirds of total fish landing in Penang, while aquaculture fisheries make up about one-third of total production. Trawl nets and drift/gill nets were the main fishing methods used by Penang's fishermen in 2018. While Penang produced the fourth-largest aquaculture fisheries in Malaysia, its wholesale value was the second-highest in the country after Perak, with shrimp farm registering the highest value nationwide. This indicates that the state has generally produced high-value aquaculture fishes compared with other states.

As a result of the MCO, Penang's agriculture sector will continue to post lacklustre growth in 2020. The state's vegetables and fruits production plunged at 3% and 1.3% per day, respectively, during the first phase of the MCO. Poor market access and food supply-chain disruptions were the difficulties experienced by farmers and distributors, leading to a high level of food wastage.

1. Global and Malaysia's economic performance

1.1 Global economic performance

World economic fallout

The global economy is facing the deepest recession in a century. The depth of the recession is estimated to be closely link to the severity of the COVID-19 pandemic in a country (Partington, 2020). As part of containment measures, lockdowns undertaken in most countries are to cause global business and social activities to slow to a near standstill. Restrictions on people mobility reduces labour supply, disrupts supply chains, and reduces business revenues. Layoffs have led to lower consumption spending. Closures of nonessential services are on the rise. Domestic disruptions have escalated and spilled over to trade and global value chain linkages. The health crisis is therefore posing a severe impact on economic activity.

Table 1.1 Key economic indicators for selected economies (%)

	Real GDP changes			Consumer prices changes			Unemployment rate		
	2019	2020*	2021*	2019	2020*	2021*	2019	2020*	2021*
World	**2.9**	**-3.0**	**5.8**	**3.6**	**3.0**	**3.3**	**-**	**-**	**-**
Advanced economies	**1.7**	**-6.1**	**4.5**	**1.4**	**0.5**	**1.5**	**4.8**	**8.3**	**7.2**
United States	2.3	-5.9	4.7	1.8	0.6	2.2	3.7	10.4	9.1
Euro area	1.2	-7.5	4.7	1.2	0.2	1.0	7.6	10.4	8.9
Germany	0.6	-7.0	5.2	1.3	0.3	1.2	3.2	3.9	3.5
France	1.3	-7.2	4.5	1.3	0.3	0.7	8.5	10.4	10.4
Italy	0.3	-9.1	4.8	0.6	0.2	0.7	10.0	12.7	10.5
Spain	2.0	-8.0	4.3	0.7	-0.3	0.7	14.1	20.8	17.5
Japan	0.7	-5.2	3.0	0.5	0.2	0.4	2.4	3.0	2.3
United Kingdom	1.4	-6.5	4.0	1.8	1.2	1.5	3.8	4.8	4.4
South Korea	2.0	-1.2	3.4	0.4	0.3	0.4	3.8	4.5	4.5
Emerging and developing economies	**3.7**	**-1.0**	**6.6**	**5.0**	**4.6**	**4.5**	**-**	**-**	**-**
China	6.1	1.2	9.2	2.9	3.0	2.6	3.6	4.3	3.8
India	4.2	1.9	7.4	4.5	3.3	3.6	-	-	-
ASEAN-5	**4.8**	**-0.6**	**7.8**	**2.1**	**1.8**	**2.7**	**-**	**-**	**-**
Indonesia	5.0	0.5	8.2	2.8	2.9	2.9	5.3	7.5	6.0
Malaysia	4.3	-1.7	9.0	0.7	0.1	2.8	3.3	4.9	3.4
Philippines	5.9	0.6	7.6	2.5	1.7	2.9	5.1	6.2	5.3
Thailand	2.4	-6.7	6.1	0.7	-1.1	0.6	1.1	1.1	1.1
Vietnam	7.0	2.7	7.0	2.8	3.2	3.9	2.2	-	-

*Note: * Projections*
Source: World Economic Outlook database April 2020, International Monetary Fund (IMF).

As a result of the pandemic, the world economy is projected to contract sharply at 3% in 2020. This is much worse than the 2008–09 global financial crisis and the 1997–98 Asian financial crisis. According to the International Monetary Fund (IMF) (2020), the global economy is projected to normalise in 2021, with an estimated growth of 5.8%. This rebound is even stronger than the growth rate recorded before the pandemic loomed in 2019. However, the magnitude of the global recession is uncertain, and is significantly reliant on global efforts in containing the spread of COVID-19.

Advanced economies are expected to be hit hardest by the pandemic. The real GDP is estimated to contract at 6.1% in 2020 with escalated job losses and tightened financial conditions. In April 2020, the IMF forecast that advanced European economies will be impacted the worst, with Italy contracting by 9.1%, Spain 8%, France 7.2%, and Germany 7% (Table 1.1). The United States is expected to contract mildly compared with the euro zone at 5.9% despite leading the world in COVID-19 cases and fatalities thus far. Among the advanced economies, South Korea is estimated to perform better than the United States and Japan, contracting at only 1.2%, supported by the intensity and efficacy of its containment measures.

The disruptions have affected demand for products and sales revenue of companies. As part of cost-cutting measures, companies have retrenched workers to keep their businesses afloat. The unemployment rate is expected to impacted severely, particularly in advanced economies. A double-digit unemployment rate is anticipated to emerge in the United States and all advanced countries in the euro zone except Germany. Spain's unemployment rate is projected to reach as high as 20.8%—the worst unemployment situation in the world—despite the fact that a gradual normalization in economy activity is expected in the second half of 2020.

All advanced economies and emerging and developing economies are set to have a lower growth rate in consumer prices. Inflation rates in advanced economies are not expected to exceed 1.5% in 2020 excluding Spain, which is estimated experience a deflation of 0.3%. The low inflation rate is attributed to the fall in oil prices. However, fears of deflationary pressures is heightened in the euro zone despite the stimulus measures of European Union (EU) central banks, including lending freely to borrowers. Consumer spending remains stalled and the economy is not picking up. Therefore, the continued downward spiral in consumer prices can impact the economy as investments dry up and unemployment soars, further dampening the wage rate.

While China was the first country impacted by the COVID-19 outbreak in the first quarter of 2020, its labour market conditions, along with economic growth, have been brought under control. Supported by its sizable domestic market, the Chinese economy is projected to grow at 1.2%, with its unemployment rate rising to 4.3% in 2020—close to full employment status—from 3.6% in 2019. Chinese urban unemployment is at a higher rate compared with rural areas (Cheng, 2020).

Although the Chinese economy has had a lower impact on its domestic employment market compared with other advanced countries, the unemployment situation continues to be a serious concern, especially with the bulk of graduates completing their degrees in the summer. Alibaba's logistics centre received more than 1 million job applications for 30,000 new managerial positions at pick-up stations (Cheng, 2020). A gradual recovery in Chinese investments, consumption, and industrial output was seen in May (Guo, 2020). However, the recovery is slower than expected.

Emerging and developing economies, on the other hand, will experience a moderated inflation rate in 2020. On average, consumer prices are expected to soften by 0.4% to 4.6% in 2020. Projections for the Chinese inflation rate see a scant increase of 0.1% to 3% in 2020 compared with 2019, supported by the rise in food prices—pork meat—and medical goods—disinfection products—which are highly demanded globally. In contrast, non-food prices sharply moderated while transportation and services showed a sharp decline in the first quarter of 2020.

India's economy is also expected to experience a subdued growth, with dramatic contractions in the industrial and service sectors. With a 1.9% estimated growth rate by the IMF, the continued spread of the pandemic will dampen consumer confidence and impede economic recovery, as reflected in a dramatic decline in industrial production, business sentiment, vehicle sales, and trade. The economic

impact of COVID-19 will be broad and substantial if containment measures are not able to reduce the number of COVID-19 cases in the near term. In a recent update from IMF's World Economic Outlook database, the projected real GDP has been revised down to -4.5% in 2020, taking the rise of COVID-19 cases into account.

Likewise, inflation in India is also growing weakly. The overall rate is anticipated to weaken to 3.3% in 2020. However, the country's wholesale price index saw a deflation of 3.2% in May 2020 primarily the result of the decline in fuel and power prices amid more expensive food prices. The jobless rate in India has increased in June 2020, with the rural unemployment rate capped at 17.7% and the urban rate at 17% in the first week of June (The Indian Express, 2020). Unemployment in rural areas has eased owing to the presence of infrastructure projects and temporary jobs provision schemes.

Japan's economy is expected to decrease by -5.2% in 2020 compared with a 0.7% increase in 2019. Without a full national lockdown, the country's economy has since seen its supply chains and businesses severely disrupted. Coupled with the hike in the sales tax to 10% from 8% in October last year, consumers are being more careful with their spending. The economy slipped into a recession in the first quarter of 2020, registering a contraction of 3.4%. As a trade-reliant country, Japan's exports have also been severely affected by the pandemic, with its motor vehicles' sales dropping worldwide. In terms of unemployment, Japan will perform relatively well among the advanced economies, with an estimated 3% unemployment rate in 2020. Job cuts are seen in the services sector and in small and mid-sized firms.

South Korea's economy saw its worst performance since the 2008–09 global financial crisis, shrinking at 1.4% in the first quarter of 2020. The IMF projected that the country's real GDP would contract at 1.2% for the entire year. The slowdown in global spending has impacted South Korea's external trade, with exports down by two digits for three consecutive months from April to June 2020 following poor global demand for automotive and electronic products. The country's inflation rate is expected to slow slightly to 0.3% this year, with the surge in agricultural, livestock, and fisheries prices superseding the slump in automobile prices. The unemployment rate, on the other hand, is projected to rise to 4.5% in 2020, with small retailers, restaurants, and lodgings struggling the most.

Modest contractions in ASEAN countries

ASEAN economies will generally outperform advanced and emerging economies such as China and India. With the exception of Singapore, the IMF anticipates that ASEAN's five major countries will register a mild contraction of 0.6% in real GDP for 2020. All ASEAN economies are estimated to have a negative growth rate except Vietnam, Indonesia, Philippines, Lao PDR, and Brunei. These projections are to be revised by officials based on the current pandemic situation in each country. ASEAN economic ministers have encouraged businesses, particularly micro, small, and medium enterprises (MSMEs), to continue operations amid the pandemic (The Edge Markets, 2020). The adoption of digital technology would allow manufacturing firms to increase production. Moving forward, the IMF projects a strong growth in 2021 at 7.8%.

Thailand's economy is expected to be hit the hardest by the pandemic among the ASEAN countries, with its projected real GDP contracting sharply at 6.7%. This is largely the result of stalled travel activity and tourism-related sectors, particularly international tourist arrivals, brought about by the pandemic. Given that the tourism sector is the country's main source of income, the pandemic has significantly impacted the Thai economy. Furthermore, the demand for manufacturing goods has decreased leading to high inventories, while the construction sector has a large number of unsold stocks. Although the IMF estimates that Thailand's unemployment rate will remain at 1.1% in 2020, the country's National Economic and Social Development Council (NESDC) alluded that, while 2.5 million workers in the tourism sector could lose their jobs, 1.5 million and 4.4 million in the industrial sector and other services sector, respectively, could be jobless (New Straits Times, 2020).

Being the world's most competitive economy, Singapore's economy is expected to decrease during its worst-ever recession since its independence, surpassing the recession that occurred during the 1997–98 Asian financial crisis (when the economy shrank by 2.2% in 1998). According to IMF projections

in April 2020, Singapore's real GDP will contract at 3.5% in 2020 from a slow growth of 0.7% in 2019. Labour shortages have severely affected economic sectors that depend on foreign workers, which is the main contributor to Singapore's COVID-19 cases. The affected sectors include construction and marine and offshore engineering. The economy will also go into deflation in 2020, with a projected rate of inflation at 0.2%. The country's consumer prices contracted for the fourth month in May owing to the decline in the cost of private transport and retail goods such as clothing and footwear and household durables. Likewise, food inflation is also felt in Singapore, particularly for the prices of non-cooked items. Singapore's unemployment rate is also forecast to increase marginally to 2.5% in 2020, up from 2.4% in 2019. The rate in the first quarter of 2020 has exceeded 3%, and the ratio of job vacancies to unemployed persons fell to the lowest in a decade with only seven jobs for every 10 unemployed people.

While most ASEAN countries reported a slowdown in COVID-19 cases, uncertainty over the Indonesian economy persists as the virus continues to spread. IMF projects that the real GDP will grow marginally at 0.5% in 2020, with the inflation rate at 2.9% and unemployment rate rising to 7.5%. The government is concerned that millions of Indonesians would fall into poverty as a result of the severe economic impact brought about by the pandemic. Like many countries, the Indonesian government has cut its interest rate to encourage consumer spending. Tourism tax cuts are also being implemented in the highly impacted tourism-related sector and local manufacturing firms. Indonesia's unemployment increased to more than 1.79 million as of May 2020 following the shutdown of non-essential services.

Vietnam's economy is set to grow at the fastest pace among ASEAN countries amid the impact of COVID-19; IMF anticipates a growth of 2.7% in Vietnam's real GDP in 2020. For the first quarter of 2020, its GDP fell to 3.8%, severely impacting the country's major trading and investment partners. Almost 35,000 companies went bankrupt, with the number of companies closing greater than the number of newly registered companies for the first time (Do, 2020).While risks from the COVID-19 pandemic remain, the Vietnamese economy will improve with the rise of the middle class and the large number of bilateral and multilateral trade agreements.

1.2 Malaysia's economic performance

Subdued economic growth with global health uncertainties

In 2019, the Malaysian economy, measured by GDP, dropped to its slowest growth since the global financial crisis in 2009. The GDP grew at 4.3% in 2019 compared with 5.8% and 4.8% in 2017 and 2018, respectively (Table 1.2). Private consumption remains the main economic driver, growing at 7.6% in 2019 while public investment plunged at 10.8%, followed by a marginal fall of 1.3% in exports amid the US-China trade war. Bank Negara Malaysia (BNM) projects Malaysia's GDP growth to hover between -2% and 0.5% in 2020 owing mainly to the COVID-19 pandemic.

Private consumption accounted for nearly 60% of Malaysia's total GDP in 2019, with a subdued growth of 7.6% compared with 2018's 8% growth. This can be attributed to continued income and employment growth through household spending. Consumption from the private sector is expected to decrease further in 2020 owing to weak labour market conditions, mobility restrictions, and poor consumer sentiments arising from the COVID-19 pandemic (Bank Negara Malaysia, 2020a). To ease these challenging economic conditions, economic stimulus packages including cash transfers to vulnerable households (such as Bantuan Sara Hidup [BSH][1] and Bantuan Prihatin Nasional [BPN][2]) and

[1] The government has allocated RM1 billion to households whose incomes are RM2,000 and below, RM2,001–3,000, and RM3,001–4,000 at RM1,000, RM750, and RM500, respectively.

[2] With an allocation of RM10 billion, a one-off cash assistance or Bantuan Prihatin Nasional (BPN) is channelled to B40 and M40 groups. The BPN given to the B40 community is based on BSH data. The payments disbursed in April and May 2020 include:

- A sum of RM1,600 given to households earning not more than RM4,000 per month.
- RM1,000 for households earning RM4,001–8,000 per month.
- RM800 for single individuals earning not more than RM2,000 per month.
- RM600 for single individuals earning RM2,001–4,000.

flexible Employees Provident Fund (EPF) savings withdrawals have been implemented to increase disposable income and advance cash flow for households. As projected by BNM, these measures are to add 2.8 percentage points to the 2020 GDP.

Private investments on the other hand softened considerably, expanding at only 1.5% in 2019—the slowest pace since 2009. This can be attributed to global trade uncertainties that have affected business sentiments over trade and investment directions. The prolonged review of large-scale infrastructure projects has also affected private sector investments in the construction sector. This also dampened investments from the public sector, contracting at 10.8% in 2019. In contrast, private investments were largely supported by the implementation of new and ongoing projects in both manufacturing and services sectors, particularly in resource-based and electrical and electronics (E&E) industries. The Movement Control Order (MCO) has resulted in some disruptions to ongoing construction projects. In the first quarter of 2020, investments from private and public sectors registered larger contractions at 2.3% (Q4 2019: +4.3%) and 11.3% (Q4 2019: -8%), respectively.

Table 1.2 Annual growth rate of GDP by demand components in Malaysia at 2010 constant prices

	2016	2017	2018[e]	2019[p]	Q1 2020[p]
Final consumption expenditure	4.9	6.7	7.1	6.6	6.5
Private	5.9	6.9	8.0	7.6	6.7
Public	1.1	5.7	3.2	2.0	5.0
Gross fixed capital formation	2.6	6.1	1.4	-2.1	-4.6
Private	4.5	9.0	4.3	1.5	-2.3
Public	-1.0	0.3	-5.0	-10.8	-11.3
Export of goods and services	1.3	8.7	1.9	-1.3	-7.1
Import of goods and services	1.4	10.2	1.5	-2.5	-2.5
GDP	**4.4**	**5.8**	**4.8**	**4.3**	**0.7**

Note: e - estimate; p - preliminary
Source: Bank Negara Malaysia and Economic Planning Unit, Malaysia.

As measured by the consumer price index, headline inflation[3] surged modestly at 0.7% in 2019, with prices of services, housing, and food and non-alcoholic beverages registering the biggest increase.

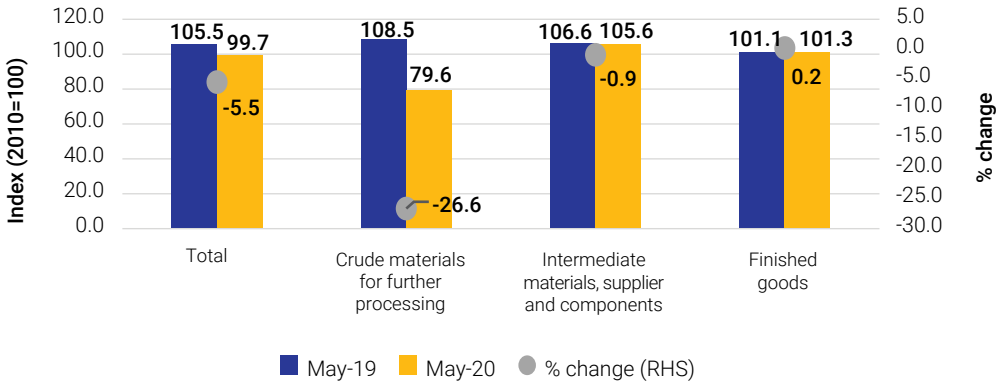
Meanwhile, prices of transportation faced the largest drop at 3.1%, followed by the prices of semi-durable goods (-1.9%) and non-durable goods (-0.7%). In the first quarter of 2020, the inflation rate moderated to 0.9% compared with 1.0% in the previous quarter. BNM has projected that a prolonged broad-base decline in prices, coupled with a collapse in demand, would cause deflation. However, Malaysia has a low risk of dipping towards a deflation trajectory as only 20% of the items in the consumer price index basket declined in prices (Yusof, 2020).

In contrast, the producer price for local production contracted at 0.9% in the first three months of 2020 compared with a growth of 1.4% in Q4 2019. This means that the cost of production is lower in Q1 2020. This decline was seen in mining and water supply, with the producer price for mining seeing the largest drop at 18.2% while water supply shrank marginally at 0.2%. The producer price continued to register a negative growth during the MCO. On a year-on-year (y-o-y) basis, the price had declined by 5.1% and 5.5% in April and May 2020, respectively, with all sectors seeing a drop except agriculture, forestry, and fishing. In May 2020, the sector increased by 5.5% while mining, manufacturing, electricity and gas supply, and water supply plunged by 52.7%, 0.8%, 0.2%, and 0.1%, respectively.

[3] Headline inflation rate is a measure of total inflation within an economy, which includes commodities such as food and energy prices (e.g. oil and gas).

In terms of stage of processing, only the prices of finished goods increased by a marginal 0.2% in May 2020 compared with the same month of the preceding year. Meanwhile, the cost of crude materials for further processing and intermediate materials, supplies, and components declined by 26.6% and 0.9% (Figure 1.1). Under crude materials, non-food materials such as crude fuel experienced the largest drop at 43.7% while the cost of processed fuel and lubricants dropped by 5.7%, leading to the mild decline in the intermediate materials category—which was affected by the drop in global oil prices. Prices are expected to perform weakly in the next three months because of the gradual resumption of production after the MCO.

Figure 1.1 Producer price index and y-o-y change for local production, Malaysia



Source: Department of Statistics, Malaysia.

All economic sectors impacted by COVID-19

From the supply side, the Malaysian economy is primarily driven by the services sector, followed by manufacturing and agriculture. The services sector, accounting for more than half of the entire GDP, increased by a moderate 6.1% in 2019, down from 6.8% in 2018 (Table 1.3). In the first three months of 2020, the MCO affected the major economic sectors considerably. While the services sector continued to be the main economic driver of the country, the sector had weakened sharply to 3.1% in Q1 2020—the slowest-ever growth since the 2009 global financial crisis. Manufacturing activity moderated to 1.5%, which was largely affected by the supply-chain disruptions brought about by the COVID-19 pandemic. In contrast, agriculture, mining, and quarrying and construction decreased significantly by 8.7%, 2%, and 7.9%, respectively.

Table 1.3 GDP performance by economic sectors, Malaysia (at 2015 constant prices)

Sector	y-o-y change (%)					Share (%)	
	2016	2017	2018e	2019p	Q1 2020p	2019p	Q1 2020p
Agriculture	-3.7	5.7	0.1	2.0	-8.7	7.1	6.5
Mining and quarrying	2.2	0.4	-2.2	-2.0	-2.0	7.1	7.3
Manufacturing	4.4	6.0	5.0	3.8	1.5	22.3	22.3
Construction	7.4	6.7	4.2	0.1	-7.9	4.7	4.5
Services	5.7	6.3	6.8	6.1	3.1	57.7	58.4
GDP at purchasers' value	**4.4**	**5.8**	**4.8**	**4.3**	**0.7**	**100.0**	**100.0**

Note: e - estimate; p - preliminary
Source: Department of Statistics, Malaysia.

Given the lockdown in non-essential services in March 2020, the services sector was largely impacted by the tourism-related and non-food retail trade activities. This led to a sharp contraction in the accommodation (-4.2%), motor vehicles (-2.9%), and transport and storage (-2.7%) sub-sectors in Q1 2020. Transport and storage activities were affected by international and inter-state travel restrictions, putting airports into a complete halt during the MCO. The insurance and information and communication sub-sectors had the highest growth rates at 6.9% and 6.7%, respectively, underpinned by demand for special COVID-19 coverage and data communication services (Table 1.4).

Table 1.4 GDP growth rate for services sub-sectors, Malaysia (at 2015 constant prices)

Services sub-sector	y-o-y change (%)				
	2016	2017	2018	2019	Q1 2020
Electricity and gas	5.0	2.2	4.5	5.6	4.9
Water	6.7	6.1	6.6	7.6	5.7
Wholesale trade	8.3	6.6	7.4	5.6	3.4
Retail trade	7.1	9.5	10.2	8.4	2.1
Motor vehicles	-3.0	1.3	3.8	4.0	-2.9
Food and beverage	7.8	8.1	9.7	10.4	3.1
Accommodation	4.9	5.4	6.0	6.6	-4.2
Transport and storage	5.7	6.2	6.4	6.8	-2.7
Information and communication	8.0	8.6	8.3	6.6	6.7
Finance	1.4	5.1	3.9	4.5	4.2
Insurance	6.5	3.6	9.9	5.0	6.9
Real estate and business services	6.9	7.6	7.6	7.8	3.4
Government services	4.8	4.8	4.5	3.7	4.4
Other services	4.9	5.1	5.5	5.5	1.4
Total	**5.7**	**6.3**	**6.8**	**6.1**	**3.1**

Source: Department of Statistics, Malaysia.

As Malaysia's second-largest economic sector, manufacturing grew marginally in the first quarter of 2020, impacted by the MCO as part of measures to contain the COVID-19 virus. It moderated by half at 1.5% in Q1 2020 against 2% in Q4 2019. The first disruption emerged when China's lockdown disrupted the global supply chain, particularly in E&E and transport equipment. With the imposition of the MCO, the majority of manufacturing operations ceased. Only essential activities were allowed to operate during the MCO, thus affecting the local supply chain. Moving forward, a slow but positive recovery will be seen in this sector, particularly in areas with digital technology and automation.

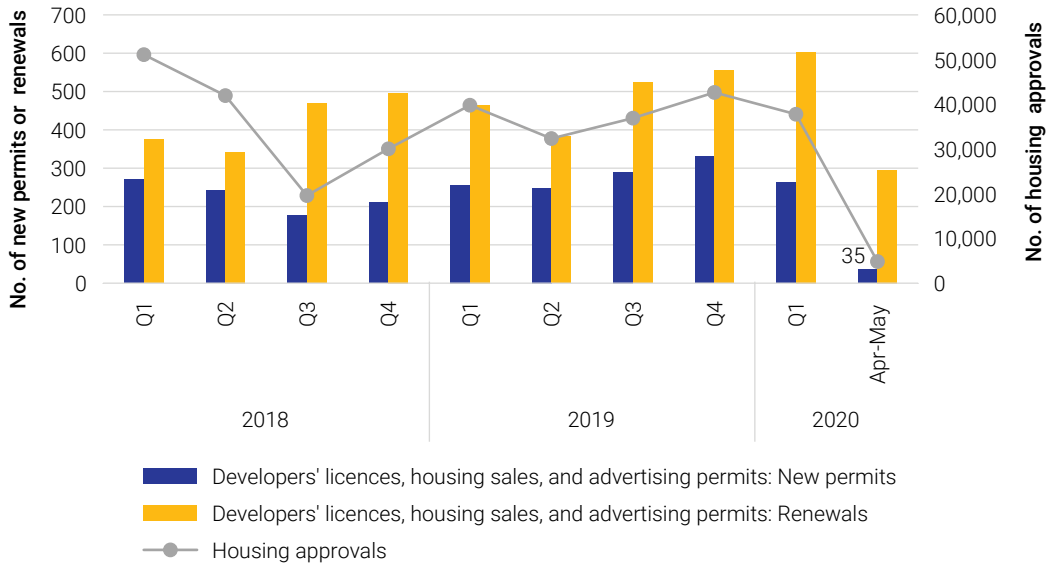
For the primary economic sectors, the agriculture sector contracted steeply at 8.7% in the first quarter of 2020 compared with -5.7% in Q4 2019, while mining remained in contraction (Q1 2020: -2%; Q4 2019: -3.4%) (Table 1.3). Dry weather conditions, coupled with the MCO, has led to a decrease in the production of agriculture items. In the first quarter of 2020, production of the major agricultural and mining commodities contracted in the first three months of 2020 except natural gas (Table 1.5). In agricultural commodities, saw logs and crude palm kernel oil were hit hardest with a sharp drop of 25.3% and 25%, respectively.

Table 1.5 Production of major agricultural and mining commodities

Commodities		2018	2019	Q1 2019	Q1 2020	y-o-y change	
						2018/19	Q1 2019/20
Rubber	('000 tons)	603.3	639.8	185.2	150.7	6.0%	-18.7%
Crude palm oil	('000 tons)	19,515.5	19,858.2	4,954.0	3,857.4	1.8%	-22.1%
Crude palm kernel oil	('000 tons)	2,300.0	2,322.2	608.9	454.6	1.0%	-25.3%
Saw logs	('000 cubic metres)	10,351.3	9,445.4	2,505.9	1,878.3	-8.8%	-25.0%
Cocoa	(tons)	826.4	1,017.1	301.6	206.1	23.1%	-31.7%
Tin-in-concentrates	(tons)	3,836.0	3,606.0	936.0	288.0	-6.0%	-69.2%
Crude oil and condensates	('000 barrels per day)	7,833.7	7,253.7	1,925.5	1,831.6	-7.4%	-4.9%
Natural gas (net)	(mmscfpd)	76,874.1	79,473.0	20,323.1	20,649.4	3.4%	1.6%

Source: Bank Negara Malaysia.

Figure 1.2 Selected construction indicators in Malaysia



Source: Bank Negara Malaysia.

Accounting for not more than 5% of the national GDP, the construction sector declined by 7.9% in Q1 2020 (Q4 2019: +1.0%). Construction activity was completely prohibited during the MCO. In the first three months of 2020, housing approvals and new permits issued to developers' license, housing sales, and advertisements were lower than those permitted in the last quarter of 2019 despite a surge in the number of permit renewals. This effect was largely felt in April and May 2020 when only 35 new permits were issued and 295 renewal permits were dispensed (Figure 1.2). According to the Bank Negara Malaysia Q1 2020 report, the lockdown has offset progress made in large transportation projects, as well as activities in the affordable housing schemes implemented before the MCO was issued.

Moderated labour market conditions

The labour market has softened as a result of efforts to contain the pandemic. In the first quarter of 2020, while the Malaysian labour force increased by a marginal 0.1% to 15.8 million people, the number of employed persons shrank by 0.1% to 15.24 million compared with the previous quarter. As a result of the MCO, the number of people who are not actively looking for jobs—or outside labour force—increased by 1.4% in Q1 2020, leading to a decline in the labour force participation rate. The unemployment rate increased to 3.5% in the first three months of 2020, particularly in March 2020. During the MCO period, industries that were most affected include accommodations; food and beverages; and arts, entertainment, and recreation.

In contrast, labour demand performed slightly better as the effect of the MCO was not completely reflected in the jobs market for the first three months of 2020. According to the Department of Statistics' Labour Market Review in the first quarter of 2020, total jobs, which consist of filled jobs and job vacancies, increased by 17,000 to 8.6 million in the private sector. While the rate of filled jobs increased to 98.1%, the rate of vacancies dropped to 1.9% from 2.3% in Q4 2019. Private firms remain cautious in the face of uncertainties caused by the COVID-19 pandemic. The semi-skilled category continues to record the largest job vacancies advertised (62.4%) compared with the high-skilled (24.3%) and low-skilled (13.3%) categories. Newly created jobs declined by 5,000, a majority of which were from the high-skilled category. More than half of the jobs available were from the services sector, and more than a quarter were from the manufacturing sector.

In Q1 2020, labour productivity, as measured by the ratio of value added to total employment, plunged by 0.8% to RM22,578 from RM24,263 in Q4 2019. Though the total hours worked decreased by 1.4% during the first phase of the MCO, value added generated by domestic production improved by 0.7% in Q1 2020 compared with 3.6% in the last quarter of 2019. As a measure of value added per hours worked, labour productivity rose by 2.1% for the same period, generating RM40 in value added per hour. In terms of economic sectors, the mining and quarrying, services, and manufacturing sectors recorded positive growth while the construction and agriculture sectors saw negative growth. Going forward, labour productivity will continue to moderate this year in response to production losses resulting from the MCO period.

Rebounded external trade environment

In the first five months of 2020, total trade fell by 8.7% to RM688.6 million from RM753.9 billion in January–May 2019. Amid global uncertainties and lockdowns in the country's trading partners, the trade balance remained robust with a surplus of RM43.7 billion in the first five months of 2020, down 23% compared with the same period last year (Table 1.6). The lower trade surplus was primarily attributed to the MCO; in April 2020 the country recorded its first trade deficit since the 1997 Asian financial crisis. Both exports and imports respectively dropped by 9.7% to RM366.2 billion and 7.5% to RM322.4 billion from January to May 2020 compared with the same period in 2019, resulting in a smaller total trade value. Malaysia's trade performance appears to have picked up at a faster-than-expected rate owing to strong external demand. Moving forward, Malaysia is expected to continue experiencing positive trade activity in 2020.

Table 1.6 Exports, imports, and balance of trade in Malaysia

RM million	2018	2019	% change	Jan–May 2019	Jan–May 2020	% change
Export	1,003,587	986,377	-1.7%	405,356	366,157	-9.7%
Import	879,804	849,067	-3.5%	348,516	322,410	-7.5%
Total trade	**1,883,391**	**1,835,444**	**-2.5%**	**753,872**	**688,567**	**-8.7%**
Balance of trade	**123,783**	**137,310**	**10.9%**	**56,840**	**43,747**	**-23.0%**

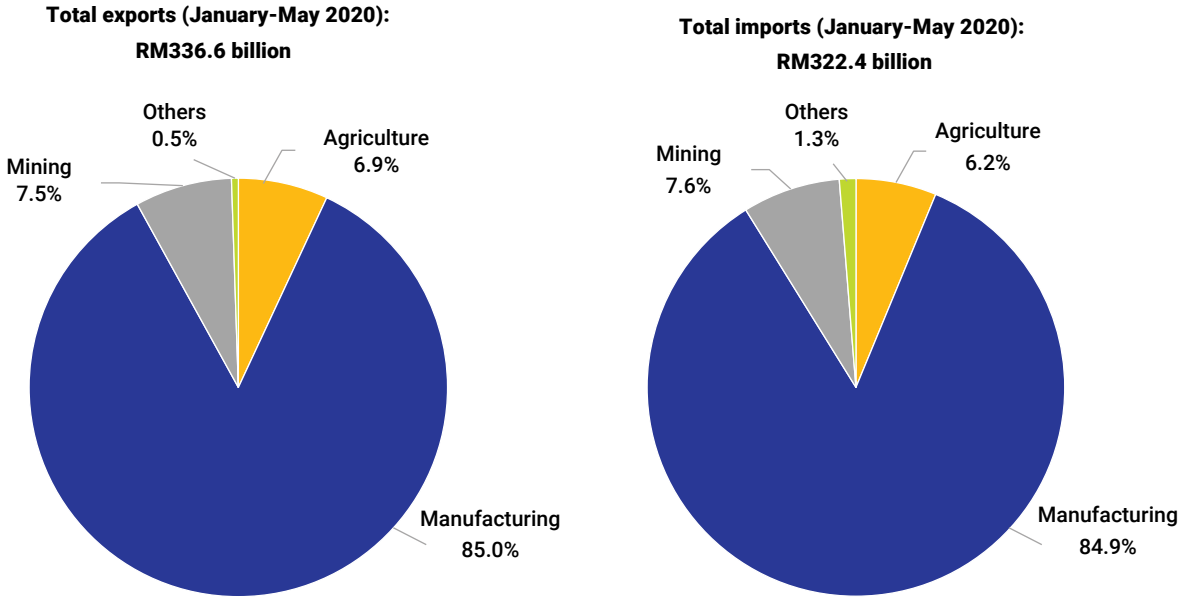
Source: Penang Institute estimates based on the Department of Statistics, Malaysia.

The majority of trade value was contributed by the manufacturing sector, accounting for as much as 85% of exports and imports from January to May 2020 (Figure 1.3). This was then followed by the mining and agriculture sectors. E&E products remained as the largest exports commodity across all economic sectors, making up more than one-third of Malaysia's exports. Due to the slowdown in the global external demand, exports of manufactured goods dropped by nearly 13% to RM133.8 billion compared with the same period last year. The drop was also reflected in the industrial production index; the manufacturing sector was impacted the most at 11.4% across all economic sectors. All other manufactured commodities a negative growth except iron and steel products (29.7%), transport equipment (23.9%), rubber products (12.6%), and paper and pulp products (7.7%).

E&E products also accounted for the largest share of total imports in Malaysia, but from a lower share compared with exports. E&E accounted for nearly 30% of the imports' value, followed by chemical and chemical products (9.3%) and petroleum products (8.4%). Among manufactured goods, machinery, equipment, and parts were hit the hardest, experiencing a significant decline of 21.1% in January–May 2020 compared with the first five months of 2019. This was then followed by textiles, apparel and footwear (-12.1%), petroleum products (-11.4%), and optical and scientific equipment (-9.9%). Only two manufactured goods registered positive growth: transport equipment (+15.4%) and processed foods (+4.6%).

Mining and agriculture sectors accounted for 7.5% and 6.9%, respectively, of Malaysia's exports during January–May 2020, with mining products registering a double-digit contraction of 21.4% y-o-y while agricultural products fell nearly 7% y-o-y compared with the first five months of the preceding year. Saw logs and sawn timber and mouldings were the most severely affected by the MCO across all agricultural products, followed by natural rubber (-13.4%) and palm oil (-2.9%). Exports of tin mining faced the largest loss among mining commodities, seeing a steep decline of 37.3% in January–May 2020 even though liquefied natural gas has the biggest share of mining exports.

Figure 1.3 Exports and imports by sector, January–May 2020

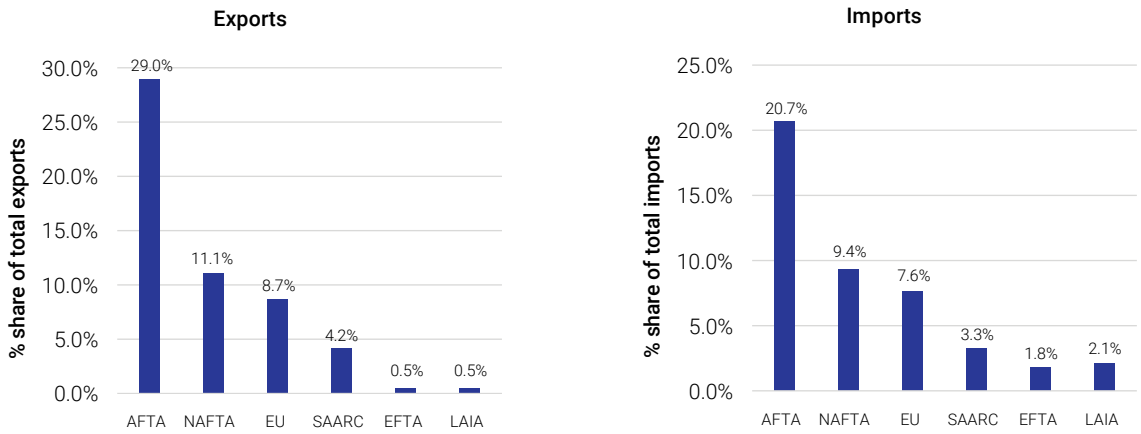


Source: Department of Statistics, Malaysia.

The ASEAN Free Trade Area (AFTA) remained as Malaysia's main export destination in the first five months of 2020, with Singapore remaining as Malaysia's key trade partner. AFTA represented 29% of Malaysia's exports and 20.7% of its imports (Figure 1.4). Within AFTA, Malaysia's exports were valued at RM53.8 billion, or 51% of Singapore's exports value, while its imports were valued at RM28.8 billion or 42.6% of Singapore's imports value.

Malaysia's second-largest trading market is the North American Free Trade Agreement (NAFTA), which accounted for 11.1% of total exports (RM40.6 billion) and 9.4% of imports (RM30.5 billion)—about 90% of which are traded in the US market. For the EU market, the Netherlands led Malaysia's export market (28.9% of exports to the European Union), followed closely by Germany (28.3% of imports from the European Union) for January–May 2020.

Figure 1.4 Direction of external trade by economic grouping, January–May 2020



Note: AFTA refers to ASEAN Free Trade Area; EU refers to European Union; NAFTA refers to North American Free Trade Agreement; SAARC refers to South Asian Association for Regional Cooperation; LAIA refers to Latin American Integration Association; and EFTA stands for European Free Trade Association, which includes Iceland, Norway, Switzerland, and Liechtenstein.
Source: Penang Institute estimates based on external trade data published by the Department of Statistics, Malaysia.

Since 2011, China has been Malaysia's largest trading partner. With Malaysia's imports valued at a total of RM175.6 million in 2019, China accounted for about 21%, while Singapore accounted for 10.5% and the United States accounted for 8.1%. Imports from China have grown by 11% per year since the global financial crisis in 2009.

China's lockdown had adversely affected the manufacturing supply chain in Malaysia as the country imports more intermediate goods for further processing to produce end-use goods or semi-end use goods for exports. More than half of Malaysia's imports were intermediate goods which manufacturers use as raw material to produce final or intermediate goods, while capital goods and consumption goods represented 11.8% and 8.7%, respectively, of imports in 2019. Approximately 85% of Malaysia's exports and imports value were attributed to the manufacturing sector in 2019. Of this, E&E products accounted for 44.7% of total exports and 33.7% of total imports.

Penang continued to be the main exporter through air

In Malaysia, seaports contributed the largest volume of exports, followed by airports and land transport. Over half of Malaysia's exports value were transported through seaports, while one-third and 13.1% were respectively transported through airports and land transports. Bayan Lepas airport in Penang continued to handle the largest exports in Malaysia, followed by Port Klang, Tanjung Kupang (Johor), Kuala Lumpur International Airport (KLIA), Bintulu, and Pasir Gudang (Johor). Bayan Lepas made up slightly more than a quarter of total exports while Port Klang comprised approximately 17% of the total export value for the first five months of 2020 (Table 1.7).

Although Tanjung Gelang (also known as Kuantan Port) handled the smallest value of exports among the seaports, the port recorded the largest

increase in the first five months of 2020 at about 53%. Kuantan Port caters to the export and import of manufactured output from the Malaysia-China Kuantan Industrial Park (MCKIP). Box 1.1 details the status of the Malaysia-China twin parks cooperation and the development of Kuantan Port.

During the MCO, all transportation modes handled lower volume of exports compared with the first five months of the preceding year. Air transport was impacted the least compared with sea transport and land transport. Exports through air transport declined by 4.2% against 15.8% through land and 11.2% through sea.

Among three main land exit and entry points of Malaysia, Johor has the largest share of exports, accounting for about 84% of the total export value handled through land transport. In Johor, the Tanjung Kupang checkpoint exported more goods (almost 74% of the total exported value of goods) than the Johor Bahru checkpoint (about 10%) during the first five months of 2020. It is estimated that the majority of exported goods were transported to Singapore for further processing or for end users. In the northern region, Bukit Kayu Hitam, which is a gateway to Southern Thailand, handled about 11.3% of the total exported value of goods through land transport. From January to May 2020, exports in Tanjung Kupang fell by only 5.4% to RM35.2 billion, compared with declines of 25% in Johor Bahru and 45.7% in Bukit Kayu Hitam.

Table 1.7 Exports by mode of transport for selected channels in Malaysia

Exports (RM million)	Jan–May 2019	Jan–May 2020	% y-o-y change	% share
Sea	**223,317**	**198,370**	**-11.2%**	**54.2%**
Port Klang	71,839	62,735	-12.7%	17.1%
Bintulu	29,523	24,558	-16.8%	6.7%
Pasir Gudang, Johor	26,830	23,033	-14.2%	6.3%
North Butterworth Cargo Terminal	22,079	17,786	-19.4%	4.9%
Tanjung Pelepas Port	16,637	13,745	-17.4%	3.8%
Tanjung Gelang/Kuantan Port	4,269	6,521	52.8%	1.8%
Others	52,139	49,992	-4.1%	13.6%
Air	**125,311**	**120,085**	**-4.2%**	**32.8%**
Bayan Lepas	92,296	92,116	-0.2%	25.2%
Kuala Lumpur International Airport (KLIA), Sepang	30,127	24,822	-17.6%	6.8%
Others	2,889	3,147	8.9%	0.9%
Land	**56,782**	**47,809**	**-15.8%**	**13.1%**
Tanjung Kupang, Johor	37,161	35,167	-5.4%	9.6%
Johor Bahru (Tambak/Causeway)	6,642	4,983	-25.0%	1.4%
Bukit Kayu Hitam	9,971	5,414	-45.7%	1.5%
Others	3,008	2,245	-25.4%	0.6%
Total	**405,410**	**366,264**	**-9.7%**	**100%**

Source: Department of Statistics, Malaysia.

For imports, Port Klang handled the largest value of imported goods in Malaysia at RM82.2 billion for the first five months of 2020. This comprised about a quarter of the imported goods, and 17.5% were contributed by Bayan Lepas airport—the second-largest importing channel in Malaysia. Interestingly, all checkpoints experienced a negative growth rate in imports during the first five months of 2020 except Bayan Lepas airport, which actually saw an increase of 7.3% or RM3.8 billion worth of imported goods in January–May 2020 compared with the same period in 2019.

Box 1.1 Status of Malaysia-China twin parks cooperation

By Dr Lee Siu Ming

The Malaysia-China Kuantan Industrial Park (MCKIP), which is located in Kuantan, Pahang, was officially launched in 2013. It is Malaysia's first national industrial park and is the sister park to the China-Malaysia Qinzhou Industrial Park (CMQIP) under the model of "Two Countries, Twin Parks". MCKIP, with a total land size of 3,500 acres, is a joint venture between Malaysian and Chinese consortiums, where the Malaysian consortium consists of the Pahang state government, Sime Darby Property, and IJM Land. The Chinese consortium consists of China Guangxi Beibu Gulf International Port Group and Qinzhou Investment Co., Ltd.

Tham (2019) highlighted that, despite the highly publicised cancellation or suspension of China-related mega-projects, private sector–funded projects such as MCKIP are still proceeding as planned.

Based on a statement by the Joint Cooperation Committee (JCC) of MCKIP and CMQIP on 14 June 2019, MCKIP has 10 committed projects with a total investment of over RM18 billion (RMB 30 billion) and is expected to create 20,000 jobs in the area. The first investment project in MCKIP is a modern integrated steel mill, while the second project is a concrete spun pile manufacturing plant which is already operational. MCKIP's targeted industries are steel and non-ferrous metals, machinery and equipment, automotive components, clean technology and renewable energy, oil and gas and petrochemicals, electric and electronic components, and research and development. Noting that this is a twin park project, the Ministry of International Trade and Industries has also encouraged more Malaysian companies to invest in CMQIP.

Any discussion about MCKIP would not be complete without mentioning Kuantan Port. According to the Ministry of Transport's Annual Transport Statistics 2017, Kuantan Port is seventh in total cargo throughputs in Malaysia. The port's handling capacity is expected to double to 52 million metric tons when the new deep-water terminal (Phase 2 expansion) is completed. Kuantan Port obtained Free Zone port status in March 2019, and recently established a Free Trade Zone on 1 April 2019.

In a presentation entitled "The Economic Impact of MCKIP: Preliminary Findings, Gaps and Future Research" at the 2nd Seminar on the Twin Parks Cooperation between Malaysia and China and Belt and Road Forum 2019, Tham (2019) noted that Kuantan Port's trade structure is likely to change from resource-based products to more manufactured products with more manufacturing activities taking place in MCKIP.

The long-term development of the region and country, types of employment generated, transfer of technology, and local sourcing opportunities should remain as key criteria in any foreign direct investments. With two companies now operating at MCKIP, it is expected that more far-reaching economic spillover effects resulting from the development of MCKIP will only be noticeable after a lengthy period of time.

2. Penang's Macroeconomic Performance

2.1 Output performance

Penang's economic growth has moderated to 3.8% in 2019, down by 1.3 percentage points compared with the GDP growth rate in 2018 (Table 2.1). It is noteworthy that Penang's contribution to the national GDP has remained at 6.7% in 2019, with the manufacturing sector being the second-largest contributor to the sector at the national level. Unlike 2018, all economic sectors registered positive growth rates in 2019, although slower growth was recorded in the manufacturing and services sectors.

Table 2.1 Penang's GDP, growth rate, and contribution to national GDP, 2017–19 (at constant 2015 prices)

	2017	2018	2019
GDP (RM million)	86,768	91,226	94,663
GDP growth rate (%)	5.2	5.1	3.8
Contribution to national GDP (%)	6.7	6.7	6.7

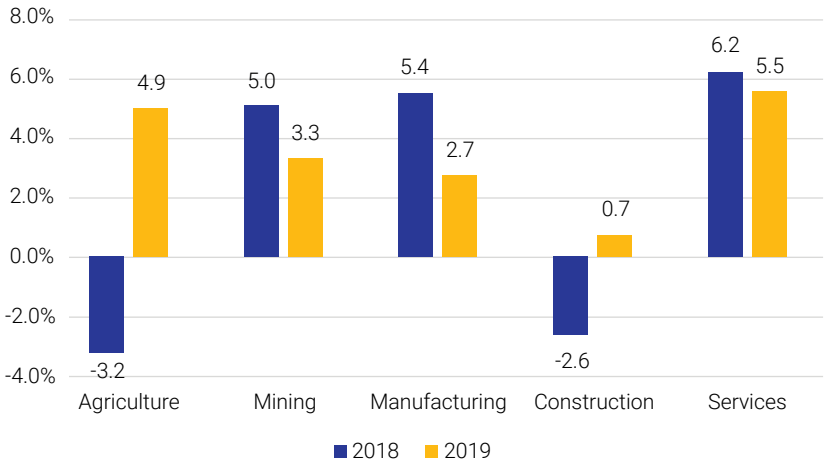
Source: Department of Statistics, Malaysia.

The services sector remained as the main growth engine for Penang's economy in 2019, accounting for 51.4% of the state's GDP. The sector's growth rate slowed down by 0.7 percentage point to 5.5%, with utility, transport, and storage and information and communication recording the largest growth (6.9%), followed by wholesale and retail trade, food and beverage, and accommodation (6.4%), and finance and insurance, property, and business services (5.4%) (Figure 2.1). All services sub-sectors recorded a lower growth rate in 2019 except finance, insurance, property, and business services. This was particularly due to the continued expansion of advanced business services brought about by a number of multinational global business services (GBS) companies such as Monitor ERP[4] and UST Global[5]. While advanced business services continue to grow, the main services sub-sector for Penang is still wholesale and retail trade, food and beverage, and accommodation, which are closely related to tourism-related activities. This sub-sector made up 16.8% of the state's GDP.

While Penang remained as the country's second-largest manufacturing sector after Selangor, it grew modestly at 2.7% in 2019. The growth rates of all manufacturing sub-sectors were lower in 2019 compared with the previous year except petroleum, chemical, rubber, and plastics products. This was partly to the result of a lower inflow of investments approved in previous years, bringing down the realised projects and growth rates (at RM5.8 billion in 2018 compared with RM10.8 billion in 2017). For 2019, Penang recorded its highest-ever approved investment at RM16.9 billion, ranking second after Selangor. As the backbone of the state, E&E and optical products had a lacklustre performance with an output growth of only 2.5% in 2019 compared with 6.3% in 2018. Petroleum, chemical, rubber, and plastics products had the largest growth rate of 4.7%, followed by transport equipment and other manufacturing and repair equipment (3.3%). E&E and optical contributed 28.4% of total state's GDP.

[4] Monitor ERP System provides business process management software supplier for companies in Southeast Asia (Persson, 2018).
[5] A digital technology and software solutions company.

Figure 2.1 GDP growth rate by sector in Penang, 2018–19 (at constant 2015 prices)



Source: Department of Statistics, Malaysia.

Table 2.2 Percentage share of economic activity to Penang's GDP, 2017–19 (at constant 2015 prices)

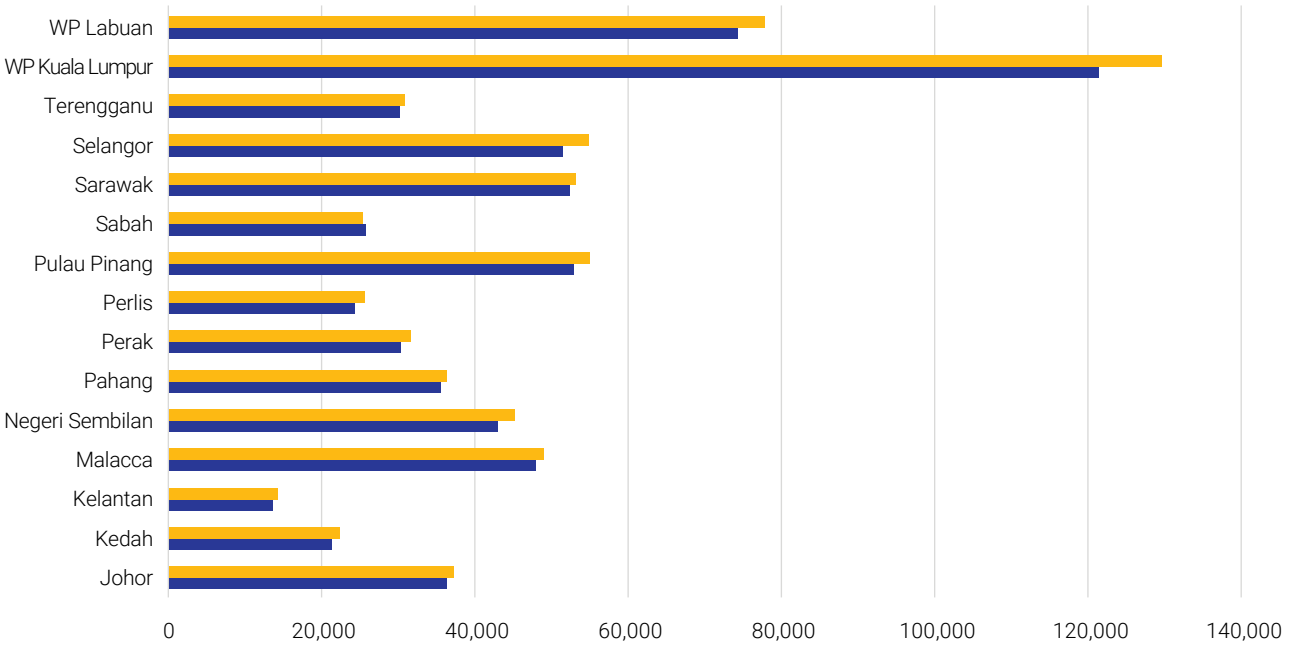
	2017	2018	2019
Agriculture	2.3	2.2	2.2
Mining and quarrying	0.2	0.2	0.2
Manufacturing	43.1	43.3	42.8
Construction	3.1	2.9	2.8
Services	50.1	50.6	51.4

Source: Department of Statistics, Malaysia.

Considering Penang's highly industrialised nature and limited land size, the agriculture sector contributes only 2.2% to Penang's GDP (Table 2.2). However, this sector plays an important role in overall growth and poverty reduction through linkages with the manufacturing sector and connecting the poor along the agri-supply chain. The sector grew significantly in 2019, rebounding from a deep contraction of 3.2% in 2018 to an expansion of 4.9%, primarily because of favourable weather conditions. The mining and quarrying sector's share, on the other hand, still accounted for less than 1% of Penang's GDP in 2019; this has not changed significantly since 2010. The contribution of the construction industry to Penang's GDP is lower in 2019 owing to the continued weakening of the Malaysian property market.

In parallel with the national economy, the state's economy is set to soften significantly in 2020 as a result of the impact of the COVID-19 pandemic. All economic activities are expected to experience a downturn, with the services sector seeing the largest impact, followed by manufacturing. Manufacturing activities are dependent on external headwinds; lockdowns in other countries have resulted in supply-chain disruptions, especially for companies that are based in Penang. While the construction and agriculture sectors constitute a small percentage of the state's GDP, the sectors will likely perform poorly owing to weak demand for residential and non-residential properties and weak export demand for agriculture. Small-medium enterprises (SMEs) in all sectors are affected by the lockdown and many may not be able to survive even after the economy reopens (Box 2.1).

Figure 2.2 GDP per capita by state, 2018–19 (current prices)



	Johor	Kedah	Kelantan	Malacca	Negeri Sembilan	Pahang	Perak	Perlis	Pulau Pinang	Sabah	Sarawak	Selangor	Terengganu	WP Kuala Lumpur	WP Labuan
2019p	37,311	22,341	14,286	49,052	45,209	36,404	31,626	25,625	55,062	25,333	53,230	54,807	30,902	129,589	77,800
2018e	36,369	21,394	13,677	47,939	43,010	35,543	30,289	24,401	52,923	25,832	52,392	51,539	30,190	121,444	74,263

Note: e - estimate, p - preliminary
Source: Penang Institute estimates based on data from Department of Statistics, Malaysia.

While Penang's GDP growth has slowed by half, its GDP per capita registered a higher rate of growth at 4% in 2019, up 0.4 percentage point compared with 2018, or RM55,062 compared with RM52,923 in 2018. This reflects an improved standard of living in the state. The state maintains its ranking at the top (without taking into account federal territories such as Kuala Lumpur and Labuan) in GDP per capita across the country (Figure 2.2). This suggests that Penang is relatively more prosperous than other states, holding all other variables constant.

Box 2.1 Effects of COVID-19 on small-medium enterprises (SMEs) in Penang's sectoral economy

By Yeong Pey Jung

The coronavirus disease 2019 (COVID-19) pandemic has plunged the SME industry into turmoil. Businesses involved in the production of non-essential goods have been directed to cease operations for the duration of the MCO. This is also applicable to businesses involved in non-essential services and sectors. As a result, workers and employees of these businesses are restricted to working from home. For those unable to work remotely, they face temporary suspension without pay, or worst, unemployment.

Under the present situation, most of the negatively affected SMEs were projected to see zero cash inflow from April to June (Shanker, 2020). The SMEs also found that the assistance afforded to them under the Prihatin Rakyat Economic Stimulus Package will not be sufficient as a significant proportion of SMEs do not quality for loan relief measures as announced by the government (Shanker, 2020). An additional stimulus package, known as the Second Economic Stimulus Package 2020, was announced on 27 March, and caters specifically to SMEs, and provided additional relief measures. Realistically, however, these are still short-term measures. Without more encompassing measures and policies, SMEs are still expected to struggle in the post-MCO period (Lee, 2020).

The five sectors of the state's economy include agriculture, mining, manufacturing, construction, and services. SMEs are integral drivers of each sector. In 2015, 66,921 of 67,591 businesses in Penang were SMEs, or 99.0% of all business establishments. The MCO has negatively impacted Penang's SMEs, leading to huge losses to the state's economy.

Table 2.3 Principal statistics of SME by sector, Penang, 2015

Sector	Number of establishments		Value added		Number of persons engaged		Salaries and wages paid	
	Total	%	Total (RM million)	%	Total	%	Total (RM million)	%
Agriculture								
Total	486	100.0%	1,064	100.0%	4,998	100.0%	92	100.0%
SMEs	470	96.7%	349	32.8%	4,021	80.5%	71	77.2%
Construction								
Total	2,888	100.0%	3,474	100.0%	71,403	100.0%	1,943	100.0%
SMEs	2,804	97.0%	1,823	52.5%	43,463	60.9%	1,046	53.8%
Manufacturing								
Total	4,191	100.0%	34,294	100.0%	272,241	100.0%	10,431	100.0%
SMEs	4,021	95.9%	8,223	24.0%	102,507	37.7%	2,791	26.8%
Services								
Total	59,997	100.0%	24,061	100.0%	291,279	100.0%	6,553	100.0%
SMEs	59,600	99.3%	19,743	82.1%	253,307	87.0%	5,350	81.6%

Source: Penang Institute estimates based on data from Economic Census, MyState Statistics, Penang, 2016 and Economic Census, Profile of Small and Medium Enterprises, 2016, Department of Statistics, Malaysia.

SMEs in the services industry were the biggest contributors to the sector in 2015[6], accounting for 99.3% of all business establishments and contributing 82.1% of the value added. Additionally, they were responsible for providing 87.0% of jobs within the sector, and paid 81.6% of salaries. Comparatively, manufacturing SMEs contributed the least to their sector in terms of value added (24.0%), number of persons engaged (37.7%), and salaries paid (26.8%). SMEs accounted for 95.9% of total business establishments in the Penang manufacturing sector.

Table 2.4 Percentage contribution of all sectors and SMEs in all sectors to Penang's total economy, 2015

Percentage contribution	Agriculture		Construction		Manufacturing		Services	
	Total	SMEs	Total	SMEs	Total	SMEs	Total	SMEs
Establishments	0.7%	0.7%	4.3%	4.1%	6.2%	5.9%	88.8%	88.2%
Value added	1.7%	0.6%	5.5%	2.9%	54.3%	13.0%	38.1%	31.3%
Persons engaged	0.8%	0.6%	11.1%	6.8%	42.4%	16.0%	45.4%	39.5%
Salaries and wages paid	0.5%	0.4%	10.2%	5.5%	54.7%	14.6%	34.4%	28.1%

Source: Penang Institute estimates based on Economic Census, MyState Statistics, Penang and Economic Census, Profile of Small and Medium Enterprises, Department of Statistics, Malaysia.

The contribution of SMEs in the agriculture sector to the economy is relatively small, standing at less than 1.0% across all parameters (Table 2.4). In terms of value added, agricultural SMEs accounted for approximately one-third of the sector's overall contribution towards the economy. The agriculture sector would be the least affected comparatively by the pandemic as foods are essential goods, and businesses are allowed to operate as usual (Kementerian Sumber Manusia, 2020; Majlis Keselamatan Negara, 2020a; Majlis Keselamatan Negara, 2020b). SMEs are expected to fare better as raw food materials continue to be in demand.

SMEs in the construction sector employed 6.8% of the total workforce, in addition to paying 5.5% of total salaries. The construction sector is deemed as non-essential and are not permitted to operate during the MCO. A post-pandemic recovery is expected to be slow as the sector may face a shortage of workers, risking productivity (Sivalingam, 2020). SMEs in this sector will face challenges in regaining their footing.

SMEs in manufacturing contribute 13.0% to the economy in terms of value added, and provide jobs to 16.0% of the workforce. Only half of the manufacturing sub-sectors are allowed to operate during the MCO, mainly in the manufacture of food, pharmaceutical, and chemical products, while the remainder, such as the manufacture of apparel, furniture, and textiles were ordered to cease operations (Choy et al., 2020). SMEs in the latter sector see zero revenue and production during the MCO, which would heavily impact cash flow and their buffer for fixed expenses, and the companies are expected to face challenges when operations resume.

SMES in the services sector accounted for 88.2% of Penang's total enterprises, and they were also responsible for 39.5% of the workforce. Only five sub-sectors in the services sector are classified as essential services during the MCO, although some services, such as professional, scientific, and technical services are able to continue operations as they can be conducted remotely (Choy et al., 2020). Some retail services are allowed to operate as well if they fall under the category of food and pharmaceutical supplies.

[6] The latest data published and available is for 2015. Therefore, this will be the reference data for this section.

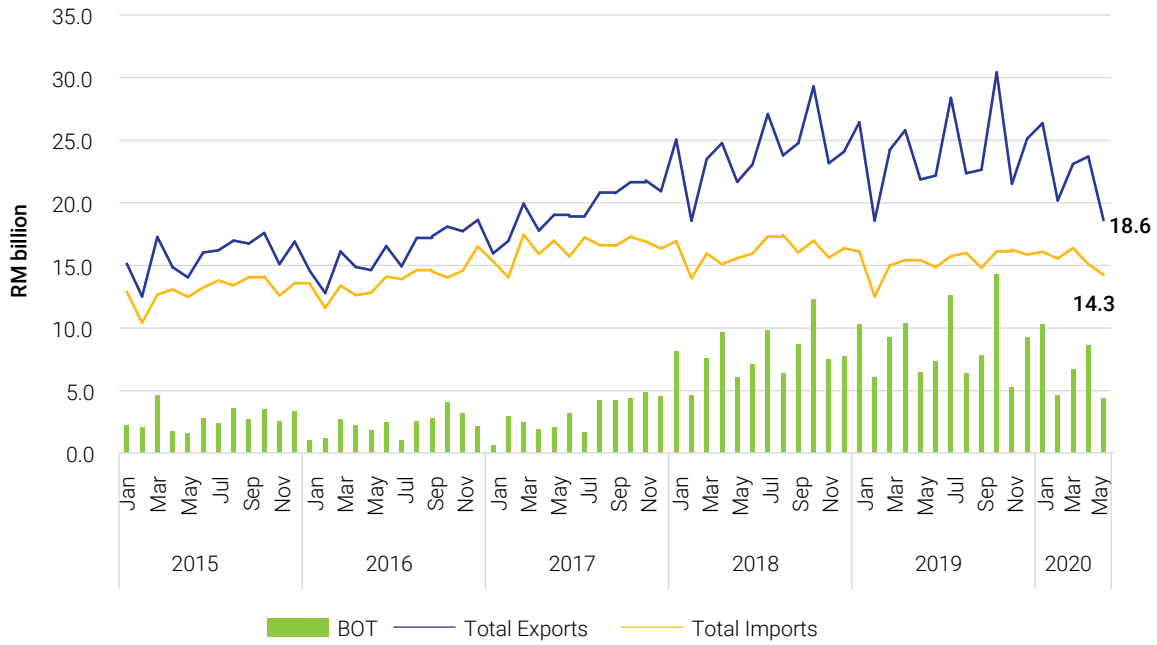
Non-operational SMEs in non-essential services will be negatively impacted, seeing no sales and revenue for the duration of the MCO. The retail sector will face especially significant challenges as the economic recession will see less spending on luxury and non-essential goods. SMEs involved in the tourism sector will be hit hardest, and these SMEs will struggle to maintain their businesses, given that tourism is not expected to recover in the short term[7].

Overall, SMEs in Penang contributed 47.9% to the state's economy in 2015 in terms of value added. Concurrently, SMEs provided employment to 63.0% of the workforce, and accounted for 48.1% of total salaries and wages[8]. It is essential that Penang SMEs receive the necessary support to sustain their businesses and operations in the post-pandemic period. Sustainable policies must be developed to ensure the survival of the industry.

2.2 External trade performance

During 2017–19, the balance of trade (BOT) in Penang was positive, indicating that the export value in the aforementioned period was higher than the import value. More than just a continuous trend, the BOT in the same period recorded a higher growth rate, further establishing Penang as a major export-oriented manufacturing hub in Malaysia[9]. This is represented in Figure 2.3, illustrating a widening gap between export and import values from 2017 to 2019.

Figure 2.3 Exports, imports, and balance of trade in Penang, January 2015–May 2020



Source: Department of Statistics, Malaysia.

[7] See page 129, Box 3.4 for more information.
[8] These percentages include the 0.1% (for value added, persons engaged, and salaries paid) contributed by SMEs in the mining sector.
[9] While this is true as evidenced in other chapters of this report, it is acknowledged that drawing a conclusion on Penang-specific performance solely from trade data may be positively biased. This is because other Malaysian states in the northern region utilise trade gateways (sea port and airports) in Penang given the absence of such gateways in other states.

A closer look at export performance shows that, in 2017, 2018, and 2019, Penang recorded growth rates of 20.7%, 23.7%, and 0.2%, respectively (Table 2.5). Import performance, on the other hand, showed a negative trend; -1.6% in 2018 and -4.7% in 2019. The significant fluctuation in growth rates over the period is consistent with the uncertainty in the global market owing to the US-China trade war which began in April 2018 (Box 2.2).

It is notable that the import value has consistently varied only within a small range of deviation despite the significant increase in export value. This indicates that Penang is not heavily dependent on imports for the production of manufactured goods. Penang has a robust manufacturing ecosystem of local suppliers, and the credible disassociation between imports and exports positions Penang as a preferred manufacturing hub to weather global uncertainties. Such a disassociation enables Penang to quickly adapt to global trade shocks, both in terms of quickly scaling capacity to meet demand shocks or become partially insulated from supply shocks.

Box 2.2 The US-China trade war and its effects on Malaysia

By Yeong Pey Jung

China's ascension to the World Trade Organisation (WTO) in 2001 has resulted in the rapid rise of its foreign trade and economic development. Today, China is one of the two biggest economies in the world, with the other being the United States. China and the United States are also each other's biggest trading partners, with bilateral trade totalling an approximate $559 billion in 2019 (South China Morning Post, 2020). However, the United States maintained a disproportionate trade deficit against China, a deficit that was a significant point of contention in the 2016 US presidential campaign. Then-Republican candidate Donald Trump blamed the deficit on unfair manipulative Chinese trade practices and vowed to close the trade gap as part of his campaign.

The strain on the US-China trade relationship intensified once Trump assumed the presidency in 2017. The beginning of the trade war was marked by Trump filing a case against China in the WTO in March 2018 for the latter's inequitable licensing practices, in addition to signing a memorandum that imposed tariffs on Chinese products and restricted investments in vital technology sectors. In April, the United States threatened China with its first set of 25% tariffs on 1,333 Chinese products, which covers $46.2 billion of US imports. China responded by imposing a 25% tariff on 106 products, amounting to $50 billion of Chinese imports (Bown & Kolb, 2020).

Amid tensions arising from the United States' decision to sanction US businesses from doing business with Chinese telecommunications giant ZTE, trade discussions were held between the United States and China in a bid to reach an agreement. The United States' demand that China reduce the trade deficit by $2 billion in two years was not met, and the talks ended without a resolution (Wong & Koty, 2020). Both countries then moved to finalise the list of products subjected to 25% tariffs, to be implemented in two phases. At the same time, President Trump demanded for the identification of another $200 billion products—mostly intermediate and consumer goods—to be subjected to a 10% tariff.

6 July 2018 marked the official execution of the first phase of China-specific tariffs, in parallel with China's own enactment of US-specific tariffs. The second phase, where respective lists of products were further revised, came into effect in August 2018, signifying the completion of the US-China's $50 billion tariffs (Bown & Kolb, 2020). In the same month, the United States contemplated increasing the original tariff rate of 10% on the $200 billion worth of Chinese goods identified in June to 25%. China retaliated by threatening to impose 5–25% tariff rates on $60 billion in US imports. These new tariffs came into effect in September, with the United States imposing a 10% tariff which increased to 25% in January 2019, and China enforcing its own 5–10% tariff rates (Wong & Koty, 2020).

The increase in tariff rates was suspended temporarily as President Trump and President Xi Jinping embarked on another round of trade negotiations in December 2018, with the aim of reaching a resolution by 1 March 2019. These discussions were not successful, and $200 billion in Chinese imports were then subjected to a 25% tariff rate in May 2019. China reacted by increasing its initial tariff rate to match the US rate of 25% (Bown & Kolb, 2020). The relationship between the two economic superpowers then worsened with the United States placing Huawei Technologies and its affiliates on its "entity list", effectively prohibiting American companies from doing business with Huawei without government approval.

Tensions were further escalated in August 2019 when President Trump threatened a 10% tariff on an additional $300 billion worth of Chinese products, then accused China of being a currency manipulator. China reacted by revealing plans to impose tariffs on $75 billion worth of US goods. The United States, then the tariffs to 15%, in addition to increasing the current 25% tariffs to 30% (ibid).

Trade talks resumed in September and October 2019, with mid-level talks taking place in September, in preparation for high-level negotiations in October. China agreed to exclude certain imports from tariffs, such as certain agricultural products and cancer drugs, while the United States delayed the increase in tariffs on $250 billion of Chinese goods by two weeks (Wong & Koty, 2020).

The two countries reached a tentative consensus after a two-day meeting held on 10 and 11 October 2019, where a "Phase 1" deal was announced. As part of the agreement, China will strengthen its intellectual property provisions, revise rules on currency management in addition to purchasing $40–50 billion in US agricultural goods per year (Mason & Lawder, 2019). The United States called off the 30% tariff hike that was scheduled to come into effect in December 2019.

The Phase 1 trade deal was signed on 15 January 2020, and US tariffs were decreased to boost China's purchase of US goods in an effort to correct the trade balance. Although certain tariffs have been reduced, most tariffs remain in effect. The specifics of the Phase 1 deal was not made public owing to concerns that disclosures could lead to market distortions (Wong & Koty, 2020). It remains to be seen, however, whether US-China trade talks will continue smoothly in light of the COVID-19 pandemic; the United States has accused China of hiding vital information about the containment of the virus, thus creating new tensions.

As a neutral party, Malaysia has seen some benefits from the US-China trade war. In the years leading up the trade war, Penang's position as one of the world's most important electronics manufacturing hub had been threatened by Chinese cities such as Shenzhen (Jamrisko & Shukry, 2019). As US businesses and factories look for alternatives supply chains outside of China in a bid to escape the escalating tariffs, Penang has emerged as an obvious choice for some companies. The Free Trade Zone and Batu Kawan Industrial Zone have a long-established and proven ecosystem of suppliers and customers (Straits Times, 2019). Penang's FDI increased by 136% to RM8.7 billion in the first half of 2019. In comparison, the FDI for the state in 2018 was RM2.1 billion. Additionally, 35% of Malaysia's approved FDI in 2019 was targeted at Penang. Factories in Penang are seeing opportunities for Penang to reclaim its role in the electronics value chain.

However, Penang had not been exempted from shocks and disruptions to the global supply chain brought on by the pandemic. Amid the uncertainty, it is difficult to predict the effects of the trade war on Penang's economy.

Table 2.5 Growth rate of exports and imports by SITC commodity section in Penang, 2017–20 (January–May)

SITC commodity section	2016/17		2017/18		2018/19		Jan–May 2019/20	
	Export (%)	Import (%)	Export (%)	Import (%)	Export (%)	Import (%)	Export (%)	Import (%)
Food	6.6	5.6	-4.8	-15.6	4.7	-1.3	-4.4	6.9
Beverages and tobacco	35.4	9.6	-13.6	-15.7	-23.9	-16.8	-55.7	-32.3
Crude materials, inedible	64.9	66.9	-17.3	-11.5	-15.8	-4.1	-10.8	-3.2
Mineral fuels, lubricants, etc.	1,194.6	23.7	-54.7	28.3	-73.0	-14.5	-50.7	-26.2
Animal and vegetable oils and fats	10.1	89.3	-20.1	-46.1	-1.8	-30.2	-2.9	-40.8
Chemicals	22.4	18.4	2.4	6.4	-7.0	-9.8	-15.6	-7.9
Manufactured goods	10.4	10.7	6.2	11.0	-0.8	-9.5	-24.2	-10.1
Machinery and transport equipment	17.4	17.5	32.1	-4.1	0.5	-3.1	-5.7	12.8
Miscellaneous manufactured articles	28.6	9.6	12.1	14.8	4.3	0.9	8.9	3.2
Miscellaneous transactions and commodities	158.9	35.4	-36.8	-14.0	-52.0	-17.2	-7.2	-59.1
Total	**20.7**	**18.2**	**23.7**	**-1.6**	**0.2**	**-4.7**	**-4.2**	**3.9**

Source: Department of Statistics, Malaysia.

Table 2.5 distills the growth rate of exports and imports in Penang by SITC commodity section. Looking solely at trade performance between 2017 and 2019, we find that some commodity sections recorded extremely erratic growth rates. Mineral fuels, lubricants, etc., for example, recorded a negative export growth rate of -54.7% and -73.0% in 2018 and 2019, respectively. Import growth rates of animal and vegetable oils and fats fluctuated significantly: 89.3% in 2017, -46.1% in 2018, and -30.2% in 2019.

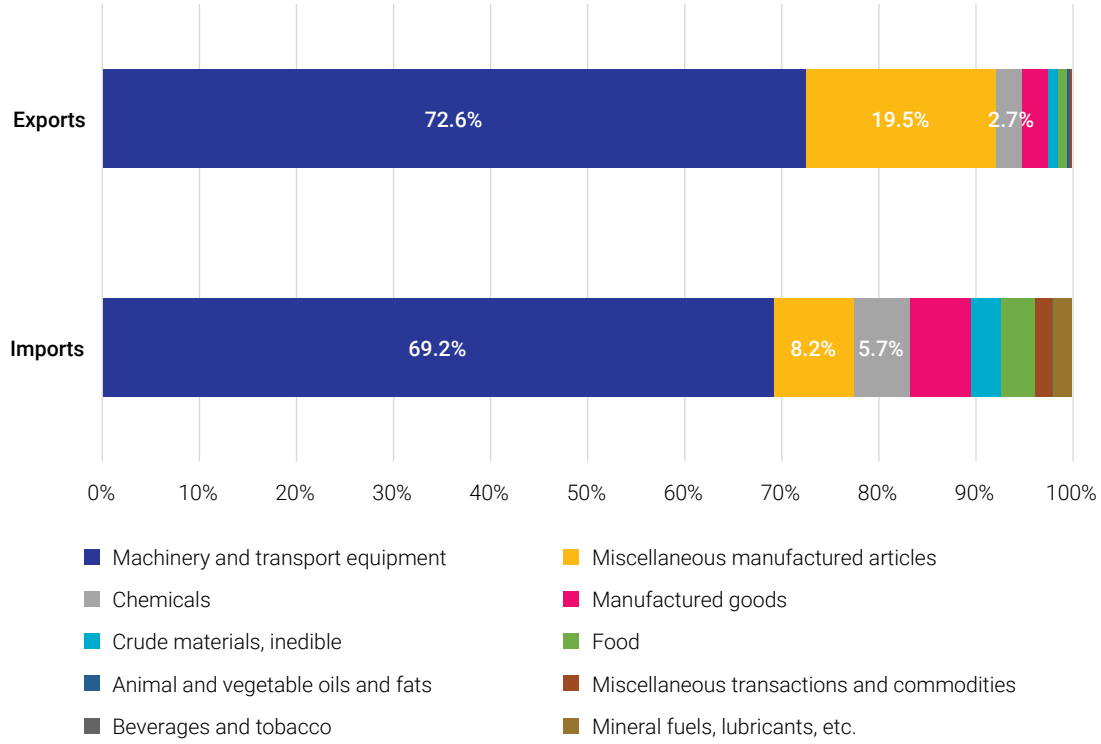
These outliers strongly reflected the position of Penang's shipping port as characterised by its niche functionality. Penang's shipping gateway may be utilised for a specific function by only one industry player (Lee et al., 2020). Such dynamics result in a pass-through effect, where the recorded trade value may only reflect firm-specific business cycles rather than as an indicator of common industry-wide market signalling.

In 2020, exports decreased by 4.2% during January–May compared with the same period in 2019. On the other hand, imports registered growth of 3.9%. A closer look at the monthly data shows that both imports and exports suffered large losses in January and May 2020. The slowdown at the beginning of the year is possibly due to a contraction in Chinese manufacturing, which had knock-on effects on Penang's ability to meet orders from customers worldwide. The subsequent drop in May is a reflection of the economic pessimism that began to unfold not only in Malaysia, but major economic hubs as well, as countries slid into severe recessions.

Overall trade of almost all commodities have contracted except for food, machinery and transport equipment, and miscellaneous transport equipment, which saw growth in imports. Export and import values of mineral fuels and lubricants fell by 50.7% owing to historically low prices and drastically decreased fuel demand.

Looking at the overall trend, however, the trade performance of established sectors in Penang are on a trajectory of robust growth. Machinery and transport equipment and miscellaneous manufactured articles, two commodity sections that make up a significant portion of the E&E and medical devices industries, remain important nodes in connecting Penang to the global value chain (Figure 2.4). Broadcom's newly established global distribution warehouse at Batu Kawan Industrial Park was earmarked to boost exports by RM65 billion in 2018 (Tan, 2017). Notably, exports for both commodity sections outweighed imports in contrast with other commodity sections where the reverse situation is observed.

Figure 2.4 Percentage share of exports and imports by SITC commodity section, Penang, January–May 2020



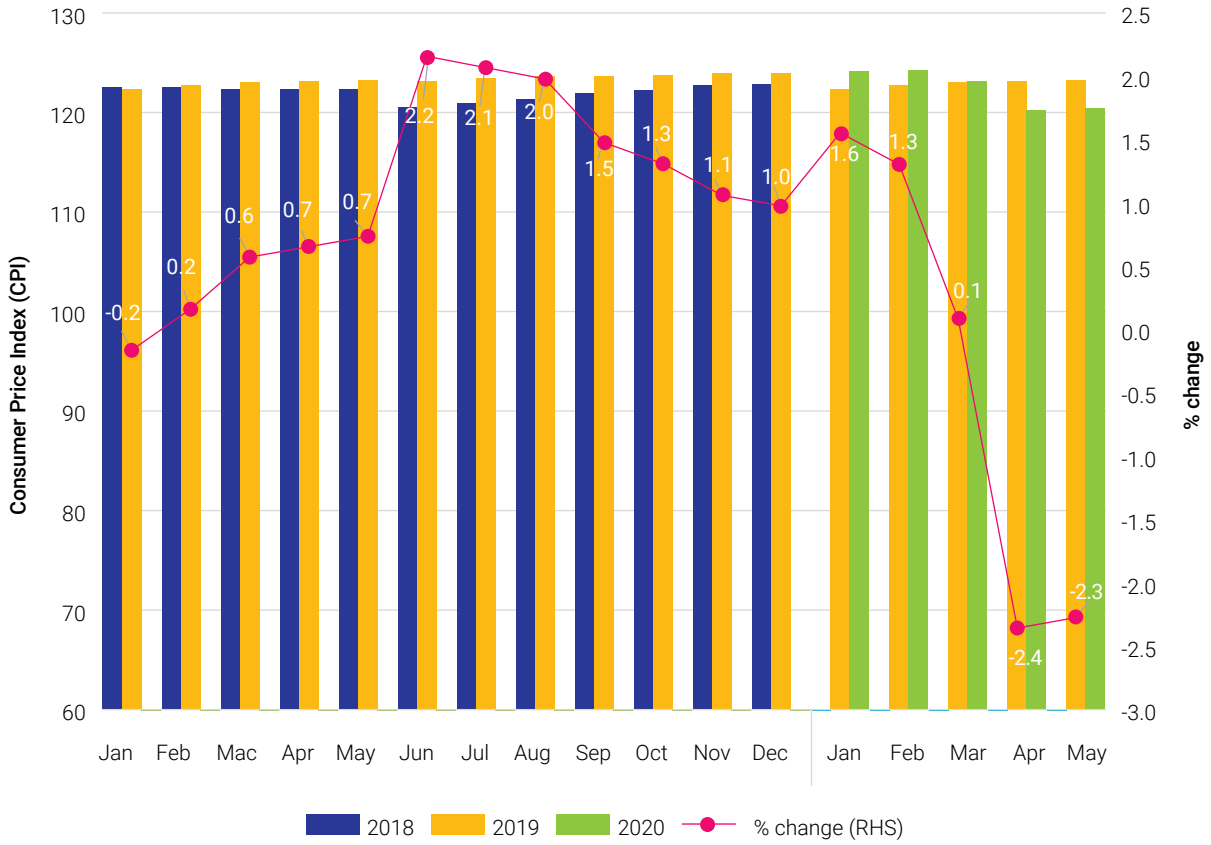
Source: Department of Statistics, Malaysia.

2.3 Prices

Consumer Price Index (CPI)

Penang recorded an inflation rate of 1.1% for 2019, 0.2% higher than the inflation rate of 0.9% in 2018. It should be noted, however, that the 2018 inflation rate was 3.1% lower than the preceding year due to the removal of the Goods and Services Tax (GST) and a three-month tax exemption period. With the Sales and Services Tax (SST) in effect from September 2018 onwards, the inflation rate saw only a slight increase as the SST only taxed 38% of the goods and services in the Consumer Price Index (CPI) basket, compared with the 60% taxed by the GST.

Figure 2.5 CPI and year-on-year percentage change in the CPI in Penang, 2018–19



Source: Penang Institute estimates based on data from Department of Statistics, Malaysia.

In the first quarter of 2019, the CPI recorded an average increase of 0.3%, which then spiked throughout the year. Figure 2.5 shows that the percentage change in CPI was significantly higher in the months of June to September in 2019 due to the aforementioned tax exemption period in the previous year. In these three months, most items in the CPI basket saw a rise in prices. With percentages of 3.4% to 4.2%, miscellaneous goods and services observed the highest price increases, while education had the lowest price increases, ranging from 0.3% to 0.4%. Clothing and footwear, as well as transport, were the only groups to experience a consistent deflation in prices, which was also reflected in the overall yearly changes.

In 2020, the CPI saw a drop from February to March, before dropping further to indicate deflation for the months of April and May. This is largely due to the lockdown measures brought about by the COVID-19 pandemic, in addition to the pandemic itself. Along with the fact that the restricted movement meant fewer opportunities to spend, the purchasing power of consumers is presumed to have declined because of financial difficulties. Non-essential items such as clothing and footwear, and alcoholic beverages and tobacco both saw reductions in price. Transport experienced the biggest decrease in prices, with prices dropping by 24.6% in April in comparison with the 10.6% reduction in the previous month. The fall in global oil prices and the MCO would explain this decrease. The only group to see a significant increase in prices was miscellaneous goods and services. The CPI changes for other groups are not substantially pronounced.

Table 2.6 Changes in CPI by groups, Penang, 2018–19 (2010 = 100)

	Weights	% Change		Contribution to CPI growth (percentage points)	
		2018	2019	2018	2019
Total	**100.0**	**0.9**	**1.1**	**0.92**	**1.05**
Food and non-alcoholic beverages	28.4	1.7	1.9	0.47	0.53
Alcoholic beverages and tobacco	2.3	0.3	2.4	0.01	0.05
Clothing and footwear	3.0	-1.8	-2.5	-0.05	-0.07
Housing, water, electricity, gas, and other fuels	29.2	1.5	2.2	0.45	0.65
Furnishings, household equipment, and routine household maintenance	3.3	-0.6	1.3	-0.02	0.04
Health	1.8	0.5	0.4	0.01	0.01
Transport	11.0	1.1	-3.7	0.13	-0.41
Communication	4.6	-1.1	0.4	-0.05	0.02
Recreation services and culture	5.2	-0.1	0.9	0.00	0.05
Education	1.7	0.0	0.3	0.00	0.01
Restaurants and hotels	2.8	1.1	1.6	0.03	0.05
Miscellaneous goods and services	6.7	-0.6	2.0	-0.04	0.14

Source: Penang Institute estimates based on data from Department of Statistics, Malaysia.

In terms of year-on-year percentage changes on specific items in the basket, alcoholic beverages and tobacco saw the biggest price increase of 2.4% in 2019, but only contributed 0.05 percentage point to CPI growth (Table 2.6). The highest contributor to CPI growth would be housing, water, electricity, gas, and other fuels, at 0.65 percentage point. In contrast, the transport group saw a deflation of 3.7% in comparison with an inflation of 1.1% in the previous year, and made a negative contribution of 0.41 percentage point towards CPI growth.

Although the abolishment of the GST saw lower prices for certain groups in 2018, the prices for most groups readjusted accordingly for the following year, most notably for services such as restaurants and hotels.

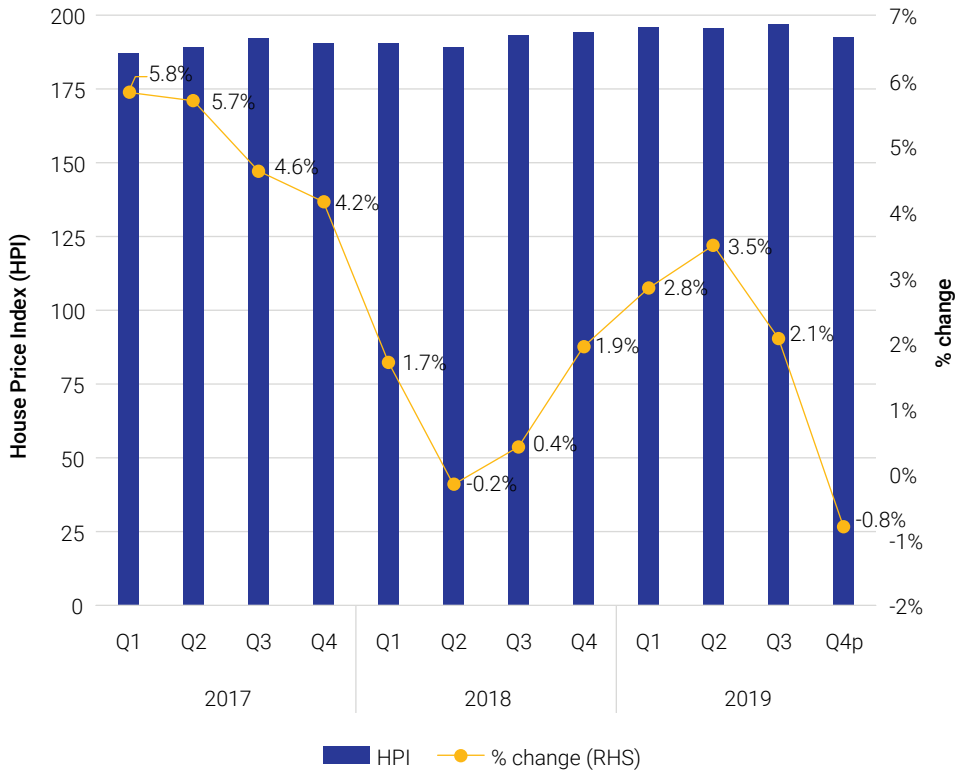
The inflation rate is expected to deflate for 2020 owing to the economic pressures brought about by the COVID-19 pandemic. As observed in Figure 2.5, the months of April and May saw the inflation rate decreasing to negative numbers, reflecting deflation. As the production of non-essential products were suspended during the MCO, the supply of these products has decreased. In a usual scenario, prices would increase because of reduced supply. However, people are unlikely to spend on non-essential items, and the reduced demand would lead to lower prices. The significant drop in current oil prices may also cause global deflationary shocks.

House Price Index (HPI)

Figure 2.6 illustrates that the House Price Index (HPI) for Penang has been increasing in the past three years. The overall HPI in 2019 was 195.3, a growth of 1.8% from an HPI of 191.7 in 2018, which is an increase from the previous year's growth of 1.0%. This growth rate is mostly attributed to the price increase across detached and semi-detached properties for the first three quarters. However, house prices fell across the board in the last two quarters of 2019, which saw the growth rate decreasing. In fact, a negative growth of -0.8% was recorded in Q4 2019, which also represented the lowest growth rate in three years.

House prices were mostly on an upward trend for the first three quarters of 2019, with terrace house prices being the sole exception, before falling in the last quarter (Table 2.7). The growth was mostly driven by the Detached House Price Index (DHPI) and High-rise House Price Index (HHPI), which averaged an increase of 1.7% across three quarters, whereas the price for semi-detached units averaged a three-quarter growth of 0.5%.

Figure 2.6 HPI and percentage of year-on-year change of the overall HPI in Penang, 2017–19



Note: p - preliminary
Source: Penang Institute estimates based on data from National Property Information Centre (NAPIC).

Table 2.7 HPI and percentage of year-on-year change of HPI in Penang by type of residential property in Penang, 2017–19

Year	Quarter	Terrace		High-rise		Detached		Semi-detached	
		HPI	% change	HPI	% change	HPI	% change	HPI	% change
2017	**Q1**	170.2	5.6%	208.1	7.4%	180.2	4.8%	183.3	2.1%
	Q2	174.1	7.2%	205.7	3.8%	185.2	5.5%	191.0	6.6%
	Q3	176.9	5.6%	209.4	1.8%	186.7	7.4%	193.4	7.4%
	Q4	175.0	6.3%	205.8	0.0%	188.8	11.3%	195.0	8.4%
2018	**Q1**	173.7	2.1%	202.6	-2.6%	197.3	9.5%	204.1	11.3%
	Q2	173.6	-0.3%	196.0	-4.7%	203.6	9.9%	209.6	9.7%
	Q3	176.2	-0.4%	201.5	-3.8%	204.8	9.7%	215.4	11.4%
	Q4	178.3	1.9%	201.3	-2.2%	208.2	10.3%	215.8	10.7%
2019	**Q1**	179.4	3.3%	205.5	1.4%	210.1	6.5%	211.7	3.7%
	Q2	175.0	0.8%	206.8	5.5%	213.9	5.1%	218.2	4.1%
	Q3	173.1	-1.8%	211.5	5.0%	219.3	7.1%	219.2	1.8%
	Q4p	170.5	-4.4%	203.6	1.1%	217.3	4.4%	217.6	0.8%

Note: p - preliminary
Source: Penang Institute estimates based on data from National Property Information Centre (NAPIC).

High-rise properties in particular rebounded from negative year-on-year growth in 2018, seeing an increase in its HPI for 2019. However, even though detached and semi-detached properties registered positive growth, their growth rates have slowed down from the previous year, with Q4 2019 achieving the lowest growth rates for the year.

Table 2.8 HPI and percentage of year-on-year change of HPI in Penang Island and Seberang Perai by type of residential property in Penang, 2017–19

Year	Quarter	Terrace				High-rise			
		Penang Island	% change	Seberang Perai	% change	Penang Island	% change	Seberang Perai	% change
2017	**Q1**	162.8	5.9%	179.7	5.1%	211.8	7.6%	149.6	2.5%
	Q2	164.8	7.4%	186.2	7.0%	209.1	3.8%	149.9	1.9%
	Q3	167.6	5.5%	189.0	5.7%	212.9	1.6%	153.8	5.6%
	Q4	161.7	3.5%	192.2	9.6%	209.0	-0.3%	154.5	6.6%
2018	**Q1**	162.1	-0.4%	188.7	5.0%	205.7	-2.9%	151.7	1.4%
	Q2	157.4	-4.5%	194.7	4.6%	198.8	-4.9%	152.0	1.4%
	Q3	159.2	-5.0%	198.3	4.9%	204.4	-4.0%	155.3	1.0%
	Q4	161.6	-0.1%	200.0	4.1%	204.2	-2.3%	156.0	1.0%
2019	**Q1**	160.7	-0.9%	203.7	7.9%	208.7	1.5%	153.7	1.3%
	Q2	156.5	-0.6%	199.0	2.2%	210.4	5.8%	148.8	-2.1%
	Q3	160.3	0.7%	198.7	0.2%	210.7	3.1%	150.0	-3.4%
	Q4p	152.9	-5.4%	193.4	-3.3%	206.9	1.3%	149.6	-4.1%

Note: 1. p - preliminary
2. The HPI for detached and semi-detached units are not disaggregated by councils.
Source: Penang Institute estimates based on data from National Property Information Centre (NAPIC).

The Terrace House Price Index (THPI) for both Penang Island and Seberang Perai has been seeing decreases since the beginning of 2019 (Table 2.8). In the same year, the popularity of high-rise properties on the island resulted in price increases in each quarter; in contrast, their prices were largely on the decline in Seberang Perai.

The THPI on Penang Island had been seeing negative year-on-year growth since the first quarter of 2018, whereas in Seberang Perai it was largely the opposite. The mainland saw positive growth for the same period, with the exception of Q4 2019, where it fell into negative growth. High-rise properties for the island, on the other hand, recorded positive growth in 2019 following negative growth in prices in the previous year. However, Seberang Perai registered negative growth since the second quarter of 2019, after having seen positive growth in the last two years. The growth rate for the last quarter of 2019 was significantly lower in comparison with previous quarters, with high-rise properties in Seberang Perai the only category to see positive growth (1.3%).

The HPI is expected to see a decrease in 2020 across all property types on both Penang Island and Seberang Perai because of the COVID-19 pandemic. The property market had been on a downward trend since the beginning of 2020 (Poh, 2020). The impending economic recession and uncertainty will lead to income and economic losses, negatively impacting buying sentiment and further reducing demand for properties. However, the industry is expected to recover in due time as transaction volumes and values had surged in the aftermath of similar crises such as the 1997 Asian financial crisis, the 2002 SARS epidemic, and the 2008 global financial crisis (Kathy, 2020). But because of the global scale of the COVID-19 pandemic, recovery will be comparatively slower.

2.4 Household income and expenditure

Household income

The median monthly household income for Malaysia recorded a compounded annual growth rate (CAGR) of 4.0%, while the compounded growth for mean monthly household income was 4.3% in 2019.

Table 2.9 Median and mean monthly household income and CAGR[10] by state, Malaysia, 2016–19

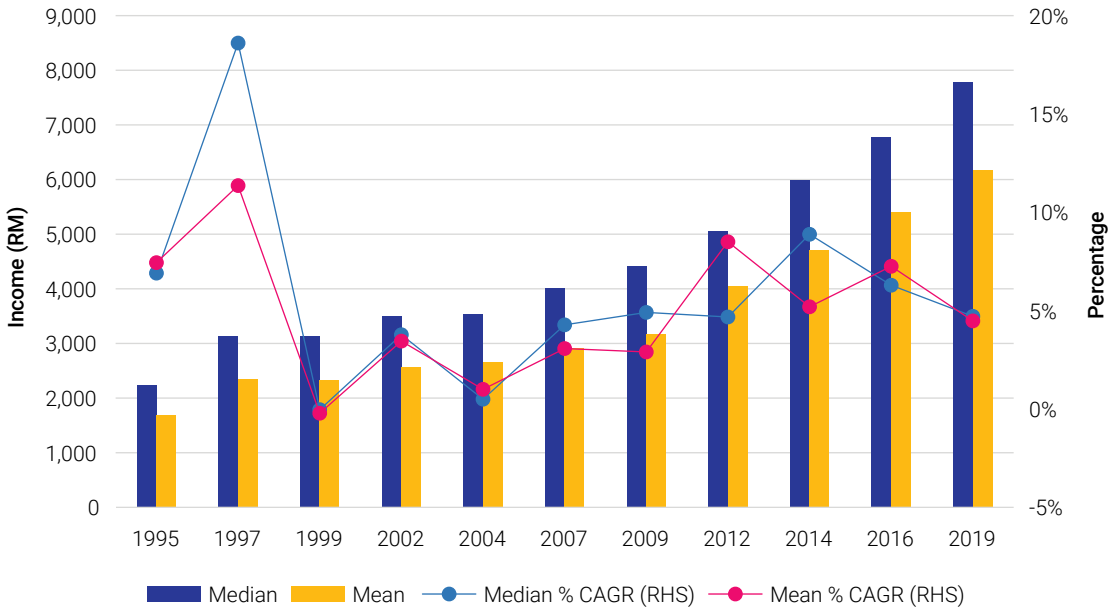
State	Median (RM)		Mean (RM)		CAGR (%)	
	2016	2019	2016	2019	Median	Mean
Malaysia	**5,228**	**5,873**	**6,958**	**7,901**	**4.0%**	**4.3%**
Johor	5,652	6,427	6,928	8,013	4.4%	5.0%
Kedah	3,811	4,325	4,971	5,522	4.3%	3.6%
Kelantan	3,079	3,563	4,214	4,874	5.0%	5.0%
Malacca	5,588	6,054	6,849	7,741	2.7%	4.2%
Negeri Sembilan	4,579	5,005	5,887	6,707	3.0%	4.4%
Pahang	3,979	4,440	5,012	5,667	3.7%	4.2%
Penang	**5,409**	**6,169**	**6,771**	**7,774**	**4.5%**	**4.7%**
Perak	4,006	4,273	5,065	5,645	2.2%	3.7%
Perlis	4,204	4,594	4,998	5,476	3.0%	3.1%
Selangor	7,225	8,210	9,463	10,827	4.4%	4.6%
Terengganu	4,694	5,545	5,776	6,815	5.7%	5.7%
Sabah	4,110	4,235	5,354	5,745	1.0%	2.4%
Sarawak	4,163	4,544	5,387	5,959	3.0%	3.4%
*Kuala Lumpur	9,073	10,549	11,692	13,257	5.2%	4.3%
*Labuan	5,928	6,726	8,174	8,319	4.3%	0.6%
*Putrajaya	8,275	9,983	11,555	12,840	6.5%	3.6%

**denotes Federal Territories*
Source: Penang Institute estimates based on Household Income Survey 2019, Department of Statistics, Malaysia.

[10] CAGR calculation: [(ending value/beginning value) ^ (1/periods)-1] x 100

Penang's median and mean monthly household income growth[11] was higher than the national average at 4.5% and 4.7%, respectively (Table 2.9). As a similarly developed state, Selangor's growth rates can be considered as on par with Penang's for both median income (4.4%) and mean income (4.6%). In Johor, the median income growth rate was slightly lower than Penang's at 4.4% but its mean income growth rate was higher at 5.0%. Kuala Lumpur, on the other hand, registered a higher growth rate for median income (5.2%) but its mean income growth was smaller at 4.3%. With a 5.7% growth rate, Terengganu was the state with the highest mean monthly household income growth rate for 2019. Meanwhile, the highest median monthly household income growth rate was found in Putrajaya, at 6.5%.

Figure 2.7 Median and mean household income and CAGR, Penang, 1995–2019



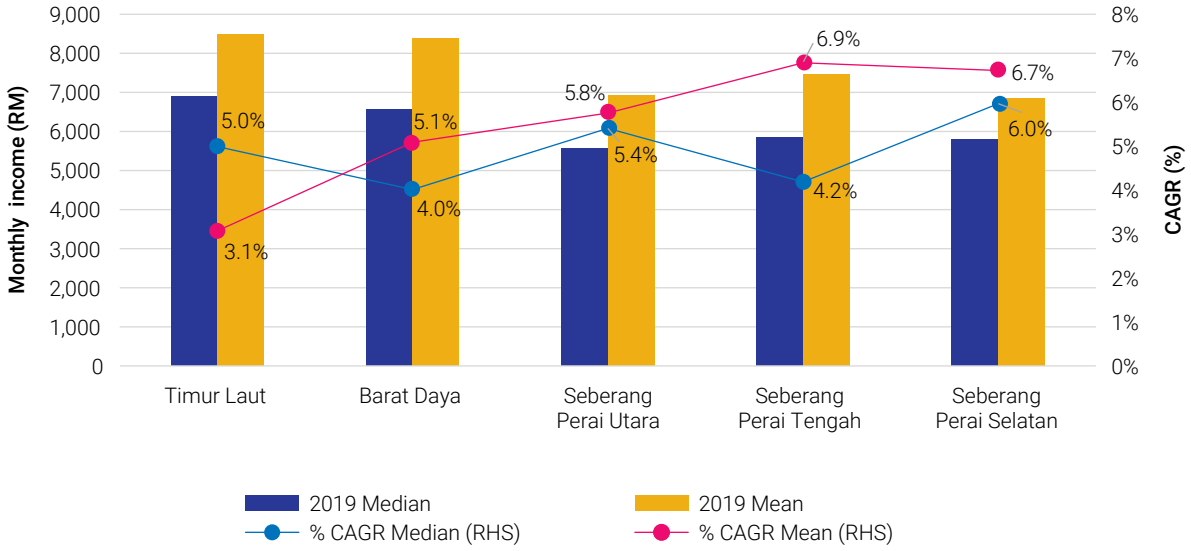
Source: Household Income Surveys, Department of Statistics, Malaysia.

Figure 2.7 illustrates the CAGR for Penang's median and mean monthly household income over a period of 24 years[12]. Both incomes saw an impressive spike in growth for 1997, with the median income achieving 18.6% growth, while growth in mean income was 11.4%. No other years in the same period came close to attaining similar growth rates. However, this was followed by a massive drop to zero growth for median income, and negative growth (-0.2%) for mean income in 1999. This was due to Malaysia being impacted negatively by the 1997 Asian financial crisis. The output of Malaysia's real economy declined heavily in 1998, with important sectors such as manufacturing (where it was, and still is, a vital sector for Penang's economy), construction, and agriculture all contracting, resulting in the country's economy going into a recession.

The gradual recovery of the economy saw household income growth rates increasing, and there were no other periods with negative growth rates since then. Growth rates for both measures of income hovered around rates below 5% for approximately a decade, before the median monthly household income saw a growth rate of 8.5% in 2012. The growth for mean income, however, had its highest growth rate of 5.2% in 2014 since the 1997 crisis. For 2019, Penang's median and mean monthly household income recorded growth rates of 4.5% and 4.7% respectively.

[11] Growth in section 2.4 is regarded as compounded growth unless otherwise indicated.
[12] Household income data for 1994 is not available, so 1995 is chosen as the starting point to illustrate growth over an approximate period of 25 years.

Figure 2.8 Median and mean monthly household income and CAGR by administrative district, Penang, 2016–19



Source: Penang Institute estimates based on data from Household Income Survey 2019, Department of Statistics, Malaysia.

With a median monthly household income of RM6,902 and a mean monthly household income of RM8,493, Timur Laut remained as having the highest incomes across all administrative districts in Penang for 2019, and this was no different from 2016 (median income: RM5,964; mean income: RM7,756) (Figure 2.8). Seberang Perai Utara's median income (RM5,566) was the lowest in 2019, but Seberang Perai Selatan recorded a lower mean income (RM6,843). There is a difference of 19.4% between both the highest and lowest median and mean incomes across districts. The income gap has narrowed when compared with 2016, where the income difference was 20.3% for median income and 27.4% for mean income.

Despite recording the highest mean income, Timur Laut's CAGR of 3.1% was the lowest across all districts, while its CAGR of 5.0% for median income was the third highest. Conversely, Seberang Perai Selatan, with a household income on the lower spectrum, recorded the highest CAGR for median income at 6.0%. The highest CAGR of 6.9% for mean income belonged to Seberang Perai Tengah. Even though household income for both categories were distinctively higher for administrative districts within Penang Island, the CAGR for administrative districts in Seberang Perai was higher than that of the island.

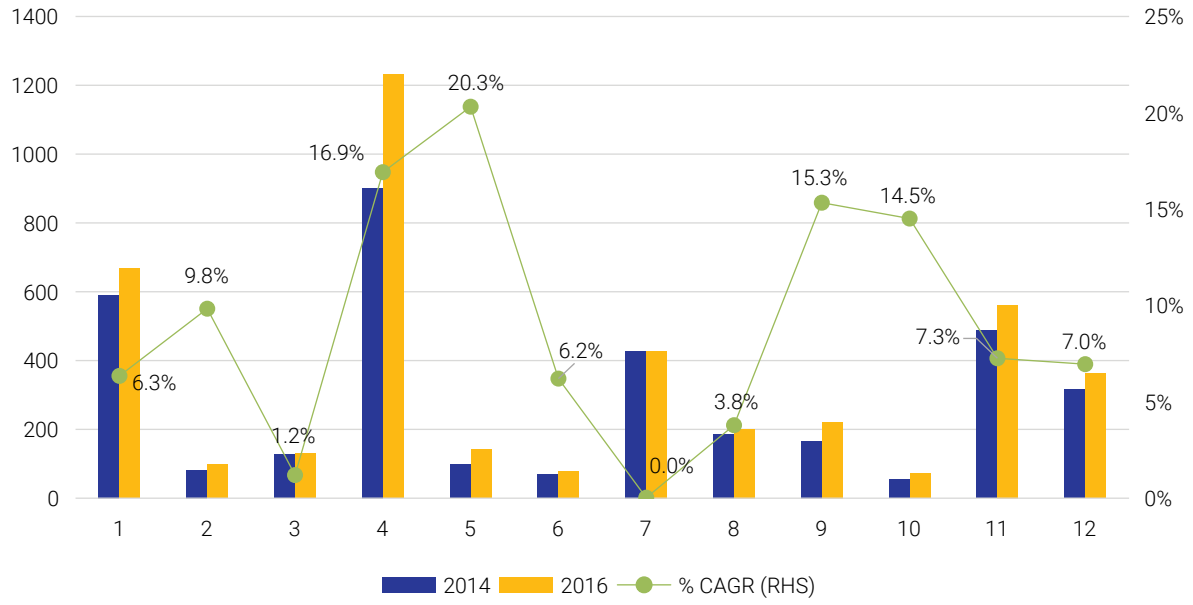
The high household incomes of Timur Laut and Barat Daya can be attributed to the fact that manufacturing and services sectors are highly concentrated on Penang Island, leading to higher overall incomes. The mainland is generally considered relatively less developed, but the state government has recognised the industrialisation of the mainland as one of its priorities. For instance, Batu Kawan in Seberang Perai Selatan has been primed for economic development with the establishment of the Batu Kawan Industrial Park and various other mixed development projects, including the IKEA shopping complex and the University of Wollongong (UOW) Malaysia KDU Penang University College. Additionally, the benefits of the gradual development of Seberang Perai is reflected in the comparatively higher growth rates in income for its administrative districts.

Due to the economic difficulties brought on by the COVID-19 pandemic, and with unemployment on the rise owing to layoffs and retrenchment, reduction in household income may be observed in the short term. Household income growth in the following years will be largely dependent on the recovery of the economy, but as a whole, it is projected to be comparatively slower.

Household expenditure

The implementation of the GST on 1 April 2015 had contributed to higher overall costs of living. With the abolishment of the GST on 1 June 2018, household expenditure after this period is also expected to increase, especially for more developed states such as Penang, as their higher purchasing power will allow them to consume more goods and services with the zero-rated GST. Additionally, the re-implementation of the SST has positively affect the prices of certain goods and services.

Figure 2.9 Average monthly household expenditure and CAGR of average expenditure in Penang, 2016–19



1. Food and non-alcoholic beverages
2. Alcoholic beverages and tobacco
3. Clothing and footwear
4. Housing, water, electricity, gas, and other fuels
5. Furnishing, household equipment, and routine household maintenance
6. Health
7. Transport
8. Communication
9. Recreational services and culture
10. Education
11. Restaurants and hotels
12. Miscellaneous goods and services

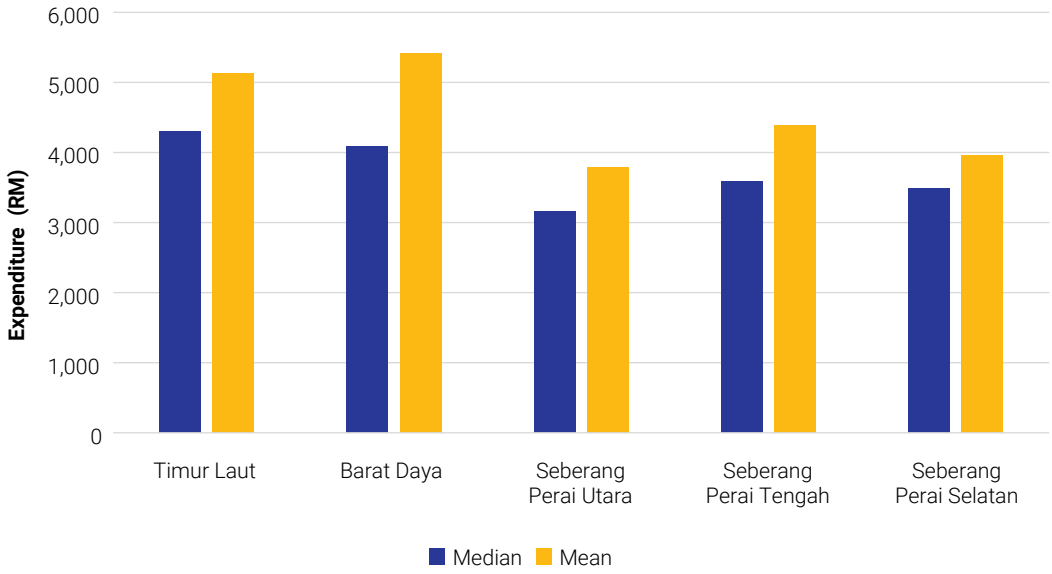
Source: Penang Institute estimates based on data from Household Expenditure Survey 2016 and 2019, Department of Statistics, Malaysia.

Figure 2.9 illustrates that Penang's mean household expenditure grew from RM4,190 in 2016 to RM4,630 in 2019, which was an overall increase of 10.5%, with a CAGR of 3.4%. The CAGR was lower compared with Selangor (3.9%) and Johor (4.8%). With a CAGR of 3.8% and 4.4%, respectively, the less-developed states of Terengganu and Kelantan also recorded comparatively higher growth rates.

Penang households spent the most on housing, water, electricity, gas, and other fuels for 2016 and 2019, where spending stood for 29.4% and 28.0% of overall spending for each respective year. The CAGR for this category, however, is among the lowest at 1.7%. Penangites also spent considerably on food and non-alcoholic beverages, with this category accounting for the second-biggest percentage of overall spending for both years—15.9% in 2016 and 15.1% in 2019—in addition to seeing a growth rate of 1.5%. Within this group, the most was spent on fresh fish (12.4%), followed by a tie between fresh meat and fresh vegetables (9.6% of total spending for food each).

Restaurants and hotels saw the second-highest growth rate of 6.3% in average spending, and this category accounted for 14.6% of overall spending in 2019—97.1% of which were spent in restaurants. Transport, which accounted for 10.3% of total average expenditure, noted a growth rate of 3.6%. Health spending recorded the highest growth rate at 10.9%, but was only 2.3% of overall spending. The lowest growth rate was seen for alcoholic beverages and tobacco, which was only 0.6%. The spending for the aforementioned category was also the second lowest.

Figure 2.10 Median and mean monthly household expenditure by administrative district, Penang, 2019



Source: Household Income Expenditure Survey 2019, Department of Statistics, Malaysia.

Reflective of household income, household expenditure was higher for the administrative districts on Penang Island compared with Seberang Perai. Timur Laut had the highest median expenditure of RM4,307 but the mean expenditure was eclipsed by Barat Daya (RM5,414). In Seberang Perai, the highest mean and median expenditure was found in Seberang Perai Tengah at RM3,586 and RM4,390, respectively. Conversely, spending was lowest in Seberang Perai Utara. With a median expenditure of RM3,160 and a mean expenditure of RM3,795, spending was 36.3% and 42.7% less compared with the state's highest spending districts, respectively.

In terms of percentages, the composition of spending across various expenditure groups for all districts were more or less the same. The categories where a spending difference was apparent would be transport and restaurants and hotels. It is observed that administrative districts on the island spent more on the aforementioned categories compared with administrative districts in Seberang Perai.

As with household income, household expenditure is expected to decrease in the current year, even with the anticipation of a possible deflation in the prices of goods. Households are expected to hold back on spending on luxury and non-essential items owing to more limited financial constraints brought on by the pandemic. Household expenditure patterns on food and essential goods are projected to be more constant in comparison.

2.5 Income distribution and poverty

Income distribution

For 2019, the most populated state in Malaysia is Selangor, with an estimated population of 6.5 million people. The people of Selangor accounted for 20.0% of the country's overall population. Penang, on the other hand, is the ninth-most populated state, with its population making up an estimated 5.5% of total population. However, Penang is the second-smallest state in Malaysia in terms of land area, and the smallest state in comparison with the similarly developed states of Selangor and Johor. Kuala Lumpur, as a federal territory, is smaller in mass size but has a higher population in comparison with Penang.

Table 2.10 Median income, household share and income share by income class and state, Malaysia, 2019

State	Top 20%			Middle 40%			Bottom 40%		
	Median income (RM)	Household share	Income share	Median income (RM)	Household share	Income share	Median income (RM)	Household share	Income share
Malaysia	**15,031**	**100.0%**	**46.8%**	**7,093**	**100.0%**	**37.2%**	**3,166**	**100.0%**	**16.0%**
Johor	14,629	12.0%	43.5%	7,549	14.1%	38.6%	3,677	10.2%	17.9%
Kedah	10,204	2.8%	43.0%	5,050	5.9%	38.2%	2,686	9.8%	18.8%
Kelantan	9,500	1.8%	45.7%	4,242	3.1%	36.3%	2,301	7.9%	18.0%
Malacca	14,393	2.9%	45.0%	7,001	3.4%	37.8%	3,318	2.9%	17.2%
Negeri Sembilan	13,257	2.8%	46.3%	5,886	3.6%	36.7%	2,801	4.4%	17.0%
Pahang	10,431	2.1%	41.9%	5,133	4.1%	37.6%	3,017	6.8%	20.5%
Penang	**14,002**	**5.8%**	**43.1%**	**7,264**	**7.2%**	**38.4%**	**3,631**	**5.3%**	**18.5%**
Perak	10,308	3.7%	45.0%	5,041	7.4%	37.1%	2,614	12.7%	17.9%
Perlis	9,782	0.3%	40.4%	5,377	0.8%	40.5%	2,665	1.1%	19.1%
Selangor	20,175	37.1%	46.0%	9,737	25.2%	37.0%	4,657	12.1%	17.0%
Terengganu	12,137	2.3%	41.3%	6,539	4.0%	39.1%	3,372	3.7%	19.6%
Sabah	11,461	4.0%	46.2%	5,177	5.6%	37.5%	2,444	10.0%	16.3%
Sarawak	11,856	5.3%	45.1%	5,478	7.3%	38.3%	2,541	11.5%	16.6%
*Kuala Lumpur	22,610	15.7%	43.2%	12,068	7.4%	37.3%	6.623	1.3%	19.5%
*Labuan	15,196	0.4%	41.2%	7,889	0.4%	39.1%	4,272	0.2%	19.7%
*Putrajaya	22,291	1.0%	44.1%	11,574	0.5%	37.0%	5,976	0.1%	18.9%

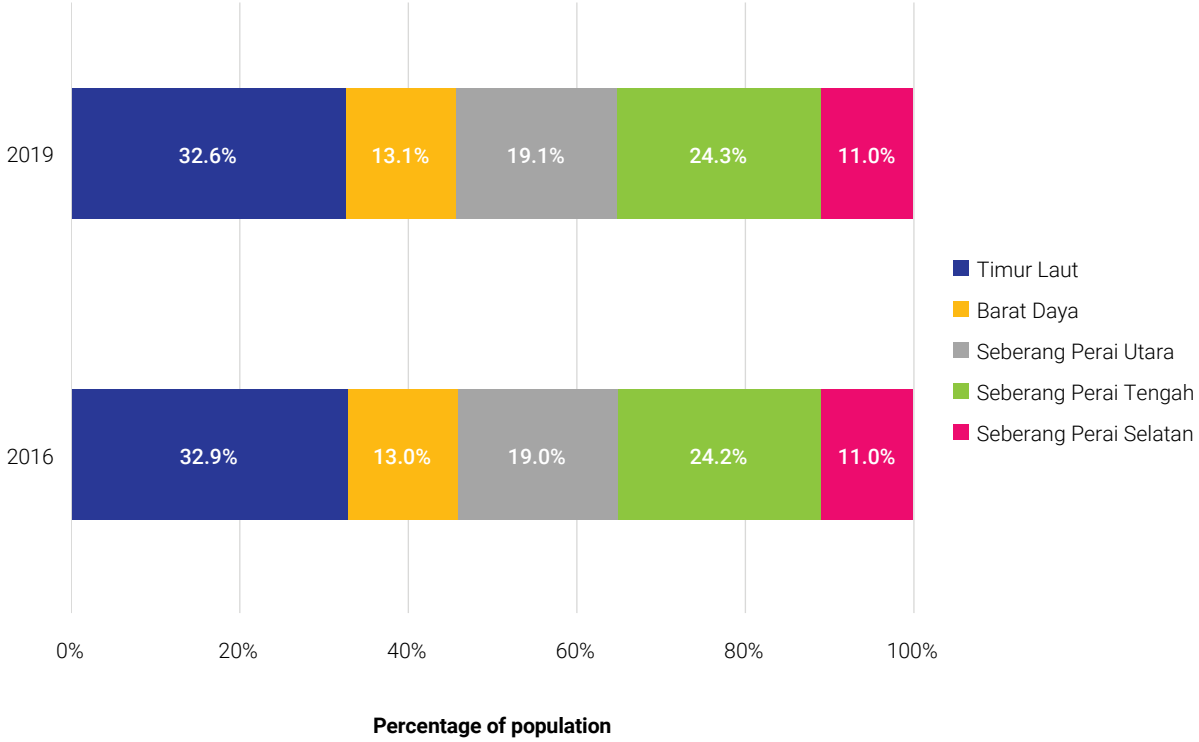
** denotes Federal Territories*
Source: Household Income and Basic Amenities Survey Report Malaysia 2019, Department of Statistics, Malaysia.

In 2019, the highest share of T20 (Top 20%) households was found in Selangor, which accounted for 37.1%, followed by Kuala Lumpur at 15.7% (Table 2.10). Penang (5.8% of total T20 households) was placed fourth after Johor. However, Selangor and Kuala Lumpur's median income for T20 households was significantly higher than Penang's—44.1% and 61.5% higher, respectively. The lowest T20 median income belonged to Kedah, which was RM10,204. T20 households typically account for more than 40% of an individual state's overall income, while holding the smallest share of total households within the states.

The same pattern persisted for the next household income group, where Selangor also held the largest share of M40 (Middle 40%) households at 25.2%, followed by Johor. With a household share of 7.2%, Penang was ranked sixth, after Kuala Lumpur (7.4%), Sarawak (7.4%), and Perak (7.3%). However, with a median income of RM12,068, Kuala Lumpur recorded the highest median income among all M40 households, followed by Putrajaya (RM11,574) and Selangor (RM9,737). Meanwhile, Penang's M40 household median income of RM7,264 was slightly lower than Johor's, and accounted for 7.0% of all M40 households. The total income share of M40 households across all states individually were close in terms of percentages, standing below 40.5% and fluctuating between 36.0% and 39.0%.

The situation differed in the overview of B40 (Bottom 40%) households. Perak held the biggest share of B40 households at 12.7%. Selangor had the next-largest household share at 12.1%, followed by Sarawak at 11.7% and Selangor at 11.5%. Penang's B40 household share was 5.3%, where these households contributed 18.5% of the state's total income. The B40 household group usually represents the biggest share of households for a state, yet accounted for the smallest percentage share of income. For 2016, the income shares of B20 households within states roughly equated to less than 20% individually, with Pahang (20.5%) being the only exception.

Figure 2.11 Population distribution by administrative district, Penang, 2016–19



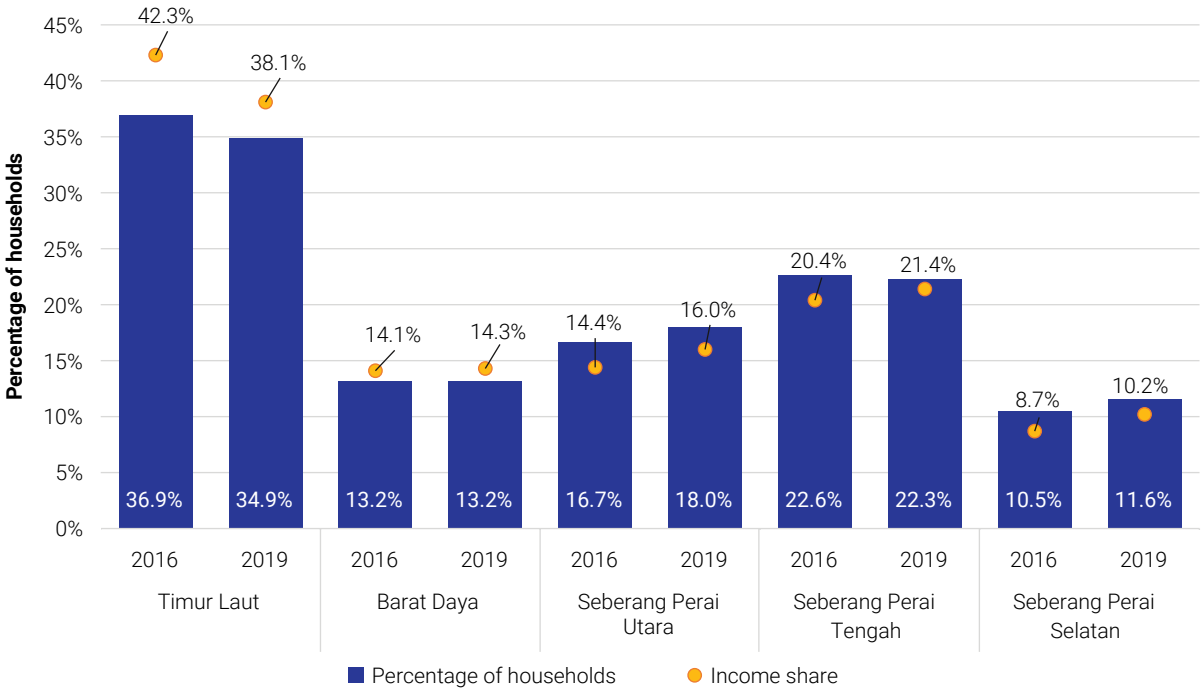
Source: Household Income and Basic Amenities Survey Report for Penang, 2019, Department of Statistics, Malaysia.

Overall, Figure 2.11 shows that population distribution remained constant between 2016 and 2019. Timur Laut maintained its position as the most highly and densely populated district in 2019, comprising 32.6% of Penang's total population and a density of 4,749 people per km^2. Timur Laut is also the smallest district in Penang in terms of land mass. Seberang Perai Selatan has the lowest population share at 11.1%, and is also the least densely populated district at 806 people per km^2.

Timur Laut held the highest percentage share of households for Penang at 34.9%, although it saw a decrease of 2.0% from 2016 (Figure 2.12). Its neighbouring district, Barat Daya, had a household share of 13.2%. However, its household share remained unchanged.

In Seberang Perai, the highest share of households was found in Seberang Perai Tengah, where it held 22.3% of total households, followed by Seberang Perai Utara at 18.0%. The former was also the only district (beside Timur Laut) to experience a decrease in its household share, where it had shrunk by 0.3%. Meanwhile, Seberang Perai Selatan had the lowest share of households overall, standing at 11.6%, but saw an increase of 1.6% over the three-year period.

Figure 2.12 Percentage of households and income share by administrative district, Penang, 2016 and 2019

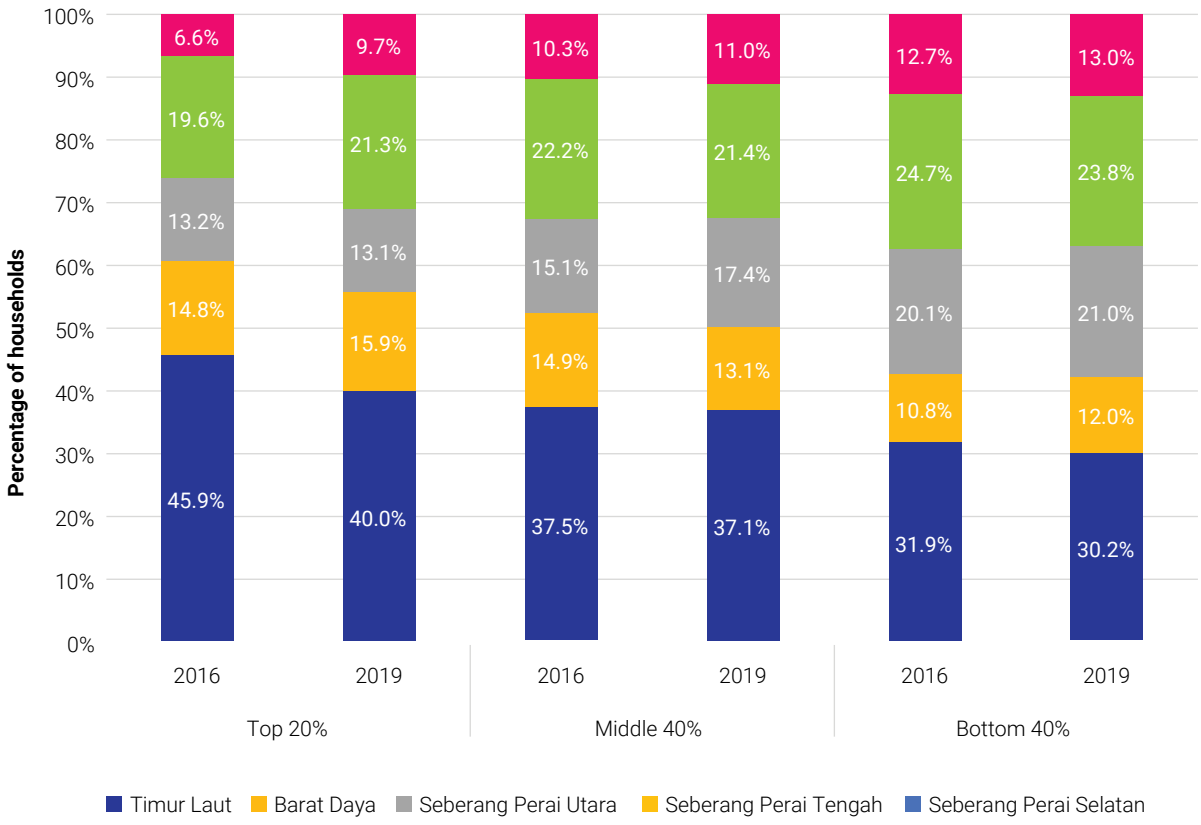


Source: Household Income and Basic Amenities Survey Report for Penang, 2019, Department of Statistics, Malaysia.

In terms of income share, Timur Laut held the highest share at 38.1%, but it also observed a significant drop of 4.2% from 2016. It was also the only district to see a decrease in its corresponding income share. With an increase of 1.0% from the previous period, Seberang Perai Tengah came in second with 21.4% of total income share. Seberang Perai Selatan held the smallest income share of 10.2%, an increase from the previous year's 8.7%. Barat Daya and Seberang Perai Utara also observed increases in their income share. However, the latter's increase of 1.6% made it the district with the highest percentage increase in income share for 2019.

Figure 2.13 illustrates that Timur Laut held the highest percentage of household share across all income groups, followed by Seberang Perai Tengah, mainly because they were the state's two most populous districts. Timur Laut accounted for 40.0% of Top 20% (T20) households—higher than Barat Daya, Seberang Perai Utara, and Seberang Perai Selatan combined. However, it was also a 5.9% decrease from 2016, in line with the decrease observed in its total income share (Figure 2.12). Seberang Perai Selatan had the lowest share of T20 households at 9.7%, but recorded a 3.1% increase from the previous period.

Figure 2.13 Percentage of households by household income groups in administrative districts, Penang, 2016 and 2019



Note: Income thresholds are as follows: T20: ≥ RM10,680, M40: RM5,310–10,679, B40: <RM5,410
Source: Household Income and Basic Amenities Survey Report for Penang, 2019, Department of Statistics, Malaysia.

The biggest increase in M40 household share was seen in Seberang Perai Utara, where it had increased by 2.3%, from 15.1% to 17.4%. Another district that saw an increase was Seberang Perai Selatan, which recorded an increase of 0.7% to 11.0%; it was also the district with the smallest share of M40 households. All other districts saw a reduction in their respective total household share. Timur Laut had the highest percentage of M40 households, but saw a decrease of 0.4% over the last three years.

Timur Laut and Seberang Perai Tengah were the only districts that saw a decline in their respective Bottom 40% (B40) household share. The former had a 1.7% decrease while the latter recorded a decline of 0.9%. Barat Daya's B40 household share saw the biggest increase, rising from 10.8% to 12.0%. Other districts observed increases of less than 1.0% overall.

Table 2.11 Percentage share of household and income share by monthly gross household income class, Penang, 2016 and 2019

Gross income class (RM)	2016		2019	
	Household share (%)	Income share (%)	Household share (%)	Income share (%)
1,999 and below	5.8%	1.3%	3.0%	0.6%
2,000–2,999	8.0%	3.0%	9.3%	3.1%
3,000–3,999	17.7%	9.0%	11.9%	5.3%
4,000–4,999	13.5%	9.0%	12.0%	6.9%
5,000–5,999	11.2%	9.1%	12.0%	8.5%
6,000–6,999	9.6%	9.2%	9.4%	7.8%
7,000–7,999	7.6%	8.4%	8.3%	8.0%
8,000–8,999	5.7%	7.1%	6.8%	7.4%
9,000–9,999	4.5%	6.3%	4.2%	5.1%
10,000–10,999	3.3%	5.1%	4.5%	6.0%
11,000–11,999	2.6%	4.4%	3.8%	5.6%
12,000–12,999	2.2%	4.1%	2.7%	4.4%
13, 000–13,999	1.8%	3.6%	2.1%	3.7%
14,000–14,999	1.0%	2.1%	1.9%	3.6%
15,000 and above	5.5%	18.5%	8.1%	24.0%

Source: Household Income and Basic Amenities Survey Report for Penang, 2019, Department of Statistics, Malaysia.

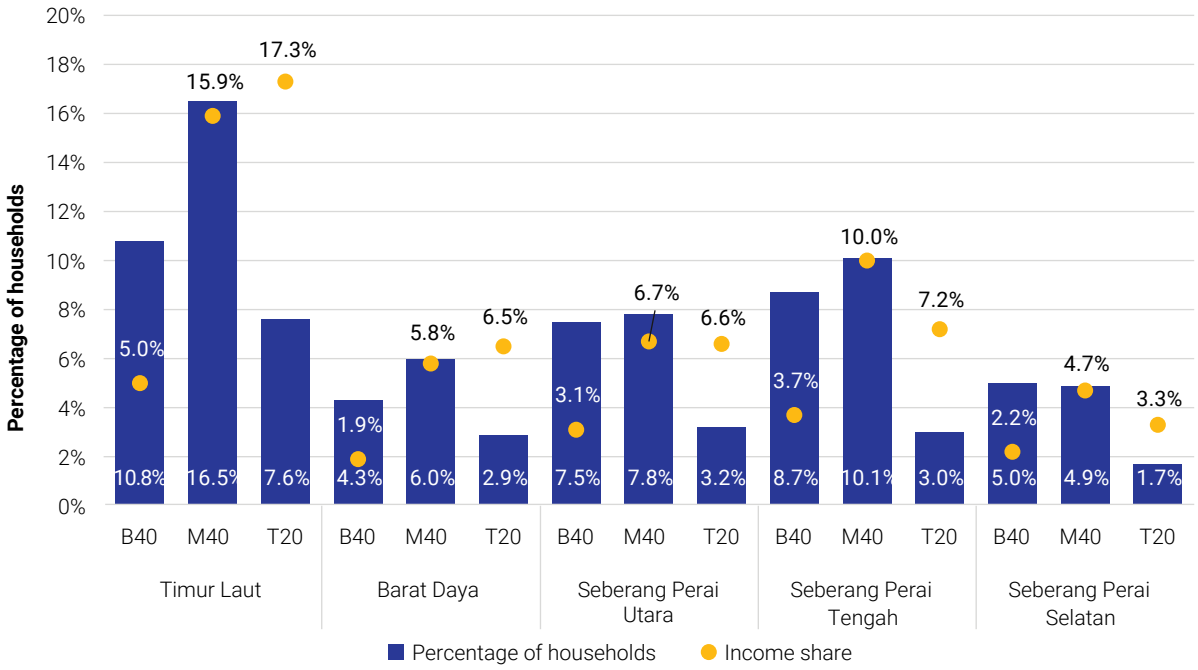
As Table 2.11 shows, the lower range of income classes generally observed decreases in total household and income shares in 2019. Within Penang households, 35.9% earned a monthly gross household income of between RM3,000 and RM5,999. Comparatively, 42.4% of households fell within the same income parameters in 2016. Income shares for the same classes of income were also lower in 2019, seeing an estimated decrease of 6.6% over the last three years. However, the biggest household shares were found in the income classes of RM4,000–4,999 and RM5,000–5,999, which held 12.0% each.

In contrast, increases in household shares were observed for the highest income classes (beginning from RM10,000), and the same situation applies to the corresponding income shares. It also signifies that approximately 23.1% of Penang households were earning T20 income[13], or at least close to it. Similarly, this represents an increase of 2.2% in household shares from the previous period, where the share was approximately 20.9% in 2016[14].

For the highest income class—a monthly gross household income of RM15,000 or more—there was a 2.6% increase in household share and a 5.5% increase in income share in the same period. Concurrently, the lowest income class of RM1,999 and below saw a reduction in their respective household and income shares. As a whole, the household shares for the lower spectrum of income classes in the B40 category (RM1,999 and below to RM5,999) saw an approximate reduction of 7.9%, while the share for M40 households saw an increase of 2.5%. Additionally, there was also an increase of approximately 5.5% in household shares for T20 households. In this sense, it can be deduced that more Penang households have moved up the income class ladder during 2016–19.

[13] The threshold for T20 income in 2019 is determined by Department of Statistics as ≥RM10,680.
[14] The threshold for T20 income in 2016 is determined by Department of Statistics as ≥RM9,200.

Figure 2.14 Percentage of households and income share by household income group and administrative districts, Penang, 2019



Note: Income thresholds[15] are as follows: T20: ≥ RM11,000, M40: RM5,000–10,999, B40: ≤ RM4,999
Source: Penang Institute estimates based on data from the Household Survey and Basic Amenities Survey Report for Penang, 2019, Department of Statistics, Malaysia.

The percentage of income share for T20 households were significantly higher, if compared with its share of total households. Income shares for T20 households were approximately double its corresponding household share. The reverse is observed for B40 households, where the income share was about half of the household share. M40 households, however, maintained a similar share for both household and income.

In 2019, Timur Laut had the highest share of all household income groups (Figure 2.14). The lowest share of B40 households was found in Barat Daya (4.3%), while Seberang Perai Selatan had the lowest share of M40 and T20 households at 4.9% and 1.7%, respectively.

Timur Laut's large share of households also signifies that income shares were also the highest within the district. T20 households in the district accounted for 17.3% of the state's total income share, with 9.2% of households earning an income of more than RM15,000. Its M40 and B40 households accounted for 15.9% and 5.0%, respectively, resulting in Timur Laut holding 38.2% of Penang's total income share. However, this is a drop of 4.1% from 2016, where 42.3% of the state's total income was concentrated in this district.

Seberang Perai Selatan recorded the smallest share of total income at 8.7%, but it was an increase of 2.9% over the three-year period. Its household share also saw a 1.1% increase. Another district with significant increases in both categories was Seberang Perai Utara, which saw an increase of 1.8% in household share and 2.0% in income share. The other two districts saw little to no changes.

The increase in household and income shares for both Seberang Perai Selatan and Seberang Perai Utara can be attributed to recent developments in the districts. With the Batu Kawan Industrial Park in Seberang Perai Selatan gaining traction as Penang's second industrial zone, other development projects

[15] The income thresholds in accordance to income classes are an approximation, readjusted to the categorisation of monthly gross income of income classes, as published by the Department of Statistics, Malaysia.

have been planned to advance the district's economy. Seberang Perai Utara has benefitted from a mixed-development project spearheaded by SP Setia, which is intended to be an economic centre (The Malaysian Reserve, 2017).

Inequality

Penang's Gini coefficient was lower than the national Gini coefficient for both 2016 and 2019, but it saw a slight increase in the latter year, going from 0.356 to 0.359. It was the lowest Gini coefficient when compared with the similarly developed states of Selangor (0.393) and Johor (0.366). Johor and Selangor's Gini coefficient also increased from 2016, and in greater value, signifying that income inequality had worsened in both states. Kuala Lumpur, however, saw its Gini coefficient decline to 0.350 from the previous period's value of 0.378. Although Sabah's Gini coefficient improved from 0.402 to 0.397 in 2019, income inequality in this state was still highest in the country.

Table 2.12 Gini Coefficient of monthly gross household income by administrative districts, Penang, 2016 and 2019

Administrative district	Gini coefficient	
	2016	2019
Timur Laut	0.377	0.356
Barat Daya	0.327	0.361
Seberang Perai Utara	0.338	0.359
Seberang Perai Tengah	0.330	0.367
Seberang Perai Selatan	0.339	0.323
Penang	**0.356**	**0.359**

Source: Household Income and Basic Amenities Survey Report for Penang, 2019, Department of Statistics, Malaysia.

Within districts in Penang, the Gini coefficient was the highest in Seberang Perai Tengah (0.367), which signified the biggest increase in value in the state (Table 2.12). Seberang Perai Selatan's Gini coefficient of 0.323 was the lowest, and had improved from the previous period. Timur Laut also saw an improvement to its Gini coefficient, going from the highest value in 2016 (0.3777) to recording the second-lowest value in 2019 (0.356). This can be explained by the increase in M40 households and the corresponding income share in the district; income was more evenly distributed. In contrast, the Gini coefficient of Barat Daya, which was the lowest in 2016, increased to 0.361, making it the district with the second-highest index in the state. Overall, the income inequality gap in Penang has slightly worsened since 2016.

Poverty

Malaysia's Poverty Line Income (PLI) has been redefined for 2019. Therefore, the PLI in 2016 has also been readjusted and recalculated in accordance to these new parameters. The national PLI for 2019 was determined to be RM2,208[16], which was an increase of 3.2% from the PLI of RM2,141 in 2016.

From 2016 to 2019, the incidence of absolute poverty generally declined across most states and federal territories, with the national incidence of absolute poverty standing at 5.6% (Table 4). The exceptions are Selangor and Putrajaya, with each seeing a 0.4% increase in their respective incidences of poverty, but they are also among the states and territories with the lowest levels of absolute poverty for both periods. Kelantan saw the biggest improvement, with its absolute poverty rate decreasing by 7.1% to 12.4%. Sabah still had the highest level of absolute poverty in 2019, despite a 4.4% drop from 2016. Penang's absolute poverty rate saw a decrease of 0.3%, going from 2.2% to 1.9%.

[16] Prior to the recalculation, Malaysia's PLI was set as RM980.

Table 2.13 Incidence of absolute poverty by administrative district, Penang, 2016 and 2019

Administrative district	Incidence of absolute poverty (%)	
	2016	2019
Timur Laut	1.0	0.5
Barat Daya	0.7	1.0
Seberang Perai Utara	4.2	4.6
Seberang Perai Tengah	2.5	2.3
Seberang Perai Selatan	4.8	2.1
Penang	**2.2**	**1.9**

Source: Household Income and Basic Amenities Survey Report for Penang, 2019, Department of Statistics, Malaysia.

Table 2.13 shows that Seberang Perai Selatan saw the biggest improvement to its absolute poverty levels. Its incidence of poverty decreased by 50%, dropping from 4.8% in 2016 to 2.1% in 2019, perhaps a result of the rapid development of the district in recent years. Timur Laut had the lowest incidence of poverty at 0.5%, an improvement from 1.0% in the previous period.

Seberang Perai Selatan had the highest incidence of absolute poverty. At 4.6%, its incidence of absolute poverty was significantly higher than rest of the districts, an increase of 0.4% in 2019.

In terms of relative poverty, 16.9% of Malaysians were considered to be relatively poor in 2019, an increase of 1.0% from 2016. At 17.0%, Malacca had the highest incidence of relative poverty among all states and federal territories, and also recorded the biggest increase in share (6.3%)[17]. The lowest incidence of relative poverty was observed in Pahang, which saw 6.0% of its total households living in relative poverty, a decline of 2.2% from the previous period. In Penang, the relative poverty rate increased by 1.9% to 13.2% in 2019. The more developed states such as Selangor, Johor, and Penang all saw increases in their respective relative poverty rates. In contrast, the incidence of relative poverty has declined in less-developed states such as Kelantan, Kedah, and Sabah.

Table 2.14 Incidence of relative poverty by administrative district, Penang, 2016 and 2019

Administrative district	Incidence of relative poverty (%)	
	2016	2019
Timur Laut	7.9	8.6
Barat Daya	5.1	10.8
Seberang Perai Utara	16.6	18.1
Seberang Perai Tengah	13.7	16.9
Seberang Perai Selatan	17.2	15.3
Penang	**11.3**	**13.2**

Source: Household Income and Basic Amenities Survey Report for Penang, 2019, Department of Statistics, Malaysia.

Incidence of relative poverty has increased across all districts except Seberang Perai Selatan, which was the only district to see the share of its households living in relative poverty decreasing, dropping from 17.2% to 15.3%. The decrease is in line with Seberang Perai Selatan's decline in absolute poverty rates. Despite an increase of 0.7% from 2016, Timur Laut remained as the district with the lowest relative poverty rate. Barat Daya saw the biggest increase in relative poverty, where it grew by more than 50%, from 5.1% to 10.8%.

[17] Incidence of relative poverty is calculated in accordance to each state's individual median income, and not the national median income.

2.6 Labour market

Labour force, employment, and unemployment

Penang's labour market remains cautiously optimistic amid global economic uncertainties brought about by the COVID-19 pandemic. While worker retrenchment is projected to be higher than previous years, some industries may have stable employment conditions compared with others. For example, layoffs in the manufacturing sector could be temporary owing to the considerable investments planned in 2019 that are scheduled to be executed in 2020–21, during which new job opportunities will be available. However, layoffs in the hospitality industry and retail trade businesses may take longer to recover.

In 2019, the Penang labour market performed relatively well compared with most states. While the number of labour force and employed persons increased by less than 1%, unemployment declined by 10.2% to 16,700 people in 2019, representing 3.3% of Malaysia's total unemployment (Department of Statistics Malaysia, 2020a). This caused Penang's unemployment rate to fall by 0.2 percentage point from 2.2%. With an unemployment rate lower than 4%, the economy has achieved full employment status.

Despite the COVID-19 pandemic, Penang's economy will likely maintain a state of full employment in 2020. During the global financial crisis, Penang's unemployment rate increased to 2.5% in 2009, while the rate was 2.3% during the Asian financial crisis in 1998. It is projected that the state's unemployment rate will be higher than 2.5% as a result of the pandemic, but will remain below 4%.

Penang's labour force participation rate (LFPR) has moderated to 67.3%; male LFPR increased by 1 percentage point to 80.5% in 2019 while female LFPR declined to 54.1% (Table 2.1). Workers aged 25–29 and 30–34 years have the highest rate of participation compared with other age groups, accounting for 86.8% and 86.3%, respectively. Meanwhile, the LFPR for tertiary education was 3.6 percentage points higher than the participation rate of labour force with secondary education (70.6% versus 67%). Labour force with certificates had the highest rate of participation (88.7%), followed by those with degrees (86.7%) and diplomas (77.7%).

Table 2.15 Principle statistics of labour force, Penang and Malaysia

Indicators	Penang		Malaysia	
	2018	2019	2018	2019
Labour force participation rate (LFPR) (%)	67.7	67.3	68.3	68.7
Labour force ('000)	849.4	852.3	15,280.3	15,581.6
Employed persons ('000)	830.8	835.6	14,776.0	15,073.4
Outside labour force ('000)	424.9	433.6	7,094.4	7,103.5
Unemployed ('000)	18.6	16.7	504.3	508.2
Unemployment rate (%)	2.2	2.0	3.3	3.3
Men labour force participation rate (%)	79.5	80.5	80.4	80.8
Women labour force participation rate (%)	55.9	54.1	55.2	55.6
Youth unemployment rate (%)	7.4	6.6	10.9	10.5

Source: The Labour Force Survey Report, Department of Statistics, Malaysia.

The share of employed persons in the manufacturing sector grew by 2.6 percentage points from 34.5% in 2018 to 37.1% in 2019. In contrast, the services sector decreased by 1.8 percentage points to 54.4% in 2019 (Table 2.16). Wholesale and retail trade continued to make up the largest proportion of employment in the services sector (15.2% of total employment in Penang), followed by accommodation and food and beverage service activities (9.5%). With a combined total of 24.7%, this reflects the significance of the hospitality industry to Penang, where a majority of the workforce in this industry are being employed in tourism-related services.

Table 2.16 Employment by industry in Penang, 2018 and 2019

Industry	('000)		% share	
	2018	2019	2018	2019
Agriculture, forestry, and fishing	13.0	11.6	1.6	1.4
Mining and quarrying	0.5	1.0	0.1	0.1
Manufacturing	286.7	309.9	34.5	37.1
Electricity, gas, steam, and air conditioning supply	3.7	2.4	0.4	0.3
Water supply, sewerage, waste management, and remediation activities	3.5	4.2	0.4	0.5
Construction	56.7	52.3	6.8	6.3
Services	466.6	454.4	56.2	54.4
Wholesale and retail trade; repair of motor vehicles and motorcycles	130	126.9	15.6	15.2
Transportation and storage	45.6	46.7	5.5	5.6
Accommodation and food and beverage services activities	79.3	79.7	9.5	9.5
Information and communication	7.4	4.7	0.9	0.6
Financial and insurance/takaful activities	18.8	16.6	2.3	2.0
Real estate activities	5.3	3.8	0.6	0.5
Professional, scientific and technical activities	21.7	22.1	2.6	2.6
Administrative and support service activities	28.7	34.3	3.5	4.1
Public administration and defence; compulsory social security	30.7	28.3	3.7	3.4
Education	43.6	43.4	5.2	5.2
Human health and social work activities	29.7	27.1	3.6	3.2
Arts, entertainment and recreation	5.7	3.5	0.7	0.4
Other service activities	13.4	11.7	1.6	1.4
Activities of households as employers	6.7	5.6	0.8	0.7
Total	**830.8**	**835.6**	**100.0**	**100.0**

Source: The Labour Force Survey Report, Department of Statistics, Malaysia.

While Penang's semi-skilled and low-skilled workforce are on a decline, there has been an increase in high-skilled occupations[18]. Since 2015, the proportion of high-skilled workforce increased from 29.2% in 2015 to 33.4% in 2019, though a majority of Penang's workforce were still employed in semi-skilled occupations[19]. Penang has the fourth-largest employment in high-skilled occupations after Putrajaya, Kuala Lumpur, and Selangor. This coincides with the education attainment of employed persons where only the tertiary-educated workforce is on the rise while workforce with primary and secondary education are declining.

Many states have their tertiary-educated workforce employed in semi-skilled or low-skilled occupations, including Penang. In 2019, about 283,300 of Malaysia's tertiary-educated workforce worked in non-high-skilled occupations, with Kelantan being the hardest hit (having 63,200 persons), followed by Terengganu (51,500 persons) and Sabah (40,200 persons). Penang had about 5,800 of its tertiary-educated workforce employed in positions that are not classified as high-skilled. Interestingly, Johor and Kuala Lumpur had workforce with non-tertiary education employed in high-skilled occupations, suggesting that there may be insufficient tertiary-educated labour in these states.

Males dominated Penang's workforce, accounting for nearly 60% of its total employment (Table 2.17). Both males and females were largely plant and machine operators, as well as service and sales workers, which are categorised as semi-skilled positions.

[18] High-skilled occupations comprise managers, professionals, and technicians and associate professionals

[19] Semi-skilled occupations consist of clerical support workers, service and sales workers, skilled agricultural, craft and related trades, and plant and machine operators.

Within the high-skilled occupational group, males were particularly prevalent among managers (73.7%) and technicians and associate professionals (70.4%), whereas more females were found in professional positions. For the semi-skilled workforce, females were dominant in clerical support, representing three-quarters of the workforce, while males were highly dominant in skilled employment in the primary sectors—agriculture, forestry, livestock, and fishery (97.4%), and craft and related trades (87.0%). A majority of the workforce in elementary occupations were males. These include cleaners, agricultural, fishery and forestry labourers, food preparation assistants, and construction and manufacturing labourers.

Table 2.17 Employed persons by main occupational groups and gender in Penang, 2019

Main occupational groups	('000)		% share		Total
	Male	Female	Male	Female	
Managers	37.8	13.6	73.7	26.5	51.3
Professionals	61.5	64.4	48.8	51.1	126.0
Technicians and associate professionals	71.7	30.1	70.4	29.6	101.8
Clerical support workers	20.6	61.5	25.1	74.9	82.1
Service and sales workers	92.7	68.8	57.4	42.6	161.5
Skilled agricultural, forestry, livestock, and fishery workers	11.1	0.4	97.4	3.5	11.4
Craft and related trades workers	61.5	9.2	87.0	13.0	70.7
Plant and machine operators and assemblers	98.7	69.5	58.7	41.3	168.2
Elementary occupations	44.1	18.5	70.6	29.6	62.5
Total	**499.6**	**336.0**	**59.8**	**40.2**	**835.6**

Source: The Labour Force Survey Report, Department of Statistics, Malaysia.

Youth unemployment remains as the main contributor to unemployment in the state. While the national youth unemployment continues to register a rate of 10.5%, Penang's unemployed youths (aged 15–24) declined by 0.8 percentage point to 6.6% or 16,700 people in 2019, compared with 7.4% or 18,600 in 2018 (Table 2.15). Without including unemployed youths, Penang only exhibited a 1.1% unemployment rate. Penang had the third-lowest rate of youth unemployment in Malaysia after Putrajaya (1.3%) and Malacca (1.1%).

Penang's unemployment level has also improved across all education levels, with its tertiary-educated workforce performing above the primary and secondary education categories. The rate of unemployment for tertiary-educated workforce was at 1.96%, down by 0.6 percentage point in 2019 from 2.56% in 2018. Meanwhile, workforce with secondary education registered the highest rate of unemployment, standing at 2.17%. These rates remain low compared with the national average.

Furthermore, working population aged 15–64 years and are not contributing to Penang's labour force grew by 2% to 433,600 in 2019. According to the Labour Force Survey Report 2019, a large proportion of working-age population outside the labour force were those in the 15–24 age group. A majority of them were not seeking jobs because of family responsibilities and schooling.

Jobs market

Labour demand is expected to be affected by the COVID-19 pandemic. Job hiring will slow down as employers are cautious about their business prospects after the MCO and CMCO, which lasted more than two months. Business are projected to take more than three months to rebound, which will impact the hiring market. However, digital-related positions will continue to experience exponential growth amid the health and economic crises.

According to the Department of Statistics Malaysia, the number of jobs created fell to less than 20,000 in the first quarter of 2020, the first time this has happened since 2015. On a year-on-year basis, the number of new jobs created declined by about 19% in the first three months of 2020 compared with the same period in 2019. Compared with the last quarter of 2019, this number plunged by 24.6% in the first

quarter of 2020, an indication of the looming impact of the pandemic on Malaysia's jobs market.

All economic activities saw a reduced number of newly created jobs except petroleum, chemical, rubber, and plastic products; transportation and storage; and information and communication. Job searches on information technology roles were particularly high during the MCO with an increase of 40% on JobStreet Malaysia reported in May 2020 compared with the previous year (JobStreet, 2020a). Hardware technician, network engineer, IT project manager, and helpdesk analyst are high in demand. For the manufacturing industries, the four-most-searched roles are supply chain assistant, mechanical engineer, production manager, and quality control manager.

The latest available data (as of December 2019) from JobsMalaysia, a jobs recruitment portal managed by the Ministry of Human Resources, reported that Penang had about 9,584 vacancies advertised, and was responsible for 7.6% of Malaysia's total job vacancies. Of this, 85.4% were permanent positions while 11.4% were contract positions. Furthermore, 3.2% were part-time and temporary positions.

In 2019, Penang received the highest-ever approved capital investment for its manufacturing sector, with foreign direct investment at RM15 billion. This investment is estimated to create nearly three times more employments in 2019 compared with the investment in 2018. A portion of the investment will be implemented this year despite the COVID-19 pandemic. However, a majority of the investment will materialise in 2020–21.

Moving forward, more work-from-home jobs will be created to enhance social distancing at the workplace in response to the COVID-19 pandemic. Newly created jobs will have to consider new norms, where employees should report for work through digital platforms. It is found that companies in Kedah had advertised a total of 80 work-from-home vacancies in December 2019.

Graduate employability

Penang's graduate labour force increased by 5.4% to 286,700 people in 2019, with its participation rate exceeding the overall participation rate at 80.8%. Of this, 98.2% of graduates were employed while the remaining 1.8% were unemployed. The rate of graduate unemployment fell to 1.9% in 2019 from 2.6% in 2018; this was 0.1 percentage point lower than the overall unemployment rate in Penang.

Both males and females exhibit different patterns in the graduate labour market. While the male graduate labour force participation rate was above 85%, the female graduate labour force participation rate remained low at 75.4%. The unemployment rate of both genders declined concurrently, but the drop in the male unemployment rate was greater than their female cohort. The male unemployment rate decreased by 0.8 percentage point to 1.5% in 2019, while the female rate dropped by only 0.2 percentage point to 2.3%. In general, females still accounted for the largest proportion of working-age population outside the labour force compared with males, with family responsibilities being the core reason.

In terms of salaries among graduates who are employed, it is important to note that Penang's employers on average paid lower monthly salaries to graduates compared with some states in Malaysia. This may be due to the lower cost of living in Penang. In 2018, the mean monthly salaries for employed graduates increased by 8% from RM3,955 in 2017 to RM4,270 in 2018. However, this is still low compared with many other states, such as Kuala Lumpur (RM6,424), Putrajaya (RM5,028), Selangor (RM5,216), Johor (RM4,842), and Negeri Sembilan (RM4,641).

Labour retrenchment

Job losses have become the key concern in the labour market primarily because of the pandemic. For the first five months of 2020, over 1,667 employees were retrenched in Penang (Table 2.18). The layoffs were particularly prevalent after the implementation of the MCO which started on 18 March 2020. The retrenchment increased by 40% in April 2020 from 252 workers in March 2020 to 353 workers.

The manufacturing and services sectors were the most affected industries. Retrenchments in these sectors accounted about 94.6% of the total retrenchment from January to May. Additionally, 525 employees took voluntary separation schemes (VSS), which were largely implemented by manufacturing firms for local employees. A total of 189 companies retrenched their workers between January and May, with two-thirds in the services sector (Table 2.19). Retrenchment activity will continue to be high in Q3 2020.

Table 2.18 Labour retrenchment and VSS in Penang, January–May 2020

Sector	Retrenchment			VSS			Grand total
	Foreign	Local	Total	Foreign	Local	Total	
Business	1	36	37	0	1	1	38
Construction	0	3	3	0	0	0	3
Manufacturing	16	453	469	0	490	490	959
Services	10	600	610	0	35	35	645
Transportation	0	21	21	0	1	1	22
Grand total	**27**	**1113**	**1140**	**0**	**527**	**527**	**1667**

Source: Penang Labour Department.

Table 2.19 Retrenching companies, January–May 2020

Sector	Number of companies
Services	125
Manufacturing	62
Construction	2
Total	**189**

Source: Penang Labour Department.

The pandemic has significantly disrupted global supply chains and businesses, leading to a substantial drop in demand for products and services. Employers are forced to restructure, leading to employees being made redundant. Though the number is not significant, the operations of a few companies have either fully or partially shifted to other states or other countries.

A survey by JobStreet (2020b) found that one in five Malaysians have lost their jobs owing to COVID-19. Ong and Lee (2020) revealed that most local manufacturing firms are laying off some employees to keep their companies going, retaining only high-value employees. As such, unemployment and worker retrenchment will be considerably high nationwide.

Salaries and wages

Based on the Salaries and Wages Survey Report (Department of Statistics Malaysia, 2019a), Penang's median monthly salary grew by 2.5% to RM2,215 in 2018, with males' median monthly salary higher than females' (male: RM2,241 versus female: RM2,082)[20]. The median gender pay gap was 7.1%, indicating that a female employee would earn 7.1% less for every RM1 earned by a male employee. Though its gender pay gap was larger than the national gender pay gap of 4.9%, Penang still outperformed Johor (17.7%), Perak (15.2%), Kedah (12.9%), Negeri Sembilan (12.5%), and Selangor (11.7%).

In Penang, the industry with the highest median monthly salary was electricity, gas, steam, and air conditioning supply, with its median monthly salary at RM415 higher than the same industry at the national level (RM3,324). Industries with the next highest median monthly salary include education, professional, scientific, and technical activities, and financial and insurance/takaful activities.

Administrative and support service activities, on the other hand, generated the lowest median monthly salary, standing at RM128 lower than the industry in Malaysia (RM1,545).

Managers earned the highest median monthly salary in Malaysia, with Penang making RM685 more than the national salary (RM6,276). Professionals enjoyed the second-highest median monthly salary. However, Penang's median salary was RM891 lower than the national median salary (RM4,814), indicating a pay

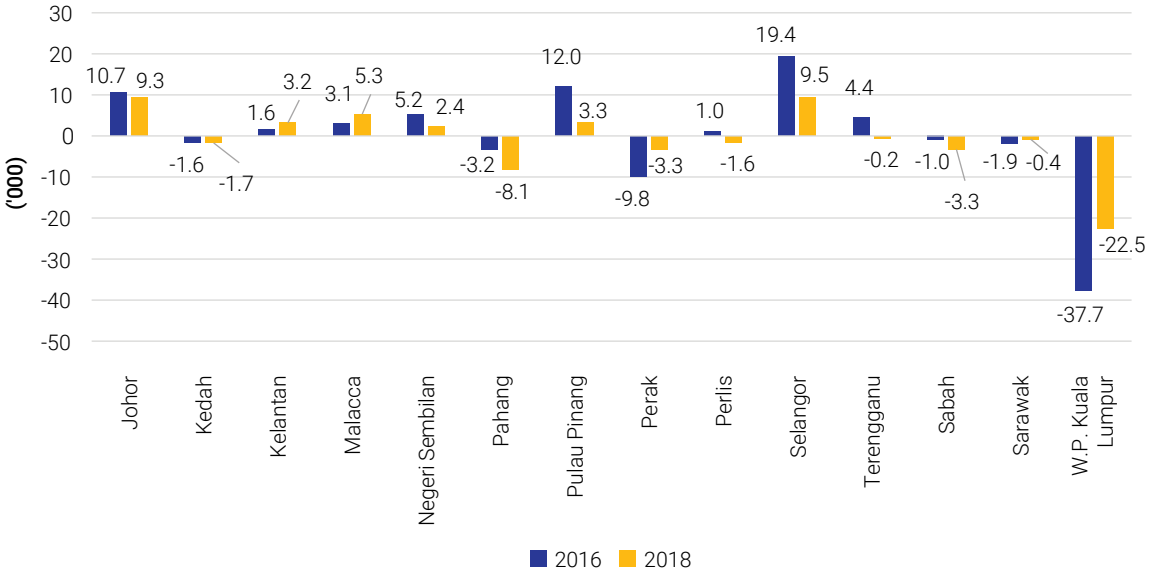
[20] Monthly salary includes basic wages, fixed allowance, and overtime payment. However, it excludes bonuses and gratuity, family allowances, and social security payments.

gap between Penang and other states in Malaysia. Meanwhile, elementary occupations registered the lowest median monthly salary, where employees in this group earned RM281 more than those in Malaysia as a whole (RM1,329).

Internal and international migration

Penang once again registered a positive net migration in 2018 despite weak migration flows (Department of Statistics Malaysia, 2019b). Net migration dropped by 52.4% per year from 12,000 persons in 2016 to 3,300 in 2018. With 11,500 in-migrants, Kedah and Perak remained the major contributors, with each recording 2,400 persons migrating to Penang. Meanwhile, 8,200 persons were moving out of Penang during the same period. A majority have migrated to Malacca, which accounted for about 3,700 persons in 2018. No out-migrants from Penang were found in Negeri Sembilan, Perak, Pahang, Terengganu, Sarawak, and Kuala Lumpur. Meanwhile, Penang attracted the highest number of migrants from overseas in Malaysia.

Figure 2.15 Net migration by state in Malaysia, 2016 and 2018



Source: The Migration Survey Report 2018, Department of Statistics, Malaysia.

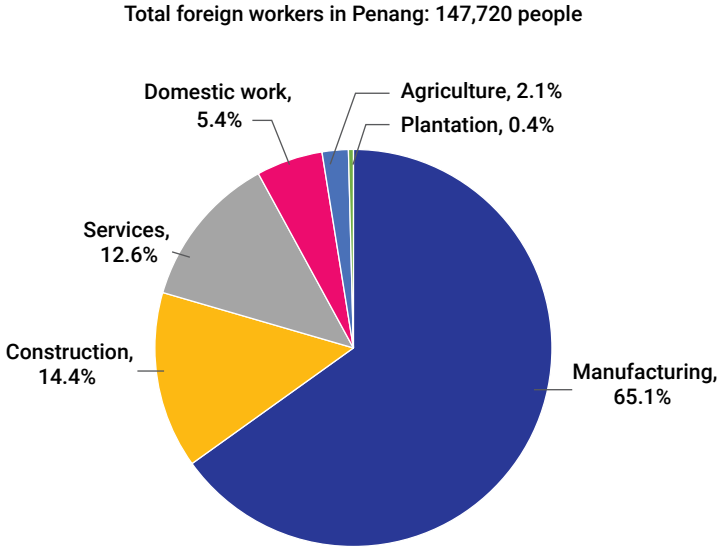
Foreign knowledge workers and foreign workers

Based on the latest available data, Penang had the fourth-largest foreign workforce in Malaysia in June 2019, with 147,720 workers. This accounted for about 7.4% of Malaysia's foreign workforce. Male foreign workforce accounted for 64% of Penang's entire foreign workforce.

As the second-largest contributor to the national GDP, Penang's manufacturing sector employs a smaller number of foreign workers compared with manufacturing firms in Selangor and Johor, suggesting that a majority of manufacturing firms in Penang hire local residents for low-skill jobs. This also suggests that a large segment of manufacturing firms is involved in high-tech and high-value-added operations, where more mid-to-high-skill workers are needed.

The manufacturing sector remained the largest sector employing foreign workers in Penang, representing nearly two-thirds of total foreign workers as of June 2019 (Figure 2.16). This was followed by the construction (14.4%), services (12.6%), and domestic work (5.4%).

Figure 2.16 Foreign workers by economic sectors in Penang as of June 2019

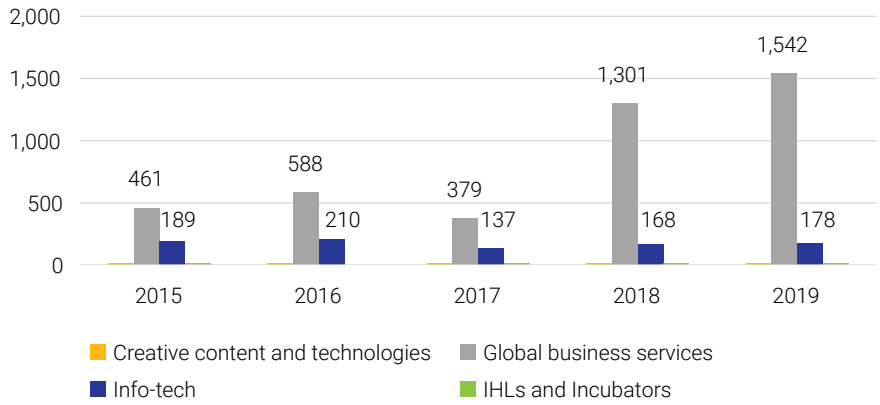


Source: Penang Institute estimates based on data published by the Ministry of Home Affairs, Malaysia.

Penang is the third-largest state receiving knowledge workers in Malaysia, following Kuala Lumpur and Selangor. It represented 6% of the total number of foreign knowledge workers contributing to companies with multimedia super corridor (MSC) Malaysia status[21]. Furthermore, the state imported a higher number of knowledge workers in 2019 compared with 2018. This volume increased by 16.9% in 2019, up from 1,476 persons in 2018 to 1,725 in 2019.

Foreign knowledge workers are categorised into four main clusters: creative content and technologies, global business services, info-tech, and institutes of higher learning (IHLs) and incubators. With 1,725 workers, about 89% of the foreign knowledge workforce were employed in global business services, and about 10% work in info-tech (Figure 2.17).

Figure 2.17 Number of foreign knowledge workers by cluster in Penang, 2015–19



Source: Malaysia Digital Economy Corporation (MDEC).

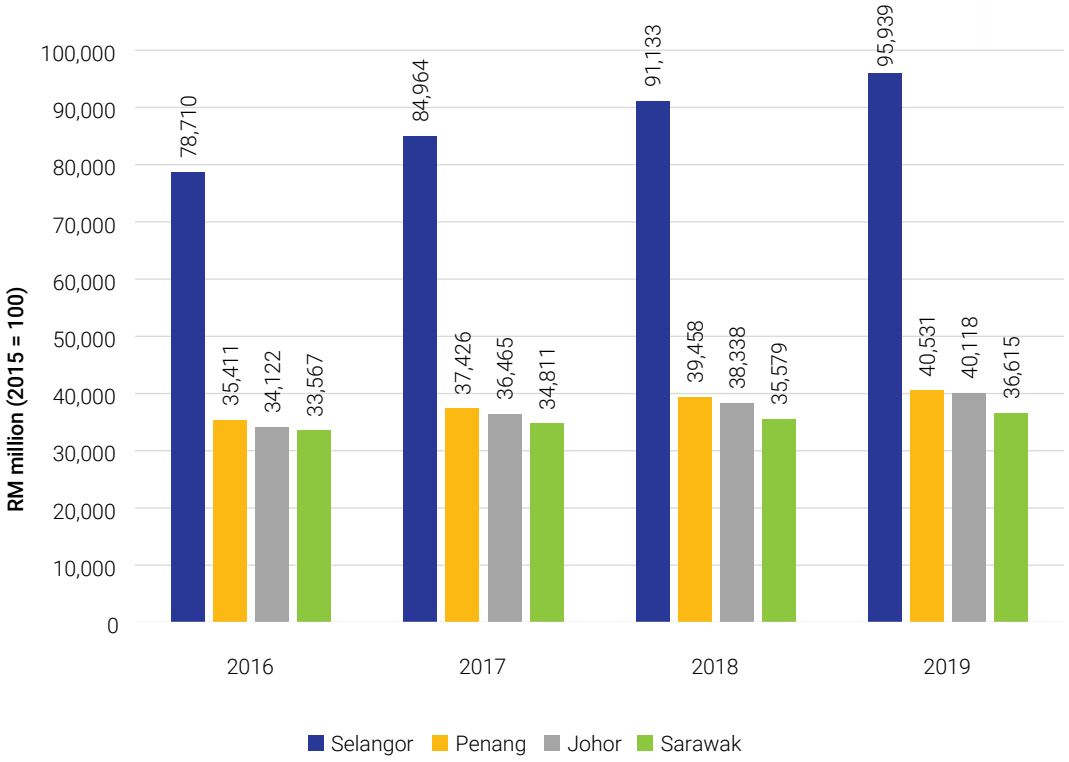
[21] According to the Malaysia Digital Economy Corporation (MDEC), MSC Malaysia has been established since 1996 to accelerate the growth of the nation's digital economy. The MSC Malaysia status provides eligible ICT-related businesses, both local and foreign, with a wide range of incentives, rights, and privileges to promote continued growth.

3. Sectoral Economic Developments and Prospects

3.1 Manufacturing sector

The manufacturing sector continues to be the core driving economic sector for Penang and Malaysia. In 2019, Penang remained as the second-largest contributor to the sector's GDP in Malaysia at RM41 billion (Figure 3.1). The manufacturing sector accounted for 42.8% of Penang's GDP. The contribution of the manufacturing sector to Penang's economic activity is significantly higher than Selangor (27.8%), Johor (29.9%), and Sarawak (26.9%). This highlights why the manufacturing sector warrants significant policy attention and why the sector arguably has to be the entry point for many policy interventions.

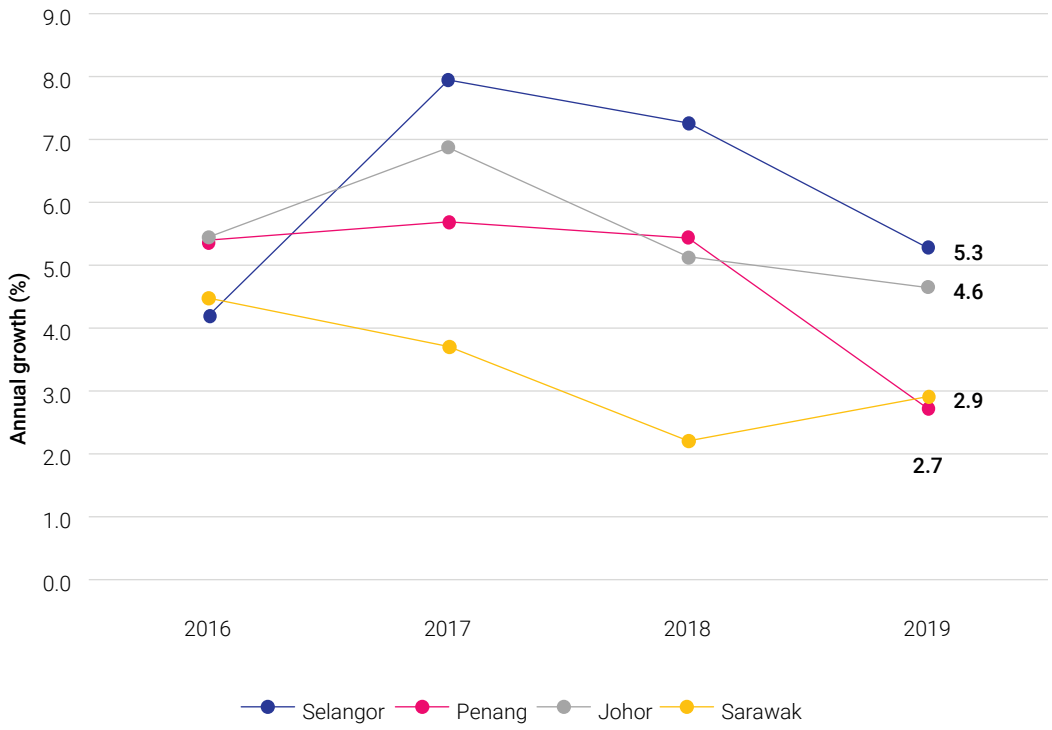
Figure 3.1 Top-four contributing states to Malaysian GDP in manufacturing activity, 2016–19



Source: Department of Statistics, Malaysia.

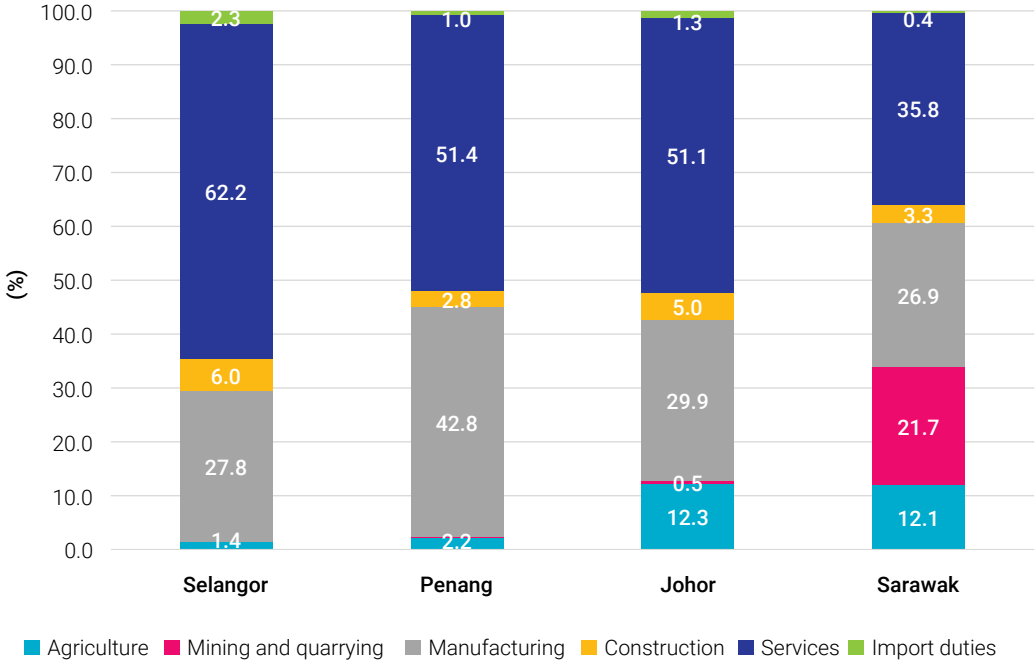
Penang's manufacturing sector also recorded a modest annual growth of 2.7% in 2019, a decline of 2.7 percentage points from the previous year. A similar decline in growth rates has also been observed in other comparable states except Sarawak (Figure 3.2).

Figure 3.2 Annual growth rates of GDP in manufacturing activity for selected states, 2016–19



Source: Department of Statistics, Malaysia.

Figure 3.3 Share of economic activity contribution to GDP in selected states, 2019



Source: Department of Statistics, Malaysia.

This sector observed global uncertainty that was brought about by the US-China trade war. In 2018 alone, approximately $360 billion worth of goods and products from the United States and China were levied with tariffs, the impact of which are country- and industry-specific. On an aggregate level, the manufacturing sector in Malaysia showed no significant nor lasting exposure. As seen in Table 3.1, the sales value of own manufactured goods recorded increased growth rates in 2018 (7.7%) and 2019 (4.9%). Likewise, a positive trend is also seen in the number of employees engaged (Table 3.1).

Table 3.1 Sales value and number of employees of the manufacturing sector, Malaysia, 2016–19

Year	Sales value of own (ex-factory)		Number of employees engaged at end of period	
	Total (RM'000)	YoY (%)	Total	YoY (%)
2016	673,222,108	1.3	1,032,897	0.6
2017	765,772,453	13.7	1,057,591	2.4
2018	824,839,857	7.7	1,075,635	1.7
2019	866,018,558	4.9	1,090,614	1.4

Source: Monthly Manufacturing Statistics, Department of Statistics, Malaysia.

The US-China trade war eased temporarily when the COVID-19 pandemic went global, affecting the global manufacturing sector. This effect became prevalent when Malaysia implemented the Movement Control Order (MCO) (Box 3.1). The IHS Markit Malaysia Manufacturing Purchasing Managers' Index in April 2020 was 31.3, down sharply from 48.4 in March. The decrease in new orders, supply-chain delays, and longer delivery times have severely restricted demand for goods (IHS Markit, 2020).

Box 3.1 The impact of COVID-19 on Penang's manufacturing supply chains[22]

By Ong Wooi Leng

The MCO reveals the importance of the local manufacturing supply system. China has been the largest supplier worldwide, with more than 5 million companies with Tier 1 and Tier 2 linkages impacted by the virus. In reality, only 15.2% of businesses in the Chinese manufacturing sector were impacted by lockdowns, and these were largely confined to Guangdong, Zhejiang, and Shandong.

Although the proportion seems small, the ripple effect of the supply-chain disruption has been enough to damage global business operations and supply chains significantly. This affected all industries, including E&E, machinery and equipment (M&E), medical devices, and others. With the MCO in place, many companies are having to consider whether a China-centric supply chain is sustainable, despite the fact that cost of input and technical capabilities are major concerns. Compared with 2004 (during the SARS epidemic), about half of companies today said that they are now more reliant on China as a direct or indirect supplier.

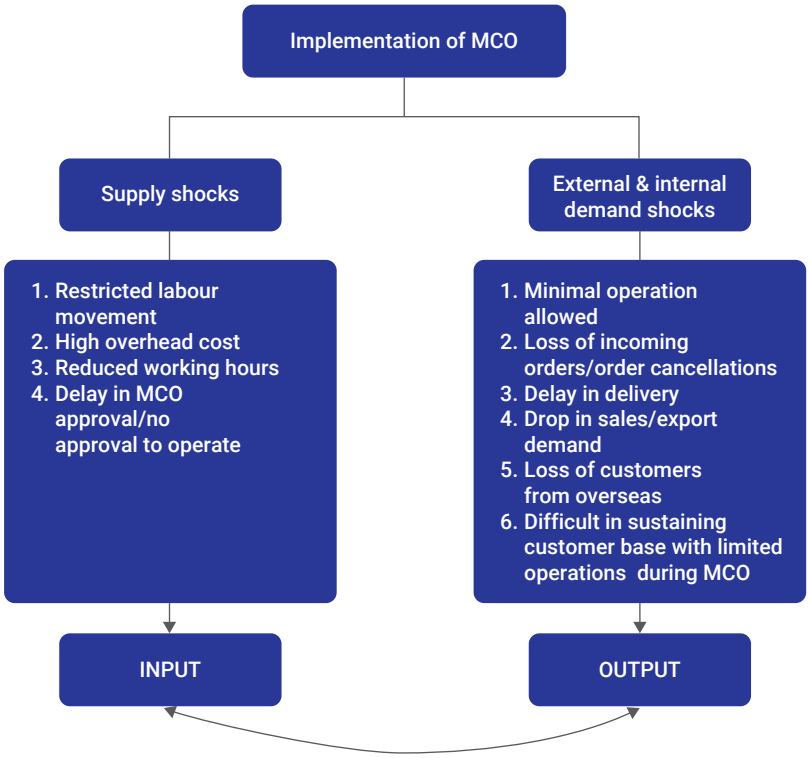
With the new border control measures, firms that have relied on overseas supply chains will have to look for alternative suppliers and parts that are available locally. A study conducted by the Penang Institute found that some multinational corporations (MNCs) have obtained most of their supplies from companies in Malaysia. This shows the importance of local and foreign companies in expanding their supply chain base and have multiple alternative suppliers, as well as the importance of enhancing the supply chain management system.

[22] Adapted from Ong, W.L. and Lee, S.M. (2020).

This can be done through supply network mapping by collecting information related to suppliers, sites, parts, and products, and then making an assessment. With Penang having a well-developed manufacturing ecosystem, an inventory of local suppliers is urgently needed, especially when supply chains are disrupted on a global scale.

The MCO has had a two-way effect on manufacturing firms in Penang and Malaysia. This can be summarized through supply and demand shocks as presented in Figure 3.4.

Figure 3.4 A summary of supply and demand shocks to manufacturing operations in Penang



Source: Survey responses (N=22).

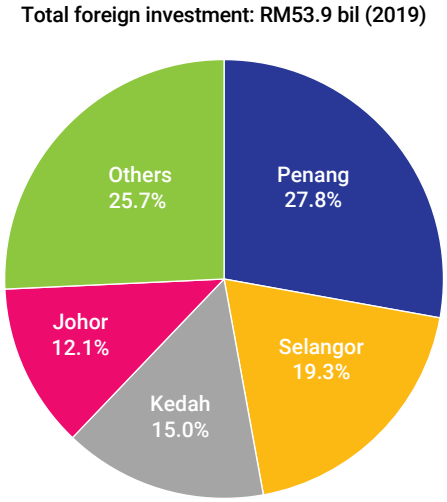
During emergencies, the study proposed that policymakers should undertake the following strategies in their policymaking. These include:

a. Making clear guidelines available for both employers and employees in emergency situations.
b. Providing staggered financial assistance to SMIs/SMEs.
c. Enhancing improved collaboration between the state and federal governments to develop a practical containment strategy at the corporate level.
d. Enabling systematic, effective, and coordinated policies across government departments.

Penang is observing a more significant and lasting impact on its manufacturing sector because of the trade war. A significant portion of Penang's manufacturing activity is in the electrical and electronics products and transport equipment and other segments, which align with the sectors most affected by the US import tariffs (Bown et al., 2018). Such sectors have seen a rise in exports as reported in Chapter 2.2 of this report. Feedback from industries in these sectors have correspondingly reported various strategies by exporters to circumvent such tariffs, largely involving shifting production and outsourcing partners to Penang, given its long history and experience in manufacturing supply chains (Pearl, 2020).

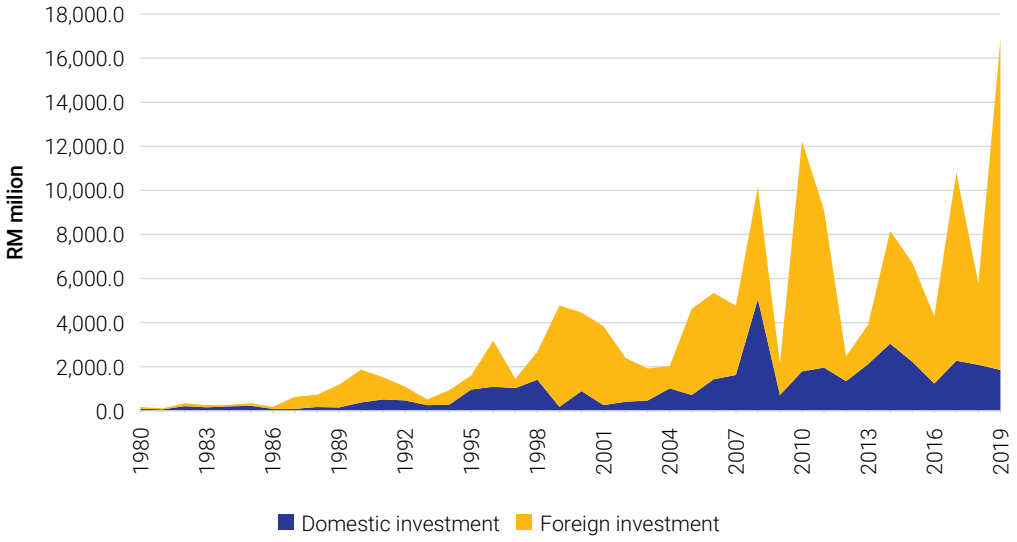
The year 2019 also saw Penang reporting the highest-ever total approved manufacturing investment: 166 manufacturing projects amounting to RM16.9 billion (Figure 3.6). This accounted for about 20.4% of Malaysia's approved manufacturing investment, a close second to Selangor, which accounted for 20.6% (Figure 3.5). Foreign direct investment made up as high as 27.8% of Malaysia's total approved investment or RM15 billion, representing the largest share of foreign direct investment in Malaysia. Top foreign investments were from the United States, Singapore, and the United Kingdom.

Figure 3.5 Percentage share of foreign direct investment by state, Malaysia, 2019



Source: Malaysian Investment Development Authority (MIDA).

Figure 3.6 Total investment in Penang, 1980–2019



Source: Malaysian Investment Development Authority (MIDA).

Among the foreign investors, the United States was Penang's primary investor, contributing over half of the total amount of approved manufacturing investment for the first three quarters of 2019. Announced investments included Micron Technology, Jabil Circuit, Bruker Malaysia, and National Instruments. Singapore was the second-largest foreign investor in Penang (12.3%), followed by the United Kingdom (10.1%) and Taiwan (5.9%).

[23] Besides the E&E sector, Penang has also placed an emphasis on the medical devices sector. Box 3.2 presents a summary of Penang's medical devices sector.

A breakdown by industry shows that the electrical and electronics (E&E) and scientific and measuring equipment (which includes medical devices) collectively accounted for 86% of Penang's total investments in 2019 (Table 3.2)[23]. E&E products are responsible for nearly 60% of Penang's total investments in 2019 (Table 3.2). This industry is expected to create 18,886 job opportunities, which is about twice the number of jobs created in 2018. In terms of the medical devices industry, Penang is home to seven medical devices firms that are in the top-25 worldwide (Box 3.2).

InvestPenang reports that this record investment amount is in part a strategy by manufacturers to diversify their geographical footprint amid the global trade war that began in 2018. This is particularly true for those in the aforementioned industries, which are directly affected by the trade war.

Table 3.2 Approved manufacturing investments by industry, Penang, 2019

Industry	Employment		Domestic investment		Foreign investment		Total capital investment	
	No.	% share	RM mil	% share	RM mil	% share	RM mil	% share
Electronics and electrical products	12,432	65.8	351.5	18.9	9,543.7	63.6	9,895.1	58.7
Scientific and measuring equipment	1,687	8.9	65.0	3.5	2,388.2	15.9	2,453.2	14.6
Machinery and equipment	1,306	6.9	242.5	13.1	2,151.8	14.3	2,394.3	14.2
Non-metallic mineral products	173	0.9	19.5	1.1	423.2	2.8	442.8	2.6
Chemical and chemical products	148	0.8	401.5	21.6	30.4	0.2	431.9	2.6
Fabricated metal products	751	4.0	327.2	17.6	34.1	0.2	361.3	2.1
Plastic products	711	3.8	74.3	4.0	174.0	1.2	248.4	1.5
Transport equipment	319	1.7	97.7	5.3	123.9	0.8	221.6	1.3
Food manufacturing	424	2.2	102.7	5.5	2.2	0.0	104.9	0.6
Wood and wood products	194	1.0	15.1	0.8	41.1	0.3	56.2	0.3
Others	1359	7.2	275.6	14.9	131.1	0.9	406.8	2.4
Total	**18,886**	**100**	**1,854.9**	**100**	**15,000.4**	**100**	**16,855.4**	**100**

Source: Malaysian Investment Development Authority (MIDA).

Box 3.2 Industry mapping and value chain analysis of medical devices companies in Penang[24]

By Dr Lee Siu Ming

While the electrical and electronics (E&E) industry remains as a major driver of Penang's investments (54% of total approved investments in 2014–18) and industrial activities, the state has experienced diversification in its industrial activities, with one major industry being the medical devices manufacturing. Penang has established itself as a destination of choice for the manufacture of orthopaedic and cardiovascular products.

Seven of the world's top-25 medical devices manufacturers have operations or have announced their investments in Penang: Abbott Laboratories, Cardinal Health, Boston Scientific, B.Braun, Smith and Nephew, Canon Inc., and Haemonetics.

[24] Adapted from Lee, S. M. (2020).

Based on data from International Trade Centre (ITC), complemented by data from the Malaysia External Trade Development Corporation (MATRADE) and directories of the Malaysian Industrial Development Authority (MIDA) and Association of Malaysian Medical Industries (AMMI), around 30 companies were identified in the medical devices manufacturing industry in Penang. A large concentration of firms is involved in the product categories of disposables, surgical instruments, and therapeutics. A high concentration of foreign firms was observed in the surgical instruments and therapeutic segments.

Table 3.3 Medical devices companies in Penang by product segments

Disposables	Surgical instruments	Therapeutic
Latex-based	Alliance Contract Manufacturing Sdn. Bhd.	Alliance Contract Manufacturing Sdn. Bhd.
Alliance Rubber Products Sdn. Bhd.	Ambu Sdn. Bhd.	B Braun Surgical Sdn. Bhd.
Central Elastic Corporation Sdn. Bhd.	B Braun Surgical Sdn. Bhd.	Boston Scientific (Malaysia) Sdn. Bhd.
Concept Rubber Products Sdn. Bhd.	B.Braun Medical Industries Sdn. Bhd.	Knowles Electronics (Malaysia) Sdn. Bhd.
Dongkuk Techco Rubber Industries Sdn. Bhd.	B.Braun Pharmaceutical Industries Sdn. Bhd.	Orthomedic Innovations Sdn. Bhd.
Gaw Rubber Products Sdn. Bhd.	Boston Scientific (Malaysia) Sdn. Bhd.	Straits Orthopaedics (Mfg) Sdn. Bhd.
Kai Sik Towa Rubber Products Sdn. Bhd.	Knowles Electronics (Malaysia) Sdn. Bhd.	Symmetry Medical Malaysia Sdn. Bhd.
Mapa Gloves Sdn. Bhd.	Lake Region Medical Sdn. Bhd.	UWC Healthcare Sdn. Bhd.
Nastah Industries Sdn. Bhd.	Orthomedic Innovations Sdn. Bhd.	Vigilenz Medical Devices Sdn. Bhd.
Profound Rubber Industries Sdn. Bhd.	St. Jude Medical Operations (Malaysia) Sdn. Bhd.	Visco Technology Sdn. Bhd.
	Straits Orthopaedics (Mfg) Sdn. Bhd.	Woodridge Life Sciences Sdn. Bhd.
Non-latex	Symmetry Medical Malaysia Sdn Bhd	
Alliance Contract Manufacturing Sdn. Bhd.	Vigilenz Medical Devices Sdn. Bhd.	
Ambu Sdn. Bhd.	Visco Technology Sdn. Bhd.	
B Braun Surgical Sdn. Bhd.	Woodridge Life Sciences Sdn. Bhd.	
B.Braun Medical Industries Sdn. Bhd.		
B.Braun Pharmaceutical Industries Sdn. Bhd.		
Boston Scientific (Malaysia) Sdn. Bhd.		
CCB Medical Devices Sdn. Bhd.		
Engineered Medical Systems Malaysia Sdn. Bhd.		
Haemonetics Malaysia Sdn. Bhd.		
Knowles Electronics (Malaysia) Sdn. Bhd.		
Lake Region Medical Sdn. Bhd.		
Orthomedic Innovations Sdn. Bhd.		
St. Jude Medical Operations (Malaysia) Sdn. Bhd.		
Straits Orthopaedics (Mfg) Sdn. Bhd.		
Symmetry Medical Malaysia Sdn. Bhd.		
UWC Healthcare Sdn. Bhd.		
Vigilenz Medical Devices Sdn. Bhd.		
Woodridge Life Sciences Sdn. Bhd.		

Diagnostics equipment	Parts	Others
Alliance Contract Manufacturing Sdn. Bhd.	B Braun Surgical Sdn. Bhd.	
Canon Medical Systems		
Polar Electro Malaysia (M) Sdn. Bhd.		

Source: Penang Institute compilation based on ITC data according to classification in Bamber and Gereffi (2013) and Torsekar (2018).

There is also a more observable concentration of local firms for disposables largely due to the presence of firms in the latex-based industries (accounting for about 33% of the firms in disposable category).

The beneficiaries of the economic spill-overs of medical devices firms' investments in Penang include suppliers in terms of metal, plastic, and chemicals; contract packaging; contract sterilization; medical trading companies; and other related E&E companies involved in the industry.

Figure 3.7 Global value chain for medical devices manufacturing

Source: Bamber and Gereffi (2013).

The highest concentration of medical devices companies in Penang are involved in components manufacturing, assembly, and production. Companies such as B.Braun and Ambu have established centres of excellence (CoEs) while Vigilenz and CCB Medical Devices have established R&D capacity (described as a high-value segment). With more global OEMs focusing on investments in innovation and advanced technologies, specialized contract manufacturers in Penang can gain traction through engineering capabilities and the ability to scale capacity. Localisation by multinationals to local suppliers appears to be relatively more challenging than other industries due to stringent medical devices standards and local companies' capability to scale.

Table 3.4 Principal statistics of manufacturing sector by state, 2017

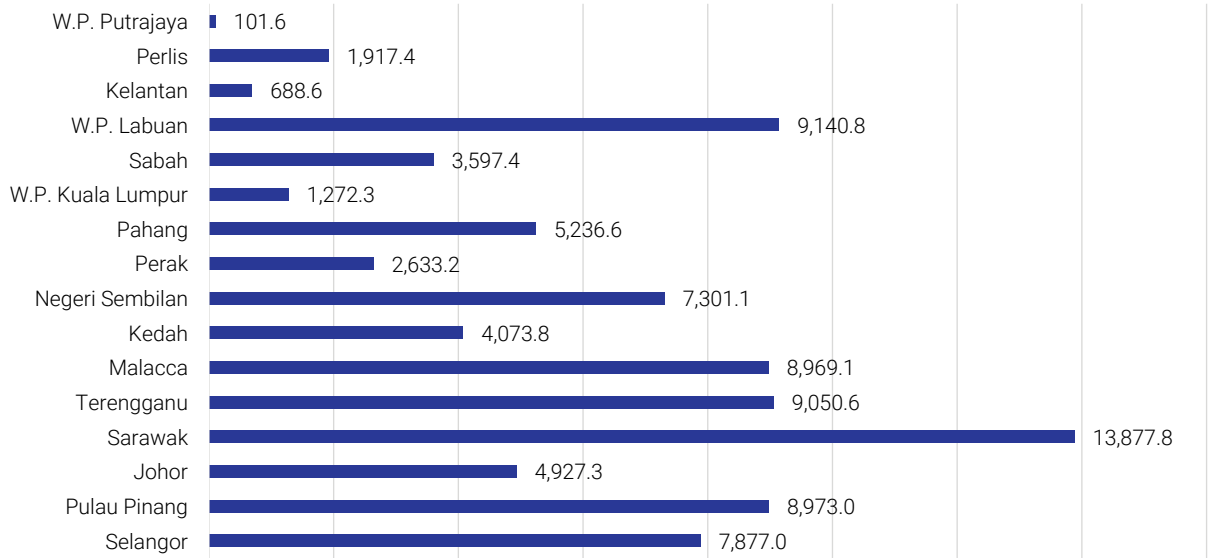
State	Value added (RM mil)	Total number of persons engaged	Salaries and wages paid (RM mil)	Average salaries and wages paid (RM'000)	Value added per worker (RM`000)
Selangor	82,174.9	661,676	24,049.9	36.3	124.2
Penang	40,611.9	288,127	12,164.6	42.2	141.0
Johor	39,926.4	473,278	13,770.6	29.1	84.4
Sarawak	37,428.4	101,324	3,062.5	30.2	369.4
Terengganu	14,709.3	26,620	1,176.4	44.2	552.6
Malacca	14,130.8	89,040	3,250.2	36.5	158.7
Kedah	13,687.2	105,181	3,258.0	31.0	130.1
Negeri Sembilan	13,611.3	81,028	3,081.9	38.0	168.0
Perak	11,645.3	143,161	3,930.2	27.5	81.3
Pahang	9,148.3	46,682	1,607.1	34.4	196.0
W.P. Kuala Lumpur	7,212.9	99,981	3,366.1	33.7	72.1
Sabah	6,744.7	68,059	1,489.2	21.9	99.1
W.P. Labuan	1,170.0	2,920	150.9	51.7	400.7
Kelantan	1,034.3	21,410	376.5	17.6	48.3
Perlis	807.4	6,362	145.8	22.9	126.9
W.P. Putrajaya	0.7	34	0.5	16.1	20.9
Total	**294,043.8**	**2,214,883**	**74,880.6**	**33.8**	**132.8**

Source: Penang Institute estimates based on data from Annual Economic Statistics (Manufacturing) 2018, Department of Statistics, Malaysia.

Malaysia's manufacturing firms created an average of RM5.9 billion of value-added to the economy in 2017. Table 3.4 shows that Penang ranked second in total value created by manufacturing industries in Malaysia; this is closely followed by Johor. Penang created about RM41 billion worth of value from its intermediate input, with its gross output valued at RM180.7 billion and intermediate input at RM140 billion in 2017.

Looking at Malaysia's top manufacturing states—Selangor, Penang, and Johor—Penang recorded a larger average value-added per employee than Selangor, even though the latter produced the highest sum of value-added in Malaysia[25]. With 4,526 establishments responding to the Survey of Manufacturing Industries conducted by the Department of Statistics Malaysia, an average of RM9 billion worth of value was generated by each manufacturing firm within Penang, compared with RM7.9 billion of value created by each firm from a total of 10,432 firms in Selangor (Figure 3.8). We can infer that Penang's manufacturing industry is generally of high value, more capital-intensive, and less low-skilled-labour intensive.

Figure 3.8 Average value-added generated by manufacturing firms in Malaysia (RM million), 2017



Source: Penang Institute estimates based on data from Annual Economic Statistics (Manufacturing) 2018, Department of Statistics, Malaysia.

With regards to states with a high concentration of medium and high-tech manufacturing industries, Penang surpassed Selangor, Johor, and Kedah with RM141,000 of value generated by each employee. This indicates that the Penang workforce is involved in relatively high value-added operations.

Meanwhile, firms in Selangor accounted for the highest sum of salaries and wages paid to their employees in the manufacturing industries. However, Table 3.4 shows that while Selangor's manufacturing firms spent almost twice as much as those in Penang, the average salaries and wages paid in Penang were RM42,200 compared with RM36,300 in Selangor, followed by RM29,100 in Johor and RM31,000 in Kedah. This indicates that workers who are engaged in manufacturing firms in Penang are compensated well above those in Selangor, Johor, and Kedah.

[25] In terms of value created by each worker, Terengganu had the highest value-added created, followed by Labuan (Table 3.4). This is largely attributed to refining crude oil activities and petroleum products, where the operations are of high value-added.

In 2020, Penang's manufacturing sector is expected to soften despite the expected materialization of investments. According to a study conducted by the Penang Institute, most industries will experience a U-shaped recovery from the pandemic—except the textile industry, which is likely to face an L-shaped recession—where the downturn is expected to continue for years. Since US and European countries are still enduring the pandemic, demand for manufactured goods, particularly E&E products, may be severely affected in the second half of 2020. Coupled with geopolitical tensions between the United States and China and the upcoming US general election, the employment situation may further deteriorate.

3.2 Services sector

3.2.1 Transportation and logistics

The success of Penang's logistics industry is heavily dependent on the state's transportation system. The former relies on the latter in order to play its role as a significant contributor to Penang's economic output, serving as a crucial enabler for the other industries which make up the backbone of state-wide economic activity.

The logistic industry makes significant direct contributions to the services sector. In 2017, it added RM5.3 billion to the state GDP, or 13.8% of Penang's total service sector output. The availability of an airport (the Penang International Airport, or PIA), seaports (the North Butterworth Container Terminal, or NBCT, and the Butterworth Deepwater Wharves, or BWCT), and road and rail networks allows the logistics industry to serve important support functions for the growth of other key industries in Penang.

Land

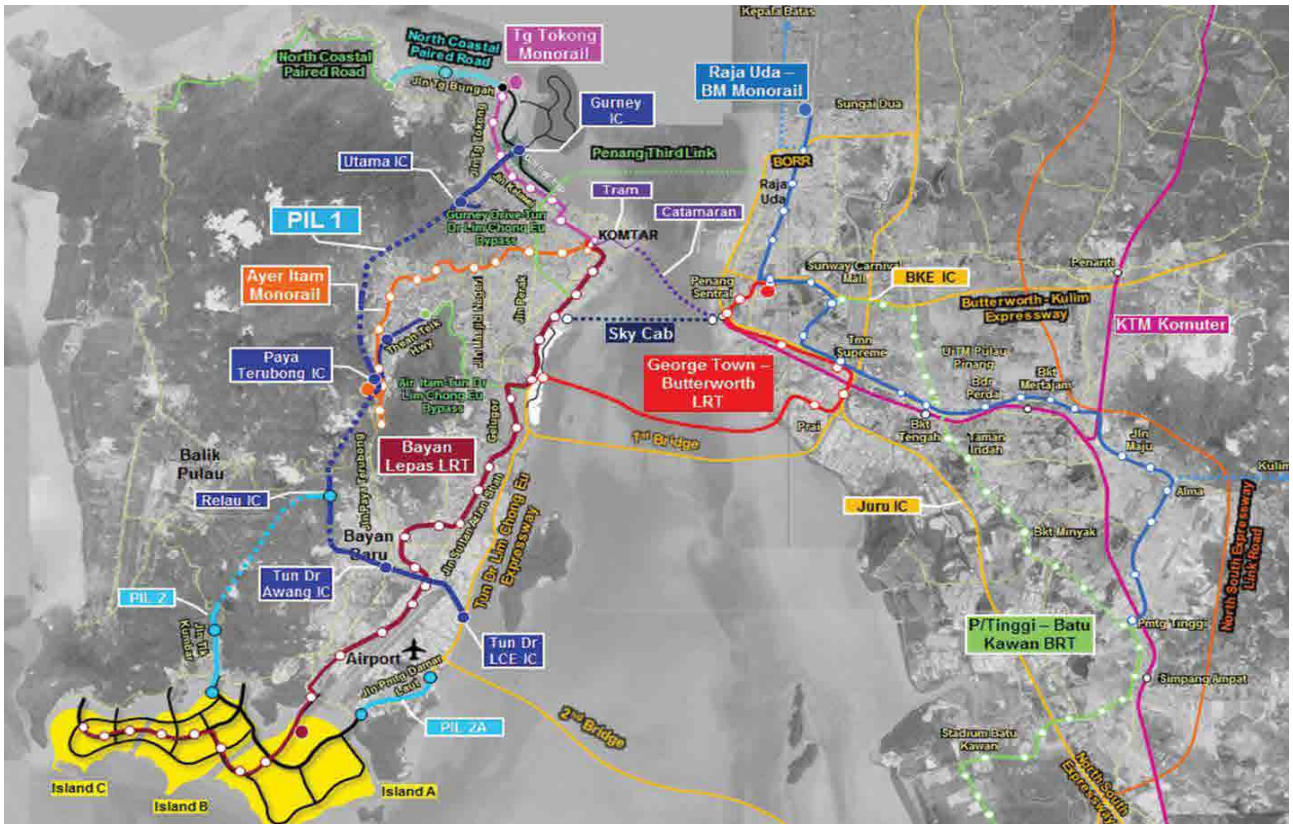
The Penang Transport Master Plan (PTMP) represents a crucial component of Penang's modernisation drive. Once completed, it will alleviate the growing issue of traffic congestion across the state, as well as enhance connectivity, accessibility, and liveability in Penang. Additionally, some of the projects under the PTMP will have positive effects for the state's logistics industry, which in turn will benefit the industries reliant on it. The PTMP's emphasis on public transport projects in the form of light rail transit (LRT), bus rapid transit (BRT), monorail, and tram services will serve to reduce the modal share accruing to private transport, currently estimated at over 95%. It achieves these goals primarily by providing the framework for a comprehensive and integrated transport system which enhances both land- and sea-based connectivity across Penang. The projects under the scope of the PTMP are listed in Table 3.5 below, and cover both public transport systems and new roads and highways, both on Penang Island and in Seberang Perai. Figure 3.9 provides a map of these projects.

Table 3.5 Projects under the Penang Transport Master Plan

Confirmed projects	Category	Length	Location
Bayan Lepas LRT	Public Transport	30km	Island
Georgetown–Butterworth LRT		18km	Island–S.P
Ayer Itam Monorail		13km	Island
Tanjung Tokong Monorail		7km	Island
Raja Uda–Bukit Mertajam Monorail		28km	S.P
Permatang Tinggi–Batu Kawan BRT		14km	S.P
George Town Tram Line		2km	Island
Pan Island Link 1	Highways	20km	Island
Pan Island Link 2		TBC	Island
Pan Island Link 2a		TBC	Island
North Coast Paired Road	Roads	15km	Island
Butterworth–Kulim Expressway Interchange		TBC	S.P
Juru Interchange		TBC	S.P
Unconfirmed projects	**Category**	**Length**	**Location**
Permalang Pasir–Perda link	Roads	7km	S.P
Bukit Minyak links		2km	S.P
Penang Third link	Undersea Tunnel	7km	Island–S.P

Note: SP denotes Seberang Perai
Source: Compiled from Penang Transport Master Plan (2019)

Figure 3.9 Map of PTMP projects



Source: Penang Transport Master Plan, retrieved from http://pgmasterplan.penang.gov.my/en/2019/07/ptmp-keseluruhan/

Priority projects under the PTMP are the Pan Island Link 1 (PIL1) and the Bayan Lepas LRT (BL-LRT). The former is a 20km highway linking the Gurney Interchange on the island's northeast to the Tun Dr Lim Chong Eu (LCE) Interchange, close to both PIA and the Penang Second Bridge. PIL1 is expected to alleviate traffic chokepoints along the LCE Expressway and its adjacent roads, including Jalan Tun Dr Awang and Jalan Sultan Azlan Shah, and in doing so shorten north-south travel times by 67% while improving accessibility to George Town, Paya Terubong, Bayan Baru, and Relau.

The BL-LRT, meanwhile, covers a distance of 29.5km and tentatively consists of 27 stations from Komtar in the north of Penang Island and ending in the upcoming Penang South Reclamation (PSR) Smart City. Additionally, the LRT will pass through high-demand areas such as Macallum, Jelutong, University Sains Malaysia, the Bayan Lepas Free Industrial Zone, and Penang International Airport, providing benefits to both the local population and tourists alike. At the same time, shifting traffic from private road transport to mass transport can mitigate greenhouse gas emissions significantly and contribute to the reduction of Penang's carbon footprint.

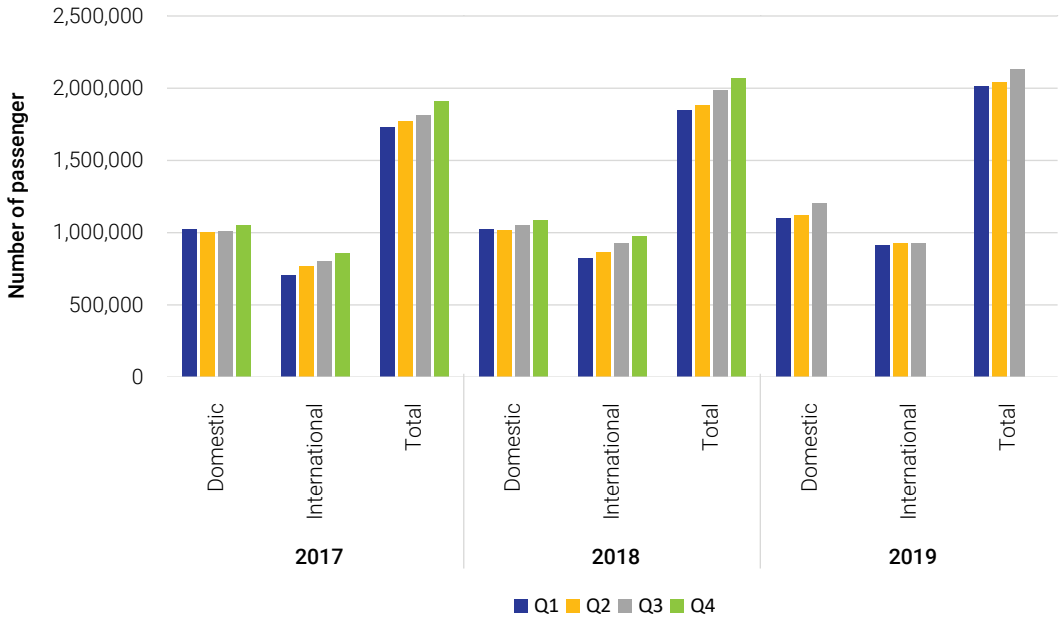
The George Town–Butterworth LRT and the Penang Third Link, an undersea tunnel connecting Gurney Drive to Seberang Prai, will provide the third and fourth links between Penang Island and Seberang Perai and significantly minimise travel times between the two areas. At the same time, reducing congestion in and around George Town is an important goal that will be helped by the development of the Ayer Itam and Tanjung Tokong monorail services, as well as the George Town tram line. In a state with more cars than inhabitants, these projects play an important role in helping the state government reach its target of achieving a public-private transport modal share of 40:60 over the next decade.

Air

The value of trade in Penang is heavily dependent on the state's airport. This is aided by the proximity of PIA to the Bayan Lepas Free Industrial Zone (BLFIZ), the heart of Penang's E&E industry. Trade value, inclusive of imports and exports, conducted through PIA is three times as large as Penang Port's North Butterworth Container Terminal. PIA accounts for a significant share of external trade conducted through air channels in Malaysia as a whole; it was responsible for approximately 66% (or RM359 billion) of air channel trade value in the country in 2019. This is in contrast with the share of total external trade value by sea accruing to Penang's seaports, which was only 8.9% (or RM90 billion). This suggests that PIA is the main gateway for trade in Penang, and, in turn, is heavily influenced by Penang's status as an E&E hub.

The key reason PIA is a beneficiary of the E&E industry's presence in Bayan Lepas stems from the nature of the industry. Final manufactured E&E goods have time-sensitive supply chains and are lightweight, possessing a high value-to-weight ratio. These characteristics make air transportation an ideal logistical choice for the industry. Given also that these products are manufactured primarily for the purpose of export rather than domestic consumption, these features explain PIA's air-trade dominance and the fact that it outperforms even Kuala Lumpur International Airport (KLIA). It also, however, means that the value of trade conducted through PIA is dependent, to a degree, on international trade developments.

Figure 3.10 Passenger traffic at Penang International Airport, Q1 2017–Q3 2019



Source: Transport Statistics Malaysia, Ministry of Transport, Malaysia.

Table 3.6 PIA passenger traffic growth, 2018–19

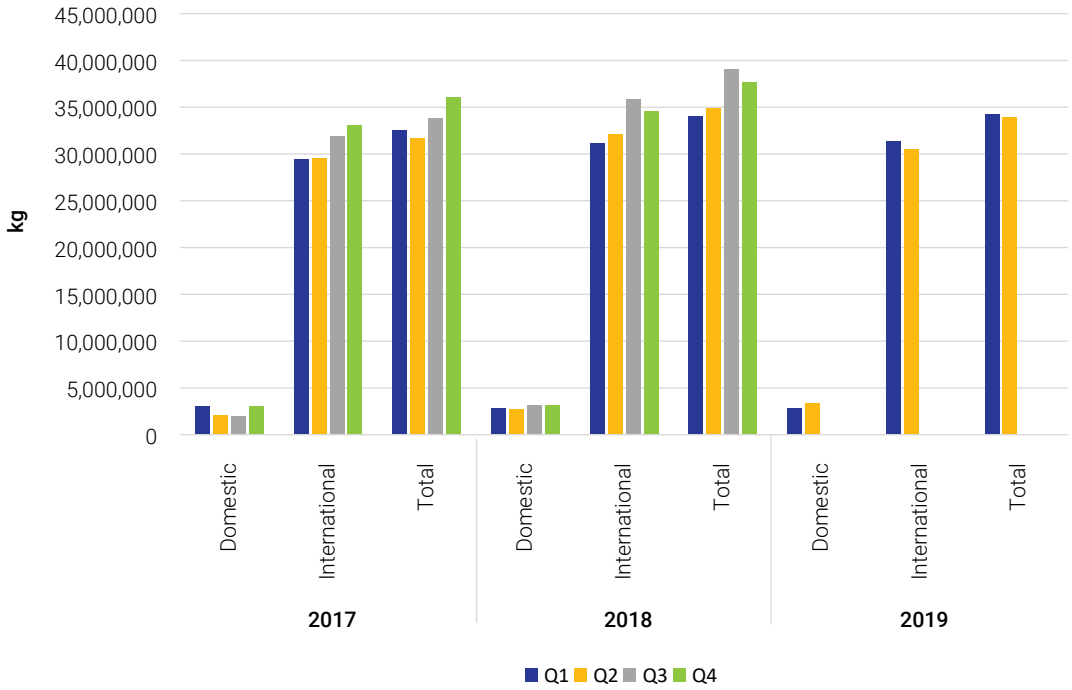
	Q1	Q2	Q3
Domestic	7.3%	10.3%	14.3%
International	11.5%	6.6%	-0.1%

Source: Penang Institute estimates based on data from Transport Statistics Malaysia, Ministry of Transport, Malaysia.

Passenger traffic through PIA has shown steady growth since 2017, and evidence from the first two quarters of 2019 suggests the pace of this growth is quickening. Compared with Q1 2018, domestic passenger traffic increased by over 7% in Q1 2019, and international passenger traffic by almost 11.5%. In the second quarter of 2019, domestic passenger traffic rose by over 10% relative to the same period last year, while international passenger traffic saw an increase of just under 7%. Domestic passenger traffic growth was even more rapid in the third quarter, but international passenger traffic showed signs of stagnation. Overall, 2019 has shown record passenger arrivals at PIA. For 2020, however, air passenger arrivals are expected to be vastly impacted by the global pandemic.

As far as cargo traffic at PIA is concerned, the picture is not as clear, and in terms of international cargo traffic, global trade tensions may be starting to have negative repercussions for Penang. While such traffic remained steady in Q1 2019 relative to Q1 2018, it fell by 5% in the second quarter relative to the same period last year. On a positive note, domestic cargo traffic increased by almost 24% in the second quarter of 2019, compared to 2018, after remaining flat through the first quarter.

Figure 3.11 Cargo traffic at PIA, Q1 2017–Q2 2019



Source: Transport Statistics Malaysia, Ministry of Transport, Malaysia.

Table 3.7 PIA Cargo traffic growth, 2018–19

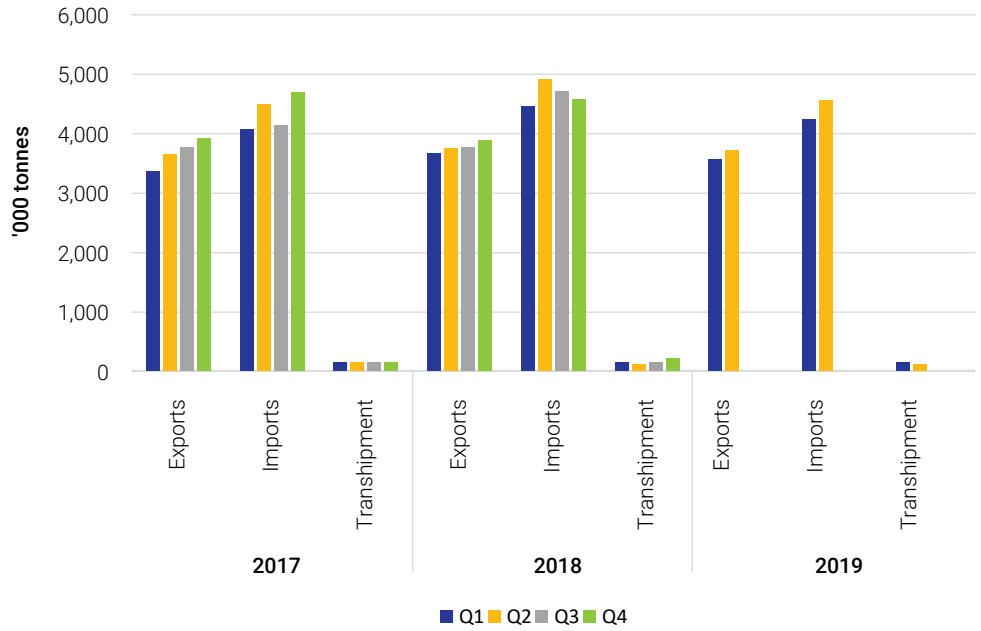
	Q1	Q2
Domestic	-0.8%	23.6%
International	0.7%	-5.0%

Source: Penang Institute estimates based on data from Transport Statistics Malaysia, Ministry of Transport, Malaysia.

Sea

While the E&E sector heavily utilises air transportation as its preferred mode of transport, other industries rely on both sea freight and road transport. This is primarily because of the nature of products and inputs which have lower value-to-weight ratios, as well as less aggressive production cycles. The availability of two key connecting nodes—NBCT and BWCT—have contributed to making Penang a strong choice for manufacturing industries that are more actively engaged in international trade, particularly those with business models that are sensitive to logistical costs.

Figure 3.12 Cargo throughput at Penang Port, Q1 2017–Q2 2019



Source: Transport Statistics Malaysia, Ministry of Transport, Malaysia.

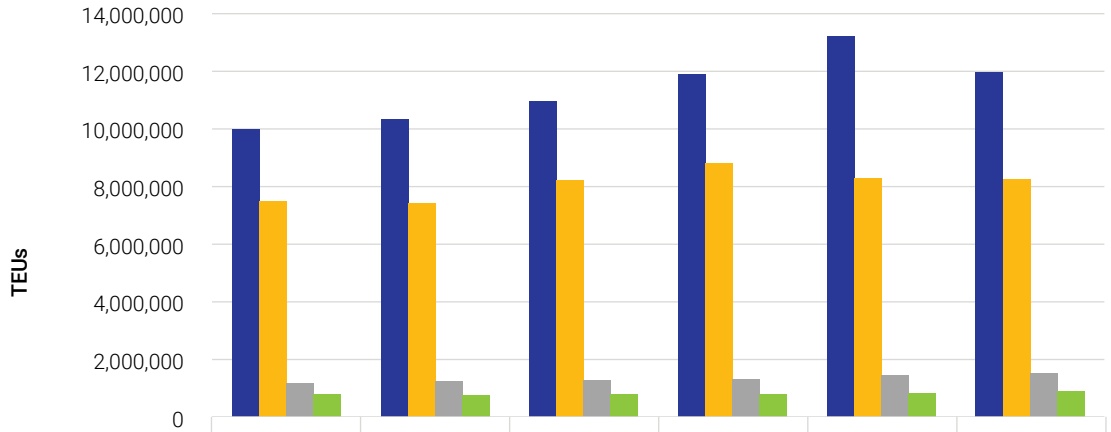
Table 3.8 Penang Port cargo throughput growth, 2018–19

	Q1	Q2
Exports	-2.5%	-0.6%
Imports	-4.6%	-7.0%
Transhipment	-0.7%	-2.3%

Source: Penang Institute estimates based on data from Transport Statistics Malaysia, Ministry of Transport, Malaysia.

Relative to Malaysia's largest seaports, Penang Port lags significantly in terms of total container throughput. Port Klang, the top performer in Malaysia, recorded an annual throughput eight times that of Penang on average between 2012 and 2017. Port of Tanjung Pelepas (PTP) is the nation's second-largest in terms of volume, averaging six times that of Penang over the same six-year period. In 2017, the volume handled at Port Klang was approximately 7.9 times that of Penang Port while the volume of containers in PTP was roughly 5.4 times larger than Penang Port's. Figure 3.13 highlights total container throughput at Malaysia's four major seaports: Klang, Tanjung Pelepas, Penang, and Johor.

Figure 3.13 Top-four performing ports in Malaysia by total container throughput



	2012	2013	2014	2015	2016	2017
Klang	10,001,495	10,350,407	10,945,804	11,886,685	13,209,577	11,978,166
Tanjung Pelepas	7,493,805	7,416,518	8,232,113	8,798,747	8,280,710	8,260,609
Penang	1,165,733	1,237,713	1,265,712	1,317,352	1,437,120	1,523,828
Johor	801,058	757,023	792,501	800,524	827,013	900,692

Source: Transport Statistics Malaysia, Ministry of Transport, Malaysia.

Penang Port is commonly categorised within the industry as a feeder port. This understanding is built upon Penang Port's primary function as a port that serves its regional market, i.e., the northern states of Malaysia. This conventional understanding, however, does not paint a wholly accurate picture. In practice, Penang Port also functions as a main port because it has liners that operate direct calls.

Penang Port does not only function as a port that caters to Malaysia's northern states; it is also a port for southern Thailand. The export volume originating from Thailand addresses the empty containers from imports. According to Penang Port Sdn. Bhd., Penang Port currently handles about 70% of the total product market share from southern Thailand, an area that covers 14 provinces in the south of Thailand.

Penang Port's functions varies according to who uses the port and the purpose for which they use it. With its current depth of 11–12m, the port may not be able to accommodate larger ships with higher TEU capacity, which typically require a draft depth of 12–15m or deeper.

Penang Port currently has a free commercial zone (FCZ) at the Butterworth Deep Water Wharves (BWCT), but presently the port has not fully realised the potential of an FCZ. The biggest reason for this is that the FCZ in BWCT is physically separated from NBCT. As NBCT does not have warehouse facilities, NBCT is suited only for full container load (FCL). Currently, traders still need to fulfil customs requirements and travel a distance of roughly 3.5km between NBCT and BWCT in order to utilise the FCZ at the latter. Plans are currently in place to extend FCZ status to the NBCT, which are elaborated upon in Box 3.3.

Box 3.3 Future developments at Penang's seaport

By Darshan Joshi

The current free commercial zone (FCZ) at Penang Port, located at the Butterworth Deep Water Wharves (BWCT), covers an area of 56.6 hectares and was gazetted in June 1996. The wharves encompass six berths, each with a depth of between 11 and 12m, and a land area of approximately 67 hectares with a storage capacity of 2,270,084 TEUs. Meanwhile, yard stacking comprises 6,669 ground slots and the export deck comprises 2,178 ground slots.

Expansions are ongoing at the NBCT, and once completed will culminate in increased capacity at Terminal 1. These upgrades are as follows:

- **Expansion Plan A:** Berth capacity is projected to increase by 194,366 TEUs (from 2.13 million to 2.32 million TEUs) after upgrades are completed. The upgrades involve extending the rear deck and rail gauge from 17m to 30.5m.
- **Expansion Plan B:** An additional increase of 412,530 TEUs (from 2.32 million to 2.74 million TEUs) is projected following the acquisition of two new Quay cranes.

Furthermore, there are plans to install a new FCZ at the NBCT, which is estimated to have a landmass of 83.61 hectares. There are multiple requirements before this can be approved, including the following:

1) Submission to MOF to gazette the NBCT, comprising a total of 83.57 hectares, as an FCZ.
2) Approval from the Penang state government on the appointment of the Penang Port Commission (PPC) as the zone authority.
3) Submission of layout plans to the Department of Survey and Mapping Malaysia (JUPEM) for the gazetting of the FCZ area and a "legal landing place".
4) Support from the Marine Department to gazette the whole NBCT as a legal landing place.

Other facilities required in the FCZ at NBCT are closed-circuit television (CCTV), street lighting, and fencing around the FCZ perimeter.

For the FCZ to realise its full potential and achieve benefits not solely limited to an increase in transhipment activities, land reclamation and dredging are required. This is because the existing area is only sufficient to support an increase in ship traffic and transhipment, but not additional value-added activities such as repackaging, which requires warehouses and distribution centres.

According to a study undertaken by Lee et al. (2020), in order to cater to the needs of large modern ships, landing berths at NBCT must be deepened. It is expected that 217 hectares of land will be reclaimed, consisting of:

1) A 65-hectare container yard. This is estimated to increase yard capacity by 2.38 million TEUs from the current 2.13 million TEUs.
2) A 22-hectare halal hub. An estimated gross development area of 250,000m2 will be available for warehousing.
3) A 130-hectare distribution park. An estimated gross development area of 1,320,000m2 will be available for warehousing. For this particular segment, Penang Port aims for the area to be gazetted as a free trade zone and intends to act as its administrator.

Figure 3.14 Existing and proposed reclamation at NBCT

Source: Google map image and information on reclamation based on information from Penang Port Commission and Penang Port Sdn. Bhd.

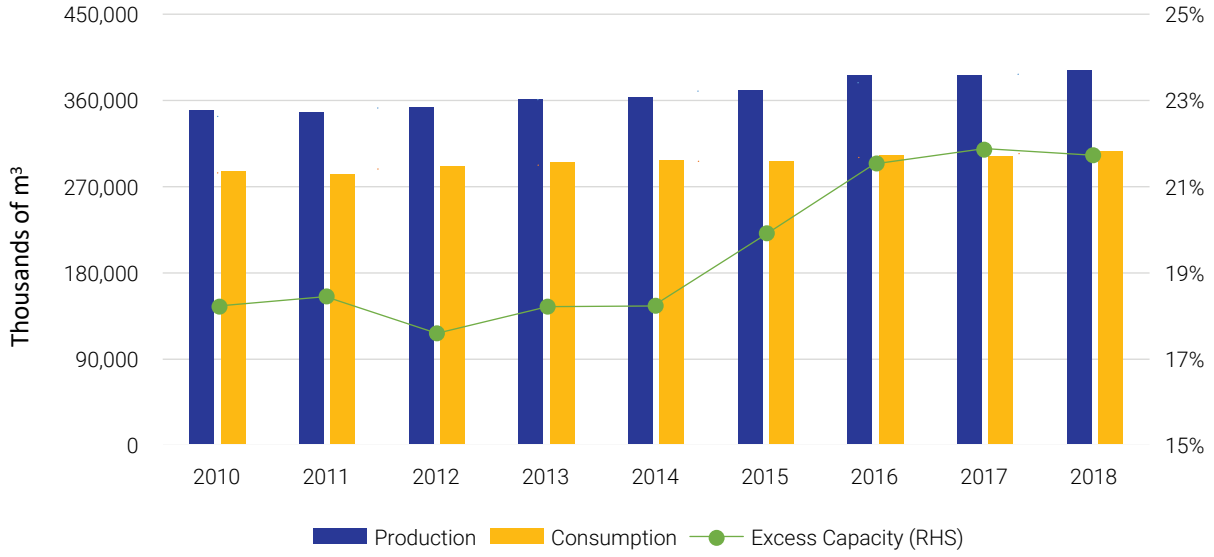
Two additional entry and exit points to the NBCT will be constructed to ease traffic congestion and cater to future growth in container volumes. These additional entrances are important; presently, there are numerous issues caused by congestion and inefficiencies related to the process of entering and leaving the NBCT. Spreading traffic across more entry and exit points will be a helpful measure, particularly if container volumes increase as a result of the instatement of the FCZ. There is no definitive timeline for these new entry and exit points, but it is understood that this process should be completed by 2024. Meanwhile, the current berth length (for six berths) at NBCT is 1.5km. Penang Port plans to double this length to 3km. It is projected that, with this future design in place, the container terminal will have the capacity to handle a total of 7.5 million TEUs.

3.2.2 Water and electric power demand and supply

Water

Since 2010, water consumption has been increasingly steadily in Penang, although at a rate slower than that water production. This is expressed by Figure 3.15 and Table 3.9. Overall, growth in water production was 12.1% between 2010 and 2018, while consumption rose by just 7.4%. As Figure 3.16 shows, much of this growth occurred because of an increase in industrial water use across the state, predominantly in Seberang Perai. Here, water consumption rose from 66.4 billion litres to 71.2 billion litres between 2015 and 2018, compared with an increase of roughly 2.2 billion litres on Penang Island. Domestic water consumption on the island remained fairly constant over this four-year period and increased by just 2.5 billion litres in Seberang Perai.

Figure 3.15 Water production, consumption and excess capacity in Penang, 2010–18



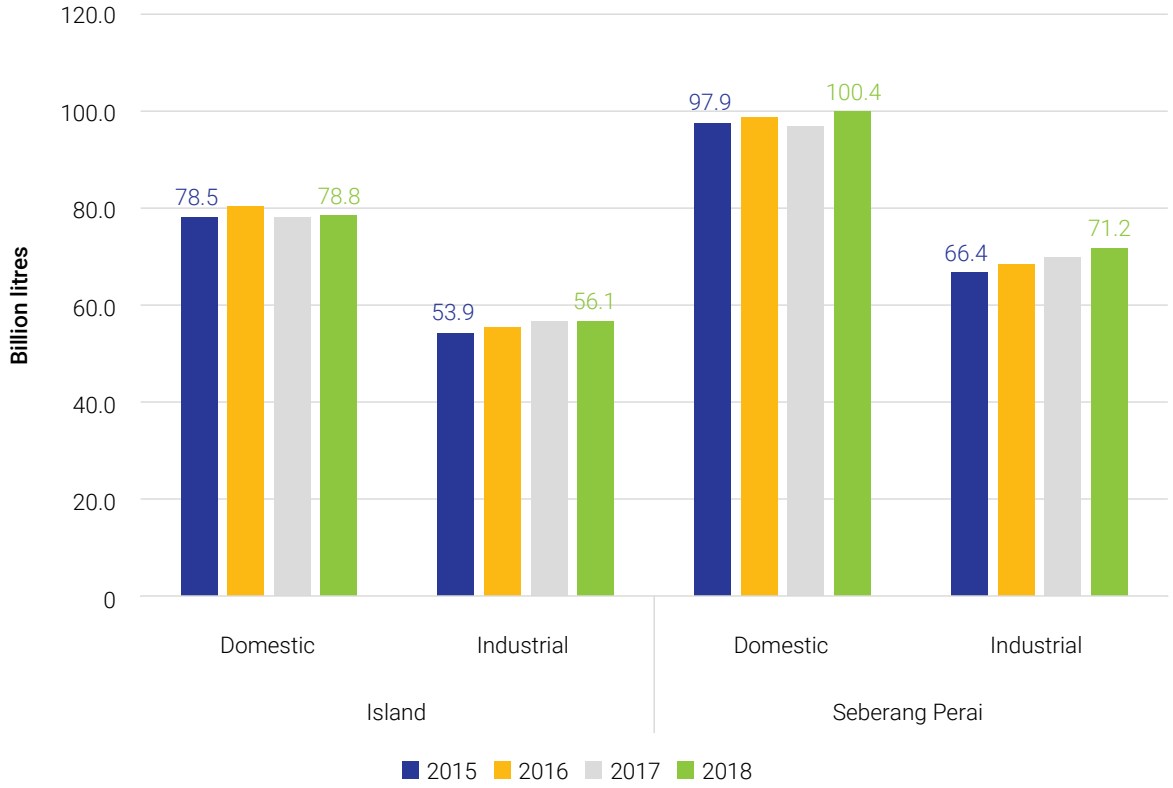
Source: Penang Water Supply Corporation (PBAPP).

Table 3.9 Year-on-year growth in water production and consumption in Penang

Year	Production	Consumption
2011	-0.63%	-0.85%
2012	1.62%	2.64%
2013	2.25%	1.54%
2014	0.69%	0.61%
2015	1.95%	-0.08%
2016	4.15%	2.01%
2017	0.11%	-0.33%
2018	1.45%	1.64%
2010–18	12.12%	7.35%

Source: Penang Water Supply Corporation (PBAPP).

Figure 3.16 Water consumption by sector in Penang, 2015–18



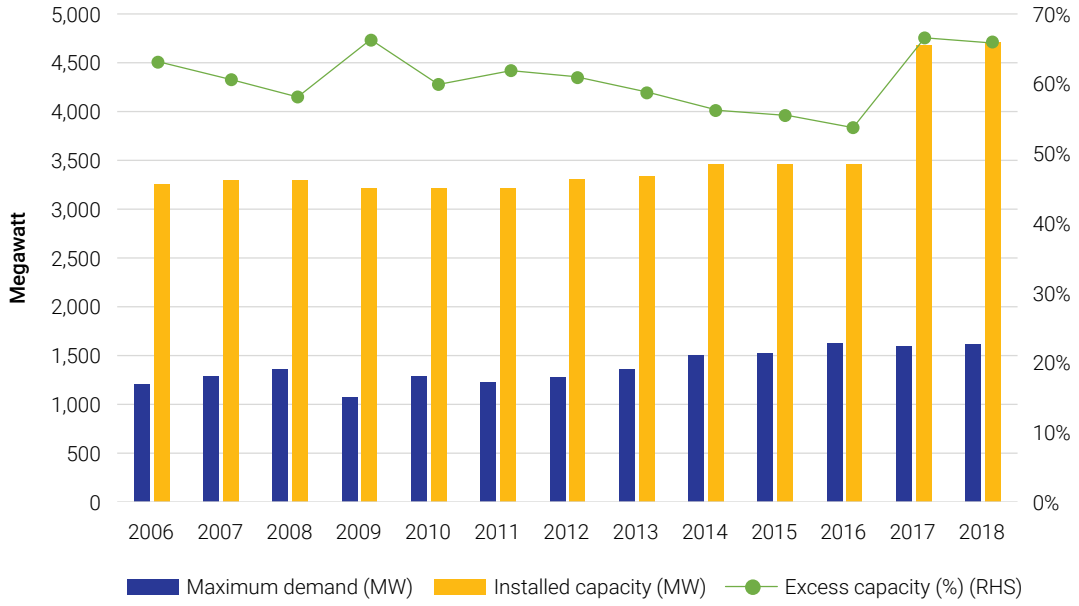
Source: Penang Water Supply Corporation (PBAPP).

Electricity

Penang enjoys a large amount of excess electricity capacity; since 2006, the reserve margin has not dipped below 50%, and since 2017 has exceeded 65% (Figure 3.17). In contrast, the national reserve margin was only around 30% in 2018. This was driven by a 36% increase in Penang's installed electricity capacity, rising from 3,456MW in 2016 to 4,680MW in 2017, and 4,710MW in 2018. Meanwhile, maximum electricity demand—which rose by over 25% between 2006 and 2014—slowed to an average annual growth rate of just 7.1% between 2014 and 2018 (Table 3.10).

The presence of a large reserve margin in Penang could allow for the state utility company to decommission older—and more polluting—fossil fuel power plants without threatening the stability of Penang's electricity system. Additionally, the government should encourage the adoption of renewable energy, particularly rooftop and large-scale solar, in order to further reduce greenhouse gas emissions associated with electricity generation in Penang. In 2016, renewable energy contributed only 14.67MW (0.4%) of the state's total electricity generation capacity of 3,456MW. This renewable energy came in the form of solar energy, which will enjoy a further 23.7MW boost to capacity once the approved large-scale solar (LSS) plant in Seberang Perai is operational. This figure, however, can and should be improved upon with a greater emphasis on solar, as well as biogas and biomass in the coming years.

Figure 3.17 Electricity supply, demand and excess capacity in Penang, 2006–18



Source: Tenaga Nasional Berhad (TNB).

Table 3.10 Annual growth in electricity demand and capacity in Penang, 2006–18

Year	Maximum demand	Capacity
2007	6.8%	1.2%
2008	6.0%	0.0%
2009	-21.1%	-2.5%
2010	19.5%	0.0%
2011	-4.1%	0.0%
2012	4.1%	2.8%
2013	6.3%	0.9%
2014	10.9%	3.7%
2015	1.1%	0.0%
2016	6.4%	0.0%
2017	-1.7%	35.4%
2018	1.3%	0.6%
2006–14	25.5%	6.2%
2014–18	7.1%	36.3%
2006–18	34.4%	44.7%

Source: Tenaga Nasional Berhad (TNB).

3.2.3 Global business services

The digital revolution has advanced business services by leveraging modern technologies into their operations. Artificial intelligence (AI), robotic process automation (RPA), cloud storage, big data, and block chain are seamlessly turning business operation models into a connected ecosystem to generate maximum value across the value chain. As the next GBS hub outside Kuala Lumpur, the GBS Focus Group (GFG) Penang Chapter was established in May 2019 and acts as a platform for industry players to share information and ideas, as well as to discuss concerns and challenges related to the industry (InvestPenang, 2019).

Penang is home to over 60 GBS companies, creating more than 12,000 high-value jobs in the areas of business processing, advanced knowledge processing, and information technology solutions. This has partially contributed to the rise of Penang's services sector, where the sector's share increased by 9.4 percentage points to 50.6% in 2018 from 41.2% a decade ago. In Penang, about one-third of its GBS companies have set up their manufacturing footprints for at least 20 years. These companies include B.Braun, Intel, Jabil, Motorola, and Osram. (InvestPenang, 2019).

While a few traditional business processing outsourcing (BPO) providers have established operations in Penang over the past 20 years, some business services have gone further by adopting intelligent operations through digitisation in recent years. Ranked second after Kuala Lumpur for its GBS investment hub, ICT and software development, and creative multimedia are two advanced services that recently gain international investing traction in Penang. Many MNCs involved in various type of services such as information technology and software development, as well as research and analytics, have established their advanced business services here, including UST Global, IHS Markit, and Clarivate[26].

For new GBS establishments, the guidelines for MSC Malaysia's financial incentives have been revised by the Malaysia Digital Economy Corporation (MDEC) effective 1 January 2019 as a result of Malaysia's participation in the Forum on Harmful Tax Practices (FHTP). In association with the Organisation for Economic Cooperation and Development (OECD) and the G20 countries, the new conditions would address issues on base erosion and profit shifting (Table 3.11). The MSC Malaysia status requirements have also been updated to incentivise the promotion of modern technologies and Industry 4.0 that are at the core of the digital revolution.

[26] A knowledge intelligence provider announced in July 2020, where the global business centre will provide world-class services to its customers worldwide from Penang (Acrofan, 2020).

Table 3.11 Selected incentive package and conditions under revised MSC Malaysia status guidelines for new establishments

MSC Malaysia status company	Tier 1	Tier 2	Tier 3
Percentage of income tax exemption	100%		70%
Exemption period	Five years		Five years
Extension of exemption period	Five years		May apply for extension provided that the company changed to Tier 1 or Tier 2 and fulfils the conditions imposed
Condition	**Tier 1**	**Tier 2**	**Tier 3**
To be complied with by the end of Year 2 from the commencement date of the exemption period and thereafter during the exemption period:			
Paid-up capital	RM500,000 (*minimum amount paid up capital needs to be increased to RM2.5million for the extension of exemption period for the second five-year period)		RM250,000
Full-time employees (comprising knowledge workers) with monthly base salaries	(i) 50 full-time employees with a monthly base salary of RM5,000; or (ii) 30 full-time employees with a monthly base salary of RM10,000 Data centre: Five full-time employees with a monthly base salary of RM5,000		(i) 30 full-time employees with a monthly base salary of RM5,000; or (ii) 20 full-time employees with a monthly base salary of RM8,000
Annual operating expenditure and investment in fixed asset	RM3.5 million Data centre: RM10 million		RM1 million
Percentage of Malaysian knowledge workers	70%		50%

Source: Malaysia Digital Economy Corporation (MDEC, 2019). Guidelines on MSC Malaysia Financial Incentives (Grandfathering and Transition under Services Incentives).

In order to create a high-income nation, creating high-value jobs by setting a minimum salary is important. In 2017, the average salary and wages paid within Penang's ICT industry was RM2,454, while that in Selangor was RM4,922 (Department of Statistics Malaysia, 2018a). Given the different lifestyles and standard of living—one which Penang is better known for—Penang has the advantage of having higher benchmarked salaries. It is expected that more knowledge workers will be attracted to Penang while taking non-salary measurements into consideration since city liveability can be an attractive pull factor. Nevertheless, the hiring of foreign knowledge workers must be allowed only when the company cannot obtain the required skillsets locally. Additionally, the salary bands proposed by MDEC would need fine-tuning at the state level, and must be based on years of experience and level of skill. For example, an experienced SAP functional analyst should be given a reasonable salary compared with the average salary offered in Kuala Lumpur.

In Penang, high demand for talent equipped with high proficiency in the latest software persists. According to Mr Kim Chin Kuang, vice-president of GBS Jabil Circuit, GBS operations require a location with access to an abundance of skilled and multi-lingual talent pool to work closely with teams in other parts of the world. Penang fits this criterion. In terms of technical proficiency, foreign knowledge workers play an important role in knowledge transfer. As mentioned in Section 2.6, the state imported 1,725 foreign workers in 2019, up 16.9% from 1,476 persons in 2018. Of this, about 89% worked in GBS in 2019 (Figure 2.17).

For GBS companies that are already in Penang, the immediate future appears to be dedicated to the pressing shift towards digitisation. This changing landscape focuses on delivering services through digital value-added analytics and automation, with a general preference away from the "shared services" moniker in favour of "integrated business/technology services"—the latter reflecting the critical role IT plays in automated services delivery. As the chairman of GFG Penang Chapter, Mr Kim believes that the new conditions set by MDEC will encourage companies to leverage on digitized operations that will improve the efficiency, effectiveness, and accuracy of companies' day-to-day operations, including existing back-end operations, as well as increasing the hiring of knowledge workers.

The GBS industry in Penang should not only facilitate everyday transactions, but also offer a broader perspective through value-added consulting and advisory services. To enable this, leveraging new technologies such as predictive analytics and big data must be done in tandem with diversifying the workforce. While on-the-job learning and continuous upskilling and reskilling are crucial for the GBS workforce, the task of ensuring a long-term supply of strong talent needs to start with the national education system. By providing opportunities to the younger generation to be exposed in the fields of programming, designing, and developing software, the foundation for the next generation of workers can be laid.

GBS Jabil Circuit has been collaborating with Universiti Sains Malaysia (USM) to train their employees to be citizen data scientists—people who generate models that leverage predictive or prescriptive analytics, but whose primary jobs are not in statistics and analytics (The Apex, 2019). This is to ensure that existing employees stay up-to-date with new technologies, processes, and requirements. They also work with partners such as MDEC, InvestPenang, TalentCorp, and the Northern Corridor Implementation Authority (NCIA) on different programmes to support their employees in transitioning to the new economy and marketplace.

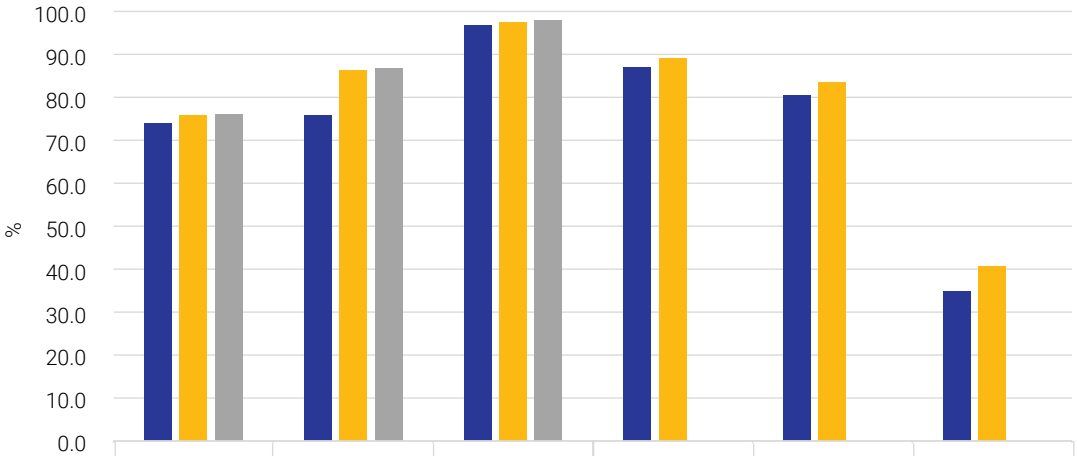
With the shift towards digitisation, GBS companies find themselves playing a more strategic and technical role within their parent companies rather than merely function as a business unit. This is because of the massive amount of critical data about the organisations and their operations that are collected by GBS units. In order to realise this potential, GBS companies require skills in the area of AI, automation, and analytics. However, this future-ready talent is still in short supply in Penang and Malaysia.

To accelerate the growth of the GBS industry, the Penang state government is establishing conducive office space and infrastructure for new GBS establishments. The Penang Development Corporation (PDC) will continue to study the need for more GBS facilities in other locations (The Star, 2020a). One such GBS office space is GBS@Mahsuri in Bayan Baru which is 80,000 sq ft and two storeys high. All office spaces have reportedly been fully booked, and tenants include companies like Clarivate (The Star, 2020b).

3.2.4 Information and communication

ICT usage among individuals and business establishments has been on an upward trend since 2015. As of 2018, at least 86.7% of Penang's population are connected to the internet (Figure 3.18). Computer usage and mobile phone usage also reached a four-year high of 75.9% and 97.9%, respectively. Likewise, the digital adoption in the business sector is also considered high: 89% of businesses conduct their operations with computers while 83.4% of businesses utilise the internet. Web presence, however, is significantly lower despite an improvement from 34.9% in 2015 to 40.6% in 2017.

Figure 3.18 Percentage of ICT usage by individuals and business establishments in Penang, 2015, 2017, and 2018



	Individual			All businesses		
	Computer	Internet	Mobile phone	Computer	Internet	Web presence
2015	73.9	75.7	96.7	87.0	80.4	34.9
2017	75.8	86.3	97.4	89.0	83.4	40.6
2018	75.9	86.7	97.9	-	-	-

Source: Malaysia Digital Economy 2018, Department of Statistics, Malaysia.

Penangites are seen to be highly connected, as broadband subscription rates sat at 151.5 subscriptions per 100 inhabitants in Q3 2019, signifying that the average person had registered for more than one subscription. Despite this, the internet speed in Penang is below average. In fact, Penang had the lowest average download speed for mobile broadband in Malaysia during the second half of 2019. Surprisingly, internet speeds for developed states such as Johor, Selangor, Kuala Lumpur, and Putrajaya are only middling (Table 3.12), with speeds slower than less-developed states such as Pahang and Terengganu.

Table 3.12 Average download and upload speed of mobile broadband by state, H2 2019

State	Average download speed (Mbps)	Average upload speed (Mbps)	Fastest service provider (based on download speed)
Pahang	26.83	12.69	Maxis
Labuan	25.27	12.65	Maxis
Perak	24.89	11.86	Maxis
Terengganu	24.57	12.15	Maxis
Negeri Sembilan	24.32	11.52	Maxis
Sarawak	24.29	11.78	Maxis
Kelantan	23.84	10.95	Maxis
Johor	23.38	12.03	Maxis
Selangor	23.29	11.67	Maxis
Sabah	22.96	12.14	Maxis
Kuala Lumpur	22.84	12.24	Maxis
Malaysia	22.75	11.79	Maxis
Putrajaya	22.49	11.99	Maxis
Kedah	20.85	11.41	Maxis
Malacca	20.67	11.68	Maxis
Perlis	19.84	11.18	Digi
Penang	19.31	11.70	Maxis

Note: The comparison is based on 4G speeds only; 3G is excluded. The average speed for a state is the simple average of speed reported by five ISPs, namely Celcom, Digi, Maxis, Unifi, and U Mobile in the state.
Source: Mobile Broadband Self-Declaration Report, Malaysian Communications and Multimedia Commission (MCMC), H2 2019.

As for fixed broadband speeds, the actual download speeds enjoyed by Johor, Kuala Lumpur, and Selangor were higher than the advertised speed, where their average speeds exceeded 100% of the subscribed packages (Table 3.13). Penang's speeds were the lowest among similarly developed states. Maxis is by far the fastest internet service provider (ISPs) for mobile broadband, while TT dotcom (TIME) has the best speeds for fixed-line internet. However, TIME's coverage is still limited. A significant number of residential housing areas (with low rise houses) in Penang are still unable to enjoy internet speeds provided by TIME as the company focuses on high-rise buildings.

Table 3.13 Average download and upload speed of fixed broadband by state, H2 2019

State	Average download speed (%)	Average upload speed (%)	Fastest service provider (based on download speed)
Johor	101.08	96.08	TIME
Kuala Lumpur	100.37	97.40	TIME
Selangor	100.36	96.76	TIME
Negeri Sembilan	99.82	96.43	TIME
Putrajaya	99.76	96.20	TM
Malaysia	99.72	96.12	TIME
Malacca	99.45	97.01	TIME
Penang	98.90	95.96	TIME
Sarawak	97.43	92.11	TM
Sabah	95.21	92.84	TM
Kedah	95.11	93.27	TM
Perak	94.89	93.67	TM
Terengganu	94.60	94.78	Maxis
Perlis	94.58	95.36	Maxis
Pahang	93.64	93.23	Maxis
Kelantan	90.66	93.87	Maxis

Note: Internet speed is expressed as the percentage of the subscribed packages. The average speed for a state is the simple average of speed reported by three ISPs, namely TM, Maxis, and TT dotcom (TIME). The data for Maxis is not available for Putrajaya while data for TIME is only available for Johor, Kuala Lumpur, Selangor, Negeri Sembilan, Malacca, and Penang.
Source: Wired Broadband Self-Declaration Report, Malaysian Communications and Multimedia Commission (MCMC), H2 2019.

Table 3.14 gives an insight into how businesses in Malaysia utilise the internet. While the share of businesses using the internet has increased significantly in 2017 for all purposes, the top-three uses identified are sending or receiving email (92.1%), internet banking (70.9%), and getting information about goods and services (67.3%). The only other purpose of usage reaching more than 50.0% engagement would be posting information or instant messaging (65.6%). On the lower spectrum of usage, only 14.6% of businesses used the internet to access other financial services (besides internet banking). The other two purposes with the lowest percentage of usage would be delivering products online (13.5%) and staff training (8.9%).

Table 3.14 Share of total business establishments in Malaysia by Internet usage, 2015 and 2017

Use of internet	2015 (%)	2017 (%)
Sending or receiving email	70.6	92.1
Internet banking	41.3	70.9
Getting information about goods or services	38.9	67.3
Posting information or instant messaging	36.6	65.6
Getting information from government organisations	23.5	40.5
Interacting with government organisations	16.5	32.5
Providing customer services	10.3	29.6
Telephoning over the internet	18.6	25.8
Internal or external recruitment	10.8	22.1
Accessing other financial services	9.9	14.6
Delivering products online	5.7	13.5
Staff training (e-learning application)	2.5	8.9
Others	12.5	19.0

Source: Malaysia Digital Economy 2018, Department of Statistics, Malaysia.

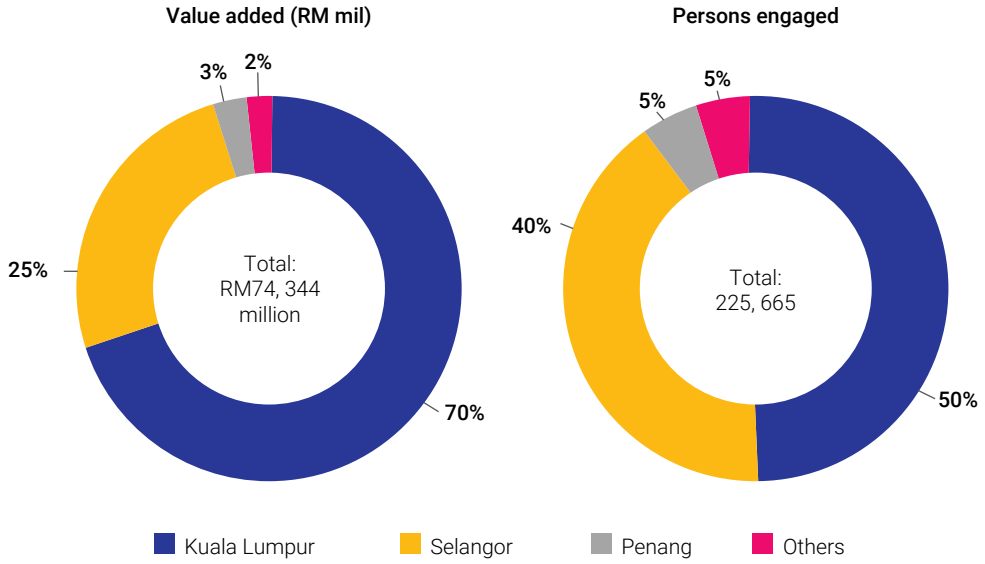
It is anticipated that the percentage of businesses using the internet for delivering products may increase during the COVID-19 pandemic. There has been an increase in small businesses switching platforms owing to the MCO, with some stating that it was necessary for the survival of their businesses (Zikri, 2020). Food businesses, including hawkers, have also started utilising the internet to deliver their products as demand for food deliveries surged. In Penang, the Penang Island City Council had launched JomBeli, an online delivery platform that catered towards the state's hawkers in hopes of increasing efficiency and sustaining their businesses during the pandemic (Dermawan, 2020).

A consistent, reliable, and fast internet connection is the key enabler to the digital economy. In 2018, the government implemented a new Mandatory Standard on Access Pricing (MSAP) to provide Malaysians with an internet connection at higher speeds and lower prices. Furthermore, a five-year National Fiberisation and Connectivity Plan (NFCP) was launched to improve the digital connectivity in the country, along with various 5G initiatives such as 5G Malaysia Showcase and 5G Demonstration Projects.

The value-added of Penang's ICT sector has grown significantly by 37.1% per year, from RM219 million in 2010 to RM1.995 billion in 2017 (Figure 3.19). In 2017, the sector produced a gross output of RM4.3 billion while engaging 11,170 persons. The ICT sector includes the following activities:

i. Motion picture, video, and television programme production; sound recording; and music publishing
ii. Programming and broadcasting;
iii. Telecommunication services;
iv. Computer programming, consultancy, and related activities; and
v. Information services.

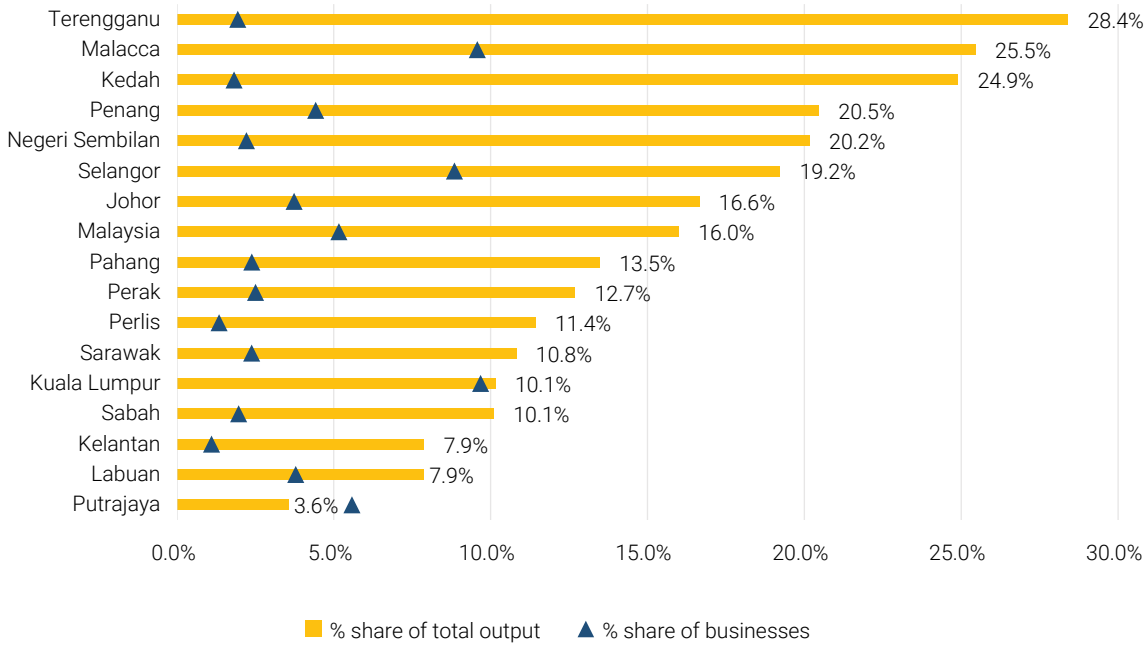
Figure 3.19 Value added and number of persons engaged in ICT sector in Penang, 2017



Source: Malaysia Digital Economy 2018, Department of Statistics, Malaysia.

The major ICT activities in Penang are computer programming, consultancy, and related activities (Department of Statistics Malaysia, 2017). Despite the rapid growth, there is still great potential for the ICT sector in Penang as it only constituted about less than 4% of the total value-added of the ICT sector in Malaysia (Figure 3.19).

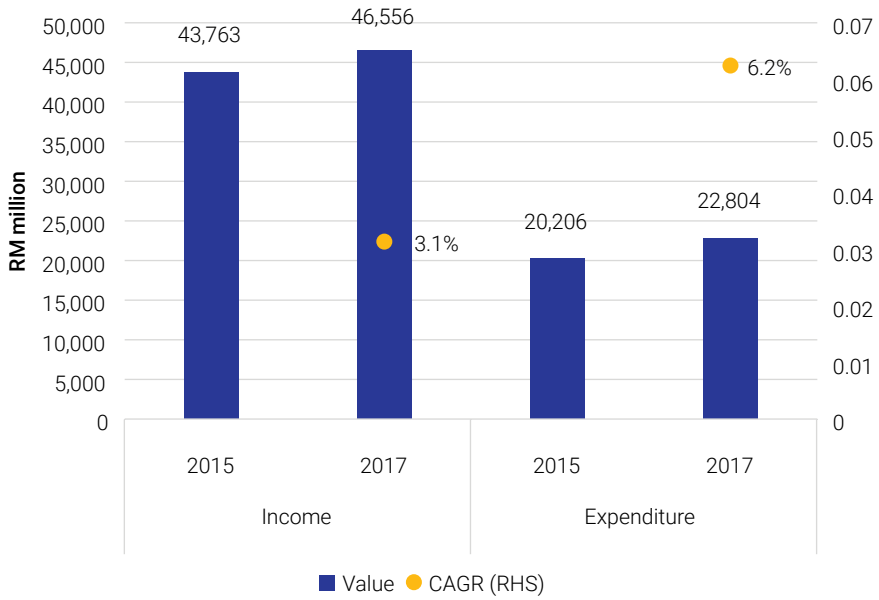
Figure 3.20 Share of business establishments involved in e-commerce and share of income to gross output by state, 2015



Source: Usage of ICT by businesses and e-commerce, Economic Census 2016 and SMEs, Department of Statistics, Malaysia.

Income generated by e-commerce has accounted for a significant share of total revenue of all businesses despite the relatively low involvement[27]. Interestingly, e-commerce has contributed larger share of income to total revenue for businesses in less-developed states such as Terengganu and Kedah, compared with Selangor, Johor, and Kuala Lumpur, indicating the important role of e-commerce as a main income source for businesses in the aforementioned states (Figure 3.20). In fact, Terengganu held the biggest percentage share of total output at 28.4%, while Kuala Lumpur ranked fifth from the bottom at 10.1%. Although only 4.4% of Penang's business establishments were involved in e-commerce during the period, the state held a 20.5% share of total output generated, ranking it fourth overall in the country.

Figure 3.21 Income and expenditure of e-commerce in Penang, 2015 and 2017



Source: Malaysia Digital Economy 2018, Department of Statistics, Malaysia.

In 2017, e-commerce income in Penang amounted to RM46.6 billion, an increase of 3.1% per year from 2015 (Figure 3.21). Meanwhile, businesses spent RM22.8 billion on e-commerce purchases, constituting almost half of the income, recording a compounded annual growth rate of 6.2%. This signifies that more companies are using e-commerce platforms to conduct their businesses and transactions. As penetration into digital commerce is still considered low, Penang's e-commerce has a lot of room to develop and grow.

3.2.5 Tourism

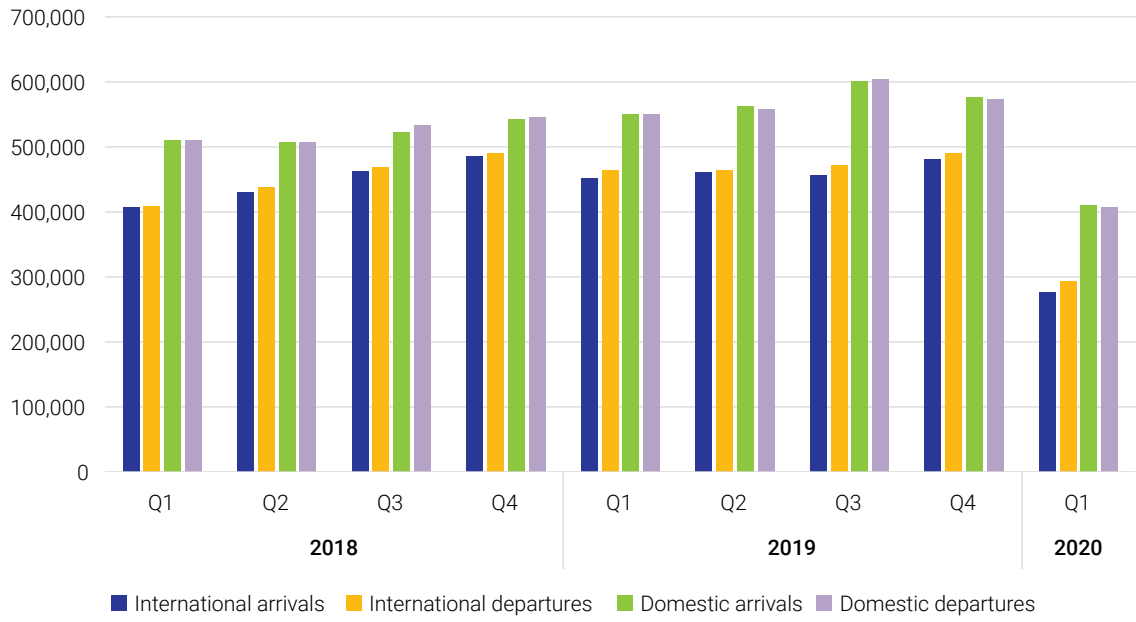
The tourism sector is a huge contributor to Penang's GDP and economic growth. As one of the most popular tourism destinations in the region and in the world, Penang attracts millions of tourists annually. Its local food, rich mix of cultures and traditions, historic heritage enclaves, and scenic beaches are often cited as the main attractions for tourists. In 2019, Penang was lauded by CNN Travel as one of the best places to visit in Asia (Springer, 2019a)

[27] The lower-than-expected involvement of e-commerce in businesses might be due to the method of calculation by Department of Statistics Malaysia, where the unit of measurement is the number of establishments instead of enterprises. The share might be undercounted if companies do not perform e-commerce at all establishments (or at least the establishments sampled) (World Bank, 2018).

while George Town was named as one of the most picturesque towns in the region (Springer, 2019b). The international exposure has greatly helped raise Penang's profile among international travellers.

Penang's tourism sector is made up of several sub-sectors, with medical tourism being one of the main sub-sectors that has significantly contributed towards tourism revenue. Other sub-sectors include heritage tourism, eco-tourism, cruise tourism, wedding tourism, education tourism, and meetings, incentives, conferences and exhibitions (MICE) tourism. The tourism industry also plays a significant role in stimulating economic growth, with the creation of new businesses in the food, retail, and accommodation industries providing more employment opportunities to Penangites. As a spill-over effect, the small business sector will be invigorated by trade, income, and entrepreneurship. However, there are also negative effects to the expansion of the tourism sector, with issues such as gentrification and harm to the environment. Therefore, it is vital to balance the growth and development of the tourism sector so that the industry remains sustainable in the long term.

Figure 3.22 Total arrivals and departures at Penang International Airport, 2018–19



Source: Ministry of Transport and Malaysia Airport Holdings Berhad (MAHB).

Arrivals and departures

Penang International Airport (PIA) represents one of the main entry points to Penang, with tens of thousands of travellers moving within the airport on any given day[28]. The airport generally saw a growth in passenger arrivals and departures in 2019, with the exception of international arrivals for the third and fourth quarters (Figure 3.22). Domestic arrivals and departures were at their highest in Q3 2019, while the numbers were highest for international travellers in the fourth quarter of the same year.

However, the situation has changed dramatically. With the COVID-19 pandemic taking root in early 2020, governments around the world have discouraged travel. Q1 2020 saw a significant decrease across the board for both domestic and international travellers.

[28] It must be clarified, however, that not all arrivals constitute of tourists, as some may be travelling for business and other purposes.

Table 3.15 Passenger growth at Penang International Airport by quarter, 2019

Passengers	% change			
	Q1	Q2	Q3	Q4
International arrivals	11.0%	7.1%	-1.2%	-1.0%
International departures	13.5%	6.2%	0.4%	0.1%
Domestic arrivals	7.8%	11.0%	15.2%	6.3%
Domestic departures	7.8%	10.0%	13.3%	5.0%
Total	**9.8%**	**8.7%**	**7.4%**	**2.7%**

Source: Penang Institute estimates based on data from Ministry of Transport and Malaysia Airport Holdings Berhad (MAHB).

Domestic arrivals and departures experienced higher growth rates compared with their international counterparts, with Q1 2019 being the only exception (Table 3.15). For Q1 2019, the growth for international arrivals and departures was 11.0% and 13.5% compared with their domestic equivalents, which recorded 7.8% growth for both categories. Domestic arrivals in the third quarter, with an increase of 15.2% in passengers, recorded the highest categorical growth. Q1 2019 recorded the highest growth in overall passenger movement (9.8%).

However, as observed in Figure 3.22, because of the gradual and global spread of COVID-19, passenger growth significantly decreased in the first quarter of 2020. With international arrivals and departures down by 38.8% and 36.9%, respectively, international passengers saw an overall decrease of 37.8%. Domestic travellers saw a 25.4% decrease for arrivals and a 26.1% decrease for departures, resulting in an overall decline of 25.7%. In April 2020, there were only 35 international departures and zero arrivals, while domestic travellers saw a drop of 98.3% from the preceding month.

Table 3.16 Total international arrivals and departures in Penang by country, 2018–19

Country	2018		2019		% change	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Indonesia	548,525	540,199	585,418	585,462	6.7%	8.4%
Thailand	187,253	196,652	187,416	196,857	0.1%	0.1%
Vietnam	56,694	57,203	60,299	62,923	6.4%	10.0%
Singapore	675,780	702,085	693,775	732,519	2.7%	4.3%
China	76,819	75,087	80,638	77,236	5.0%	2.9%
Hong Kong	170,431	166,968	164,630	157,165	-3.4%	-5.9%
Taiwan	46,517	45,049	47,899	47,237	3.0%	4.9%
Qatar	23,936	22,734	30,740	31,417	28.4%	38.2%
Total	**1,785,955**	**1,805,977**	**1,850,815**	**1,890,816**	**3.6%**	**4.7%**

Note: "Country" refers to the exit and entry point of airports, not the country of nationality.
Source: Penang Institute estimates based on data from Malaysia Airport Holdings Berhad (MAHB).

There were eight countries with direct flight connections to Penang. However, travellers from the eight countries do not represent the entirety of Penang's international visitors, as a significant proportion of travellers from other countries would have arrived in Penang via Kuala Lumpur International Airport.

Table 3.16 shows that the highest number of direct international travellers to Penang originated from Singapore, standing for 38.4% and 38.1% of total passengers in 2018 and 2019, respectively. Indonesian travellers were a close second at 30.3% for 2018 and 31.3% in 2019. Nonetheless, Indonesia's passenger growth was higher than Singapore's, with a 6.7% growth in arrivals and an 8.4% growth in departures against Singapore's 5.0% and 2.9% growth, respectively.

Despite having the lowest volume of passengers, Qatar recorded the highest growth rates of 28.4% in arrivals and 38.2% in departures. This is attributed to Qatar Airways entering its second year of providing direct flights to Penang, in addition to an extra flight weekly from July 2018 and a supplementary Friday flight providing connection to Langkawi from October 2019.

Data on travellers by country for the first half of 2020 have not been made available at the time of writing.

Table 3.17 Total domestic arrivals and departures in Penang by state and city, 2018–19

State/City	2018		2019		% change	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Johor	263,803	257,160	326,887	312,487	23.9%	21.5%
Kelantan	24,113	26,675	27,287	29,582	13.2%	10.9%
Pahang	N/A	N/A	5,959	5,872	N/A	N/A
Kuala Lumpur	1,167,702	1,173,781	1,200,698	1,203,464	2.8%	2.5%
Subang	270,904	275,827	308,327	312,261	13.8%	13.2%
Sabah	96,071	101,295	111,403	109,650	16.0%	8.2%
Sarawak	86,067	84,844	101,176	99,694	17.6%	17.5%
Malacca	11,990	11,961	40,751	40,505	239.9%	238.6%
Langkawi	162,417	164,921	169,690	171,335	4.5%	3.9%
Total	**2,083,067**	**2,096,464**	**2,292,178**	**2,284,850**	**10.0%**	**9.0%**

Source: Penang Institute estimates based on data from Malaysia Airport Holdings Berhad (MAHB).

The highest number of domestic arrivals and departures originated from Kuala Lumpur, where visitors accounted for 56.0% of total passengers in 2018 and 52.5% in 2019. However, Table 3.17 shows that Kuala Lumpur recorded the lowest growth in passenger movement, with only 2.8% growth in arrivals and 2.5% growth in departures. Subang passengers were the second-highest in 2018, while this spot was taken by Johor travellers in 2019. Even so, Johor sustained higher growth rates in 2019. Malacca had the lowest volume of passengers but recorded staggering growth rates of 239.9% in arrivals and 238.6% in departures.

Data on travellers by country and state for the first half of 2020 have not been made available at the time of writing. However, as seen in Figure 3.22, it can be concluded that travellers would be on the downward trend for the first two quarters of 2020. Travelers are expected to increase in phases when lockdown restrictions are lifted, but the volume of passengers are not anticipated to return to the level of previous years in the short term.

Hotels and accommodation

In 2018, there was a total of 192 hotels in Penang, although more than half were unrated. These unrated hotels are surmised to be small boutique and budget hotels that perhaps did not qualify for the star and Orchid system (a separate rating system for budget hotels). There were 12 five-star hotels in Penang, including Eastern and Oriental Hotel and Rasa Sayang Resort. Four-star hotels accounted for 10.4% with 20 hotels. These hotels also held the highest proportion of total rooms at 27.6%.

Homestays are another option of accommodation for tourists, especially international tourists. Tourism Malaysia, as part of the Ministry of Tourism, Arts and Culture, runs a Homestay Experience Programme (Program Pengalaman Homestay), where registered homestays are expected to provide opportunities for guests to immerse themselves in the daily lives of the community and understanding the local culture. The hosts play a major role in helping the guests to understand the way of life in the local community.

Table 3.18 Number and percentage of hotels and rooms by rating, Penang, 2018

Rating	Number of hotels	Percentage share of hotels	Number of rooms	Percentage share of rooms
5-star	12	6.3%	3,614	18.5%
4-star	20	10.4%	5,402	27.6%
3-star	14	7.3%	2,340	12.0%
2-star	13	6.8%	1,773	9.1%
1-star	3	1.6%	136	0.7%
3-Orchid	10	5.2%	799	4.1%
2-Orchid	9	4.7%	318	1.6%
1-Orchid	11	5.7%	254	1.3%
Unrated	100	52.1%	4,945	25.3%
Total	192	100%	19,581	100%

Source: Penang Institute estimates based on data from National Property Information Centre (NAPIC).

Table 3.19 Number of homestays, operators and rooms by district, Penang, 2019

District	Number of homestays	Number of operators	Number of Rooms
Timur Laut	0	0	0
Barat Daya	3	56	57
Seberang Perai Utara	2	25	32
Seberang Perai Tengah	3	46	65
Seberang Perai Selatan	3	107	110
Total	**11**	**234**	**264**

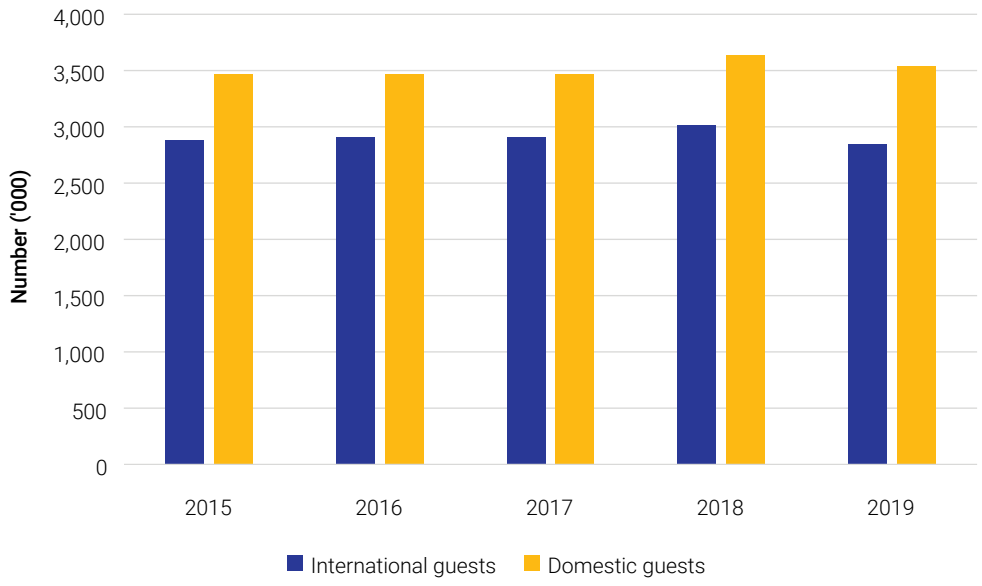
Source: Ministry of Tourism, Arts and Culture Malaysia.

As of 2019, the programme has registered 11 homestays in Penang, with Barat Daya, Seberang Perai Tengah, and Seberang Perai Selatan equally sharing the highest number of homestays with three establishments each (Table 3.19). Seberang Perai Selatan held the most operators and rooms—more than 50% greater in comparison with other districts with the same number of homestays.

According to statistics provided by the programme, domestic homestay tourists in Penang has been declining since 2016, reaching a five-year low of 3,663 guests in 2018. International homestay tourists, however, saw increases from 2014 to 2017, before dropping by 30.5% to 849 guests in 2018. Penang does not host a large number of homestay tourists; these are found in Pahang, Sabah, and Selangor.

However, the homestay statistics presented do not capture the number homestays that are not registered with the programme. Additionally, the statistics also excluded tourists staying in AirBnB, a choice of homestay-styled accommodation that has been increasingly popular among tourists and travellers.

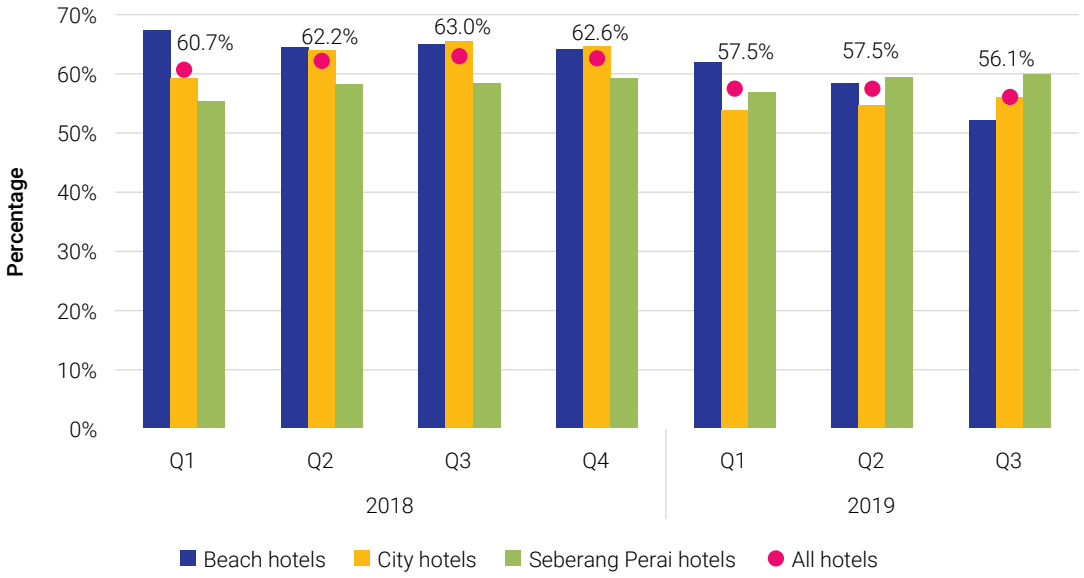
Figure 3.23 Total number of hotel guests by type, Penang, 2015–19



Source: Tourism Malaysia.

Figure 3.23 illustrates that the number of guests increased during 2015–18, although growth was considerably minute for domestic guests in 2016 and for international guests in 2017. However, a decrease was seen in 2019, where the number of international guests dropped by 5.6% while domestic guests declined by 2.7%. Overall, domestic guests in hotels outweighed those of international guests, typically by approximately 20%. The largest number of guests in the five-year period, both domestically and internationally, was observed in 2018, where the growth rate for the former was 4.9%, whilst the latter saw 3.6% growth.

Figure 3.24 Average hotel occupancy rate by type of hotel, Penang, 2018–Q3 2019



Source: Malaysian Association of Hotels, Penang Chapter.

Hotel occupancy rates for 2019 were declining across three quarters in 2019 (Figure 3.24). Both beach and city hotels, as well as all hotels as a group, comparatively recorded lower occupancy rates, with the exception of Seberang Perai hotels. The highest overall discrepancy was seen in Q3 2019, where the total occupancy rate fell by 6.9%.

Considering the occupancy rates for beach hotels, the rate fluctuated negligibly across quarters for 2018, but steadily declined quarter to quarter in 2019 (from 61.9% in the first quarter to 52.2% in the third), with the biggest drop of 12.8% observed in the third quarter. The highest occupancy rate for beach hotels in 2018 was the first quarter (67.4%), while the rate in Q1 2019 was 61.9%. To further illustrate the less-than-stellar occupancy rates in the last year, the lowest occupancy rate for 2018 (64% in the fourth quarter) was higher than the highest occupancy rate in 2019 (61.9% in the first quarter).

As with beach hotels, city hotels' average occupancy rate also varied across quarters in 2018, increasing from the first quarter before declining in the fourth quarter; this trend continued in Q1 2019. In contrast, an upward trend was observed for 2019. However, the average occupancy rates were markedly lower than 2018: the highest occupancy rate for 2019 (56.1% in the third quarter) was, again, lower than the lowest for 2018 (59.3% in the fourth quarter).

Apart from city hotels, Seberang Perai hotels also saw higher average occupancy rates across all three quarters in 2019, outperforming its peers. The hotels recorded occupancy growth of between 1.2% and 1.5%, with the highest growth observed in Q3 2019.

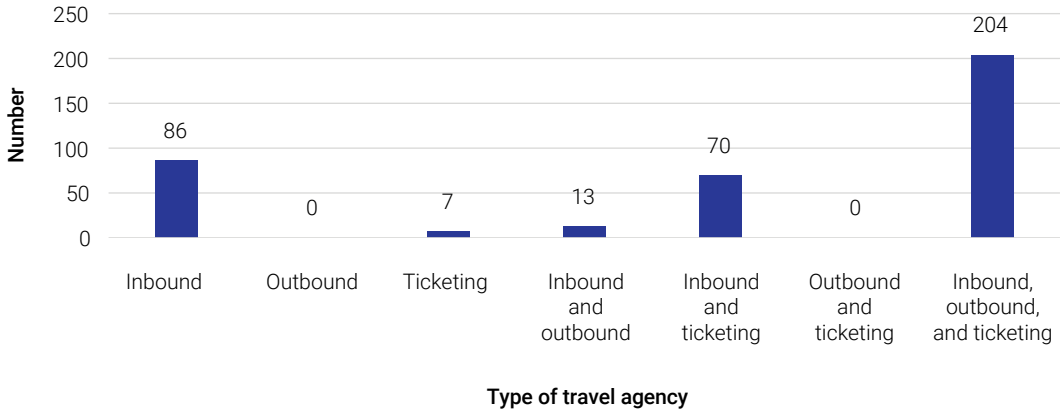
Lower hotel occupancy rates have been attributed to more prudent spending by tourists (Teoh, 2019). With hotel room rates being markedly more expensive compared with budget hotels, homestays, and AirBnB, tourists are increasingly turning to the latter as their preferred accommodation choice.

Although no official numbers have been released thus far for 2020, it can be deduced that Penang's hotel occupancy rate will see astronomical declines owing to the COVID-19 pandemic. A small sample of hotels surveyed by Penang Institute disclosed that they had zero guests and bookings for the month of April (Box 3.4). This situation will persist until the tourism sector eventually recovers.

Travel agencies and tourist guides

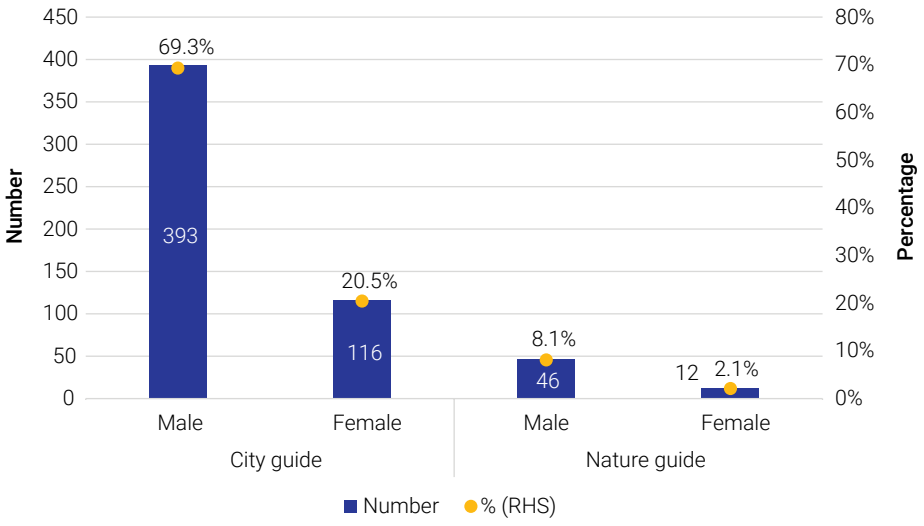
Even though travel and planning are becoming increasingly convenient with the digitalization of flight bookings, accommodation, and tours, travel agencies still maintained its market share, as there are still tourists who prefer to avoid the extensive planning that can be required. In 2019, there were 380 registered travel agencies in Penang, with 53.7% of them responsible for inbound, outbound, and ticketing services (Figure 3.25). There was no one company that exclusively provided outbound services, as outbound services are often coupled with another service. However, there were 86 (or 22.6%) travel agencies that exclusively handle inbound tourists and tours.

Figure 3.25 Total number of registered travel agencies in Penang by type, 2019



Source: Tourism Malaysia.

Figure 3.26 Total number and percentage of registered tour guides by gender and type, Penang, 2019



Source: Penang Institute estimates based on data from Tourism Malaysia.

As shown in Figure 3.26, Penang provided 567 registered tourists guides: 89.8% were city guides and the remaining 10.2% were nature guides. The industry is dominated by males, as the proportion of male tourist guides is significantly higher than that of female guides. For instance, male city guides in 2019 outnumbered female city guides by 48.8%, and female nature guides were only about a quarter of male nature guides. This may be because the work of a tourist guide required long hours as well as late and early transfers at the

airport. Some women may struggle at balancing these unusual hours with their additional domestic duties.

However, with the COVID-19 pandemic, both travel agencies and tour guides have been significantly affected. The global lockdowns imposed have resulted in no demand for the services of tour agencies and guides. Both the state and federal government have provided stimulus packages to players in the tourism industry in a bid to help them cope with the loss of business and income, but the negative impact is expected to persist as short-term recovery is looking to be unlikely. The overall recovery will be dependent on global control of the pandemic.

Tourists in Penang

Between 2018 and 2019, owing to a weakening ringgit and external and domestic economic challenges due to rising and deepening global trade tensions—particularly between the United States and China—along with policy changes brought about by a new governmental regime, Malaysians are increasingly opting to replace international travel with domestic travel. As seen in Table 3.20, Penang recorded 3.9 million domestic tourists in 2019[29]. However, this was a decline of 2.5% over the previous year. This can be attributed to the significant reduction of travellers from Johor and Negeri Sembilan, which had recorded a large number of tourist arrivals in 2018 but saw declines of -31.7% and -68.9%, respectively, in 2019. Interestingly, local tourists within the home state declined significantly by 88.4% in 2019, contributing to the decline in domestic tourists during the year. The general election held in 2018 may be the reason for the large number of Penangites being recorded as tourists due to the crossing of districts. A significant decline was also observed for Sabah and Labuan, but from a lower base.

The largest growth was seen in Kedah (154.1%) and Kuala Lumpur (90.9%), which also contributed the third- and four-highest number of overall tourists and visitors, respectively. Penang received the most tourists from Selangor, where a 50.6% increase was seen.

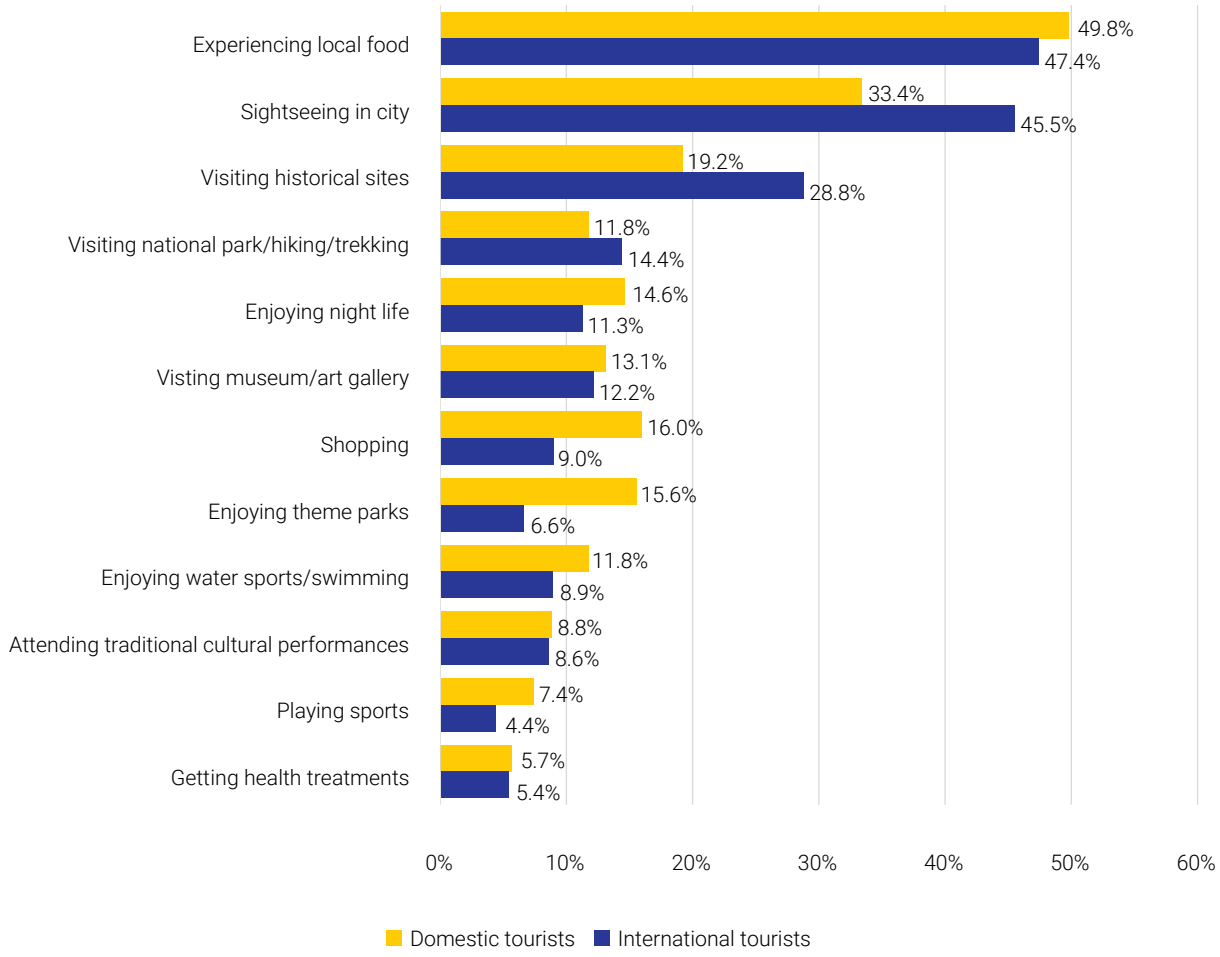
Table 3.20 Number and percentage of domestic tourists by state, Penang, 2018–19

State	2018		2019		% change
	Number ('000)	%	Number ('000)	%	
Johor	85.4	2.1%	58.3	1.5%	-31.7%
Kedah	262.9	6.6%	668.1	17.1%	154.1%
Kelantan	207.6	5.2%	175.3	4.5%	-15.6%
Malacca	39.5	1.0%	53.8	1.4%	36.2%
Negeri Sembilan	140.8	3.5%	43.8	1.1%	-68.9%
Pahang	76.3	1.9%	70.8	1.8%	-7.2%
Penang	**1,021.7**	**25.5%**	**118.5**	**3.0%**	**-88.4%**
Perak	837.4	20.9%	715.2	18.3%	-14.6%
Perlis	59.8	1.5%	104.8	2.7%	75.3%
Selangor	1,001.3	25.0%	1,507.6	38.6%	50.6%
Terengganu	30.1	0.8%	26.8	0.7%	-10.9%
Sabah	40.7	1.0%	14.1	0.4%	-65.3%
Sarawak	14.0	0.3%	6.9	0.2%	-51.0%
*W.P. Kuala Lumpur	169.1	4.2%	322.8	8.3%	90.9%
*W.P. Labuan	7.7	0.2%	1.5	0.0%	-80.9%
*W.P. Putrajaya	8.7	0.2%	16.2	0.4%	86.9%
Total	**4,002.9**	**100%**	**3,904.6**	**100%**	**-2.5%**

**denotes federal territories*
Note: The number of international tourists by nationality is not available.
Source: Penang Institute estimates based on data from Domestic Tourist Survey, Department of Statistics, Malaysia.

[29] As defined by the Domestic Tourist Survey, an individual is considered a domestic tourist once they leave their usual place of residence and remained at another location for more than 24 hours. For Penang, the crossing of districts is included in the definition of domestic tourist. For example, an individual who lives in Timur Laut but spent more than 24 hours in Seberang Perai Utara would be considered a tourist.

Figure 3.27 Activities partook by selected international and domestic tourists in Penang, 2018

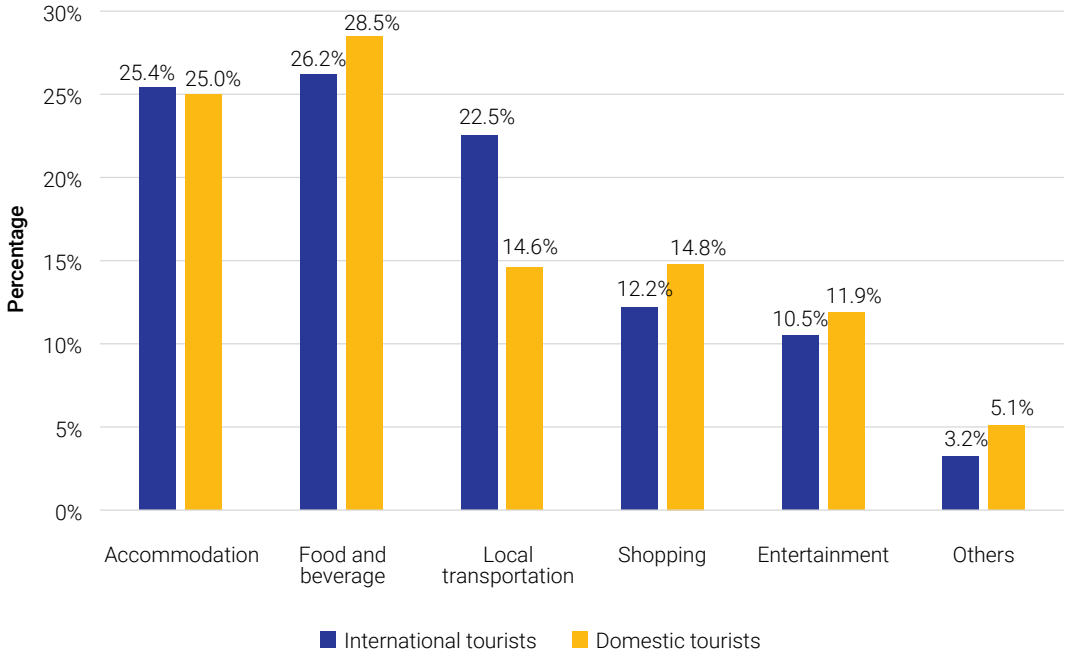


Note: The survey consisted of responses from 3,100 tourists (1,619 international tourists and 1,481 domestic tourists) aged 18 and above and had spent a minimum of one night in Penang from January to December 2018.
Source: Penang Tourist Survey, 2018.

According to a survey conducted by Penang Global Tourism, experiencing and enjoying local food was cited as the top activity for both international (47.4%) and domestic tourists (49.8%) in 2018 (Figure 6), with most respondents classifying it as an essential activity. Activities within George Town, such as city sightseeing and visiting historical and heritage sites, were also highly popular, with international tourists taking a greater interest in said activities. On the other hand, activities such as shopping and enjoying theme parks were more popular among domestic tourists, with 31.6% of surveyed domestic tourists taking part in these activities compared with 15.6% of international tourists.

The same survey also shows that the spending patterns of international and domestic tourists did not differ significantly, with the latter spending more than the former across all categories except for local transportation (Figure 3.28). This was because most domestic tourists would have opted to drive from their home states (this is reflected in Figure 3.29), while international visitors would have to spend on taxis and ride-shares.

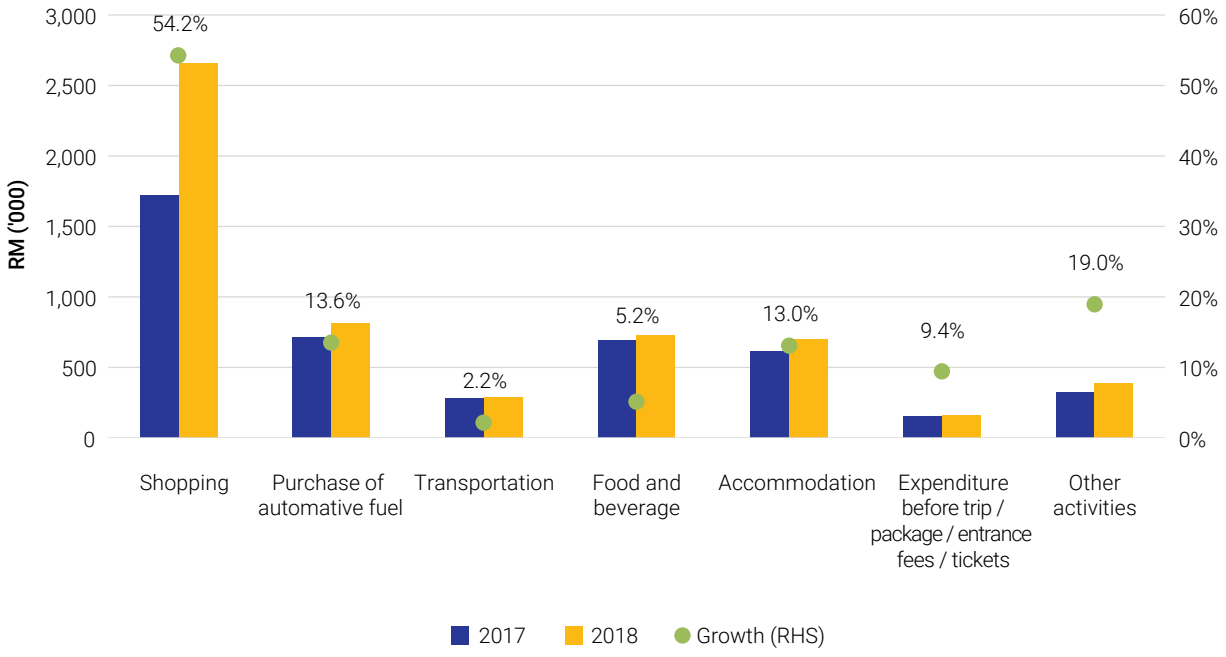
Figure 3.28 Proportion of expenditure by selected international tourists, Penang, 2018



Note: The survey consisted of responses from 3,100 tourists (1,619 international tourists and 1,481 domestic tourists) aged 18 and above and had spent a minimum of one night in Penang, from January to December 2018.
Source: Penang Tourist Survey, 2018.

Both international and domestic tourists spent the most on food and beverage (with domestic spending being higher), which was approximately 27.4% of overall tourist expenditure. This was followed by accommodation (25.2%), shopping (19.6%), and entertainment (11.2%).

Figure 3.29 Total expenditure by domestic tourists by component, Penang, 2017–18



Note: Domestic tourist expenditure by state for 2019 has not been made available.
Source: Penang Institute estimates based on data from Domestic Tourist Survey 2020, Department of Statistics, Malaysia.

The Domestic Tourist Survey provided a more comprehensive and in-depth picture of domestic spending, where the proportions differed from the previous survey. According to Figure 3.29, the highest proportion of spending went towards shopping for both 2017 and 2018, with a high growth rate of 54.2% in 2018. The survey showed that more than 90% of domestic visitors arrived via personal vehicles. This would explain the proportionally higher spending on automotive fuels, which saw a 13.6% growth in 2018. Domestic tourists also spent more on food and beverage in comparison with accommodation, as some would be staying at the properties of friends and family. Nonetheless, growth in accommodation spending (13.0%) was higher than food and beverage (5.2%).

The number of both international and domestic tourists are expected to significantly decline in 2020 as a result of the COVID-19 pandemic. Due to travel restrictions imposed by all countries, the domestic tourism industry has stagnated completely between March and May 2020. At the time of writing, restrictions for domestic travel have recently been lifted, but international travel is still highly restricted, with non-Malaysians not allowed to enter the country until further notice. The Penang state government has formulated plans to focus on promoting domestic tourism with the reopening of state borders in June 2020. A recovery in international tourism is not expected in the coming months.

Heritage tourism

Heritage tourism, as defined by the World Tourism Organisation, is a form of tourism where travellers are able to experience a country's culture and heritage, be it through the physical structures such as buildings and architecture, or through experiences such as festivals and other cultural events. With the United Nations Educational, Scientific and Cultural Organization (UNESCO) inaugurating George Town as a World Heritage City in 2008, George Town has become the centre of Penang's heritage tourism.

Penang's rich history and mix of cultures has ensured that heritage conservation remains a priority of the people as well as the government. Penang Heritage Trust (PHT) (a non-governmental organization) and George Town World Heritage Incorporated (GTWHI) (a government-linked company) are the two bodies that aim to preserve the heritage of Penang. Both organisations are integral when it comes to providing support to the local government and communities in protecting George Town's heritage. GTWHI in particular has been documenting the intangible heritage and traditional trades of the community, such as clogs-making, joss-stick making, and wayang potehi (traditional glove puppetry).

International tourists are especially attracted to the cultural elements of George Town's heritage. The heritage trail walks conducted by Penang Heritage Trust are very popular among these tourists, as experienced guides are able to provide the historical and cultural background behind sites such as Fort Cornwallis, the Street of Harmony, the Clan Jetties, and others. The 2018 Penang Tourist Survey showed that visiting historical sites was the third-most-popular activity for both international and domestic tourists.

Heritage tourism also has the potential to thrive outside George Town. There has been calls by PHT to inscribe Pulau Jerejak as a UNESCO World Heritage Site (alongside Sungai Buloh Leprosarium) (Mok, 2019). With a history dating back to before World War II, Pulau Jerejak was known as the "Alcatraz of Malaysia". The island helmed a maximum-security prison but also functioned as a leper colony, and had housed a tuberculosis centre (The Star, 2020). Other sites of historical significance within the island includes a mixed-faith cemetery and a pre-war underground bunker. There is significant potential for Pulau Jerejak to be preserved and promoted as a heritage site for tourism.

The popularity of heritage tourism has brought on the establishment of new and local businesses, which in turn would generate positive effects for the state's employment opportunities and encourage economic growth. The service industry in George Town, particularly the hotel and food and beverage segments, has grown significantly over the years. Existing local businesses also stand to reap positive economic effects from tourism spending.

But there are also unwanted effects resulting from the boom in heritage tourism. The rapid addition of cafes, souvenir shops, and boutique hotels has resulted in the gentrification of George Town. Many of the original occupants have moved out, selling their properties to developers and contributing to the

decline of traditional communities and trades. The smaller roads within the heritage enclave are also becoming increasingly congested.

The COVID-19 pandemic has resulted in heritage tourism coming into a standstill for a large part of 2020. The pandemic may also have changed the landscape of heritage tourism. The emphasis of small groups and social distancing may be something that will persist even in a post-COVID-19 world. With new measures in place, the congestion of people and cars in the heritage area can be improved. A more sustainable way of conducting heritage tourism can be realised.

It is vital that the state government and all stakeholders work together to strike a proper balance between tourism growth and heritage conservation. Tourism revenue should be channelled back into the local communities to help them preserve their way life, and in turn preserve the cultural charm and heritage of George Town.

Ecotourism

In a time where sustainability is seen as crucial, the International Ecotourism Society encourages ecotourism as a form of "responsible travelling", for this sector of tourism places importance on the natural environment. The main objective of ecotourism is to introduce an appreciation of nature in its purest form as a tourist activity. Eco-tourists would be able to enjoy various kinds of flora and fauna in their natural habitat, and educate themselves on the importance of environmental conservation and sustainability. One of the main features of ecotourism is that it prioritises minimal impact on the environment and its surroundings, and therefore operates on a much smaller scale. Ecotourism also advocates for earned revenue to be put towards ecological conservation and sustainability of local indigenous cultures.

Hiking, trekking, and visiting national parks was ranked third on the 2018 Penang Tourist Survey. Penang boasts of having rainforests that are hundreds of years old, and these rainforests are carefully maintained and preserved according to sustainable forest principles, as they are gazetted as Permanent Reserved Forests (PRFs). Peat and mangrove swamps are also classified and protected as PRFs, ensuring that ecotourism activities would not negatively affect the natural environment.

The Penang National Park (also a PRF), Penang Hill, and Botanical Gardens are among the other nature spots sought out by eco-tourists. Pantai Keracut, found within the confines of the Penang National Park, is gaining traction for its meromictic lake and as a hotspot for turtle nesting. Monkey Beach has been touted by The Travel as one of the 20 best beaches in the world (Henley, 2019), where a colony of macaques roam free in their natural habitat. Built attractions such as Entopia and the Habitat centre their respective developments around the preservation of nature, with attention given to ecological sustainability.

The state government has also prioritised the development of ecotourism on Seberang Perai's beaches, forests, and mangrove swamps, with the intention of turning Seberang Perai into the main destination for ecotourism. Teluk Air Tawar-Kuala Muda is one of the main attractions, with the mangrove being a key destination for bird-watchers as it is home to more than 200 species of shorebirds and waders. The coast is regarded as one of Peninsular Malaysia's most important bird habitats (Heng, 2013).

The mangrove stretches between Teluk Air Tawar and Kuala Muda and other similar mangrove forests needs to be protected as they are important sources of income for local fishermen, being that they do function as breeding ground for several species of commercial fish. The vivacity of the mangroves and the authenticity of the fishing and local communities make them attractive destinations for ecotourism.

As with other sub-sectors of tourism, the success of ecotourism has given birth to more economic activities in the vein of tours, homestays, food and beverage services, and others. This in turn would provide employment opportunities for the local communities, for example as nature guides. However, ecotourism rules state that the economic benefits must not take priority over the preservation of nature. Sustainability is the key to ecotourism, and any negative impact on the environment in the name of development would not be feasible during efforts to expand the sub-sector. The maintenance of the natural environment should always take precedence.

Ecotourism has not been exempted from the adverse effects of the pandemic. However, the chances of recovery in ecotourism may be higher than other sub-sectors as ecotourism places a strong focus on small groups for the purpose of nature preservation and sustainability.

Cruise tourism

Cruise tourism is one of the largest sub-sectors of tourism. Cruise tourism offers accommodation, food and beverage, recreational activities, sports facilities, and retail services, all in one place. Cruise ships often make several calls in different cities, where passengers can disembark and explore.

Swettenham Pier is one of the 10 ports in Malaysia that acts as a berth and dock for cruise ships. Its cruise terminal sees high volumes of cruise ships and passengers every year, and is one of the country's busiest ports. According to the state government, there was an increase of 27.1% in cruise passengers and a 7.0% increase in cruise ship arrivals in 2019 from the previous year, with five ships making it their maiden call (Trisha, 2020). The largest increase in passengers came from South Korea (75.8%), followed by the United Kingdom (68.1%) and India (51.6%). China and Australia also registered large increases of passengers at 50.8% and 44.9%, respectively.

Swettenham Pier Cruise Terminal is slated to undergo a significant upgrade in 2020, with the project scheduled for completion within two to three years (Ong, 2020). There will be an extension of 220 metres to the north of the existing wharf, which will enable two of the world's largest Oasis-class ships to dock simultaneously. Upon completion, the pier will be able to increase its passenger capacity by 50% as it will be able to accommodate 12,000 passengers in comparison with the present 8,000 passengers.

Swettenham Pier's strategic location allows cruise passengers to enjoy George Town, as it is within walking distance to popular heritage sites such as the Clan Jetties. Other tourist areas such as Armenian Street and the Street of Harmony are also within reach, either by walking or by public transportation.

However, the development of cruise tourism has adverse effects on environmental sustainability. The waste generated by cruise liners often pollute coastal areas, damaging the marine ecosystem (Brida & Aguirre, 2009); cruise ships need to undertake more environmental friendly measures in disposing their waste. Local communities around the pier may also face over-commercialisation, negatively impacting local traditions.

Cruise tourism is arguably the sub-sector that has been impacted the most by the pandemic. Given the nature of cruises, where crowding in semi-enclosed areas is unavoidable and exposure to new environments with numerous cruise stops is frequent, the spread of the pandemic among cruise passengers had been rapid—and deadly. This is especially evident in the case of the Diamond Princess and the Ruby Princess. While the cases on the two aforementioned ships are the most serious, they are by no means the only cruise ships affected.

Sailing without a full load of passengers amid social distancing measures has been deemed untenable by industry leaders, who say that this will severely affect their financial performance (Hancock, 2020). Additionally, tourists may be more unwilling to board cruise ships after the debacles of the Diamond Princess and the Ruby Princess. The Diamond Princess became a hotspot for COVID-19 when a disembarked passenger was found to be COVID-positive. The ship, with 3,711 people onboard consisting of both passengers and crew, was forced into quarantine for 27 days in the Port of Yokohama. The handling of the incident was deemed to be chaotic and inadequate, and quarantine measures onboard were severely lacking, leading to 712 infections and 14 deaths (BBC News, 2020).

On the other hand, the Ruby Princess, upon docking in Sydney, made the mistake of allowing its 2,700 passengers to disembark and return home via domestic flights without proper temperature checks and scans (Zhou, 2020). This was despite the ship recording incidences of 158 illnesses involving high temperatures on the previous journey. Approximately 900 passengers and members of the crew were tested positive for COVID-19, with infections scattered throughout Australia, in which it was estimated that one in 10 Australian COVID-19 cases was linked to the cruise ship (Cockburn, 2020).

The future of cruise tourism is looking to be extremely shaky; cruise companies will need to collaborate with governments to develop enhanced health and safety measures for passengers and crew, both onboard and when they dock.

Wedding tourism

Wedding tourism is a sub-sector that has gained much attention in the last two years. Wedding tourism refers to a form of tourism where travelling takes place for the purpose of marriage-related matters—be it engaging in a wedding ceremony (either as part of a bridal party or as relatives and friends) or the process of taking engagement and wedding photos (Lowry, 2017). With its rich and diverse mix of cultures, Penang has emerged as one of the top wedding destinations within the region.

PGT has been actively promoting Penang as a destination for engaged and soon-to-be married couples. George Town's fusion of eastern and colonial heritage, Batu Ferringhi's beaches, and natural environments of Penang National Park and Teluk Air Tawar provide a distinctive backdrop for wedding photos and wedding ceremonies.

Couples are also able to choose different styled weddings for their special occasion, with the Peranakan-style Baba and Nonya wedding being a popular option and the Pinang Peranakan Mansion serving as a complimenting venue. Malay, Chinese, and Indian wedding ceremonies can provide individually unique experiences for soon-to-be wedded couples.

The arrival of wedding guests in the form of friends and relatives to Penang also contribute a significant amount of revenue towards the tourism industry, as they are likely to spend on accommodation, food, transportation, and shopping, in addition to partaking in tourist activities.

The growth of wedding tourism has had positive effects on the wedding planning industry, encouraging the establishment of new businesses such as bridal houses, photography studios, and caterers. These ventures were anticipated to provide employment opportunities in addition to contributing towards the state's economic growth.

However, the industry has suffered significantly from the pandemic. The pandemic has placed limitations on wedding ceremonies and parties owing to the need for social distancing and the minimisation of crowds, leading to weddings increasingly getting cancelled or delayed. Furthermore, as long as Malaysia's borders remained closed or restricted, wedding tourists will be unable and disinclined to choose Penang as a destination, severely affecting the growth of wedding tourism. The recovery of this sub-sector will be dependent on the reopening of borders and the global ability to overcome the COVID-19 pandemic.

Education tourism

Education tourism is defined as a form of tourism where tourist activity and education takes place simultaneously, where travel is either motivated by the tourists' desire to seek education, be it academic or cultural ("education first"), or that the tourists aim to receive educational information on local cultures and traditions during their travels ("tourism first") (Lowry, 2017). In short, education tourism stipulates that the tourist must make education their primary or secondary purpose over the course of their trip.

As a spill-over effect to other sub-sectors of tourism, education tourism in Penang has been thriving. The steady growth of the sub-sector has resulted in the establishment of the Penang Centre of Education Tourism (PCET), which is tasked with promoting Penang internationally as a destination for education by highlighting the quality and variety of the state's institutions of learning.

Education tourism in Penang focuses primarily on tertiary education and technical skills, such as culinary skills. As seen in Table 3.21, most members of PCET comprises private higher-education institutes in Penang, such as Penang Medical College and Tunku Abdul Rahman University College. These colleges are highly reputable and offer twinning programmes to internationally renowned universities such as the Australian National University, the University of Essex, and Ohio State University.

Table 3.21 List of educational institutions under Penang Centre of Education Tourism, 2019

Full members	Associate members
Culinary Arts Centre	Clinical Hypnotherapy Practitioners Malaysia
Disted College	EDS Business Sdn. Bhd.
Equator College	First Penguin Sdn. Bhd.
Golden Chef Culinary Academy	Livingston House of Learning
Han Chiang College	Penexpo Events Sdn. Bhd.
INTI International College	
IPK College	
UOW Malaysia KDU Penang University College	
Olympia College	
Penang Medical College	
SEGI College	
Sentral College	
Stradford International College	
Tunku Abdul Rahman University College	

Source: Penang Centre of Education Tourism.

Indonesian students account for the most number of students taking part in education tourism in Penang, and the numbers are continually increasing each year. PCET has said that the large number of Indonesian students are spill-over effects from Penang's medical tourism. Penang's liveability has made lasting impressions on medical tourists, and some have opted to send their children to Penang for higher education, in addition to recommending Penang as an education destination to friends and family. Other international students come from within ASEAN (Myanmar, Thailand) and Asia (China, South Korea, and India).

PCET has also engaged with the Japan Travel Agent Association in hopes of attracting Japanese students to Penang. Penang welcomed a group of 20 Japanese students in August 2019, who were placed in homestays and attended short courses in colleges. The students were able learn and understand the local way of life with their hosts, in addition to receiving an academic experience at their colleges. PCET hopes to expand and grow the programme and to further tap into the Japanese market.

International students engaged in a wide variety of courses, with the more frequently chosen courses being business, marketing, accounting, and hospitality. Culinary arts are also popular. Some colleges are able to curate short courses for international students and student exchange, where tourist activities are embedded into the course itself. The students are then able to combine academic learning with cultural learning.

In addition to generating economic revenue, the growth of education tourism has encouraged private higher-education institutes to work towards improving the quality of education and expand the number of courses available to remain competitive in the domestic and regional markets.

The COVID-19 pandemic has negatively impacted the potential of Penang's education tourism. Even though travel restrictions have been lifted for international students (Puvaneswary, 2020), some international students may be unable to continue their education due to financial constraints. Private higher-education institutions in Penang are expected to see a drop in new intake of international students; the sub-sector's performance will only see improvements with the rebounding of the global economy.

Medical tourism

Malaysia is ranked high as a destination for health tourists due to the country's comparatively affordable yet high-quality medical services (The Star, 2019). Medical tourism in Malaysia is strictly regulated, monitored closely by the Ministry of Health and Ministry of Tourism, Culture and Arts. The Malaysia Healthcare Travel Council (MTHC) is the coordinating body for tourists and medical facilities at the national level. Most medical tourists to Malaysia have cited Penang as their preferred destination to receive medical treatment (Lim, 2019). As a result, medical tourism is one of the most important—and most profitable—sub-sectors in Penang's tourism industry.

Penang boasts a number of private hospitals staffed with reputable and experienced doctors, professional staff, and advanced medical equipment (Lim, 2019). Penang's equivalent to MHTC, Penang Centre of Medical Tourism (PMED), is responsible for the management and marketing of medical tourism for the state, and the organisation frequently participates in international healthcare tourism conferences to promote Penang as a destination of choice.

Currently, there are 11 full members and 11 associate members in PMED (Table 3.22). Most of the listed private hospitals are centred on the island and clustered in Timur Laut. The hospitals have also undergone extensive restructuring and expansion to accommodate the growing number of international and local patients.

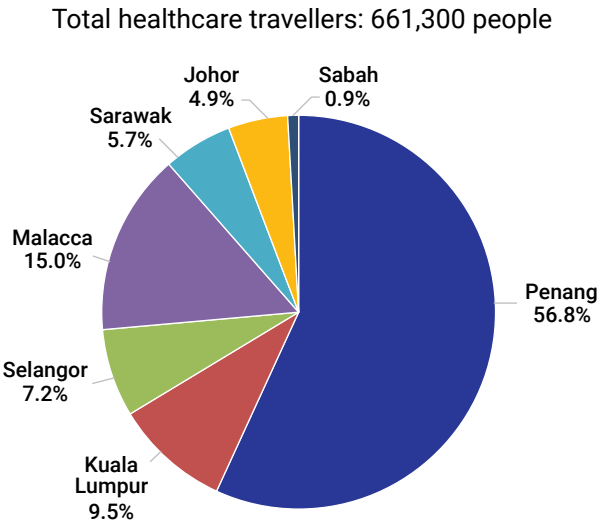
Table 3.22 List of medical institutions under Penang Centre of Medical Tourism, 2019

Members	Associate members
Bagan Specialist Centre	Clinical Hypnotherapy Practitioners Malaysia
Genesis IVF & Women's Specialist Centre	Eco Terraces Care Hub
Gleneagles Penang	Heartbit E-ECP
Island Hospital	dr.Spine Chiropractic Centre
Georgetown Specialist Hospital	HAMC Health Solution Centre
KPJ Penang Specialist Hospital	Marina Dental
Loh Guan Lye Specialists Centre	MediAsia Advance Wound Care & Tissue Repair Centre
Mount Miriam Cancer Hospital	Spinecare Chiropractic
Optimax Eye Specialist Hospital	PS Healthcare Gentle Chiropractic & Spine Rehabilitation
Pantai Hospital Penang	TMC Fertility & Women's Specialist Centre (Penang)
Penang Adventist Hospital	TLC Orthopaedic Physiotherapy

Source: Penang Centre of Medical Tourism.

Medical tourism in Malaysia is a billion-ringgit industry and has significant multiplier effects on the national economy. According to MHTC, the number of healthcare travellers to Malaysia are continually increasing; in 2018 there was a 14.0% increase in healthcare travellers. As seen in Figure 3.30, Penang is the most popular destination, accounting for 56.8% of healthcare travellers entering the country. Malacca follows at 15.0%. Kuala Lumpur and Selangor only received 9.5% and 7.2%, respectively, of the country's healthcare travellers.

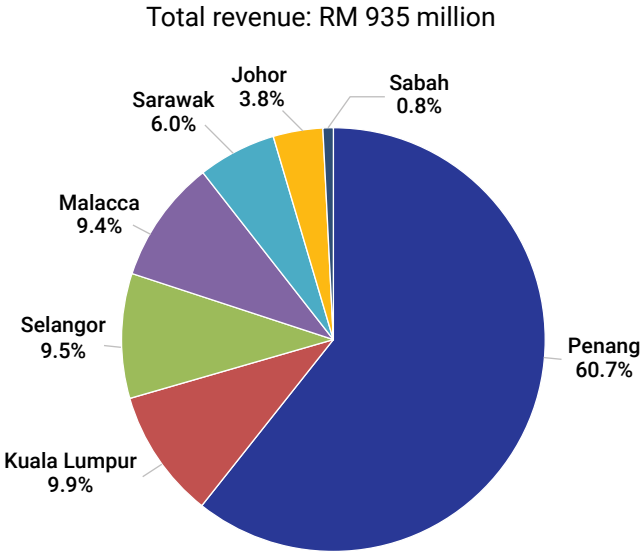
Figure 3.30 Percentage of healthcare travellers by preferred destination, Malaysia, 2018



Source: Malaysia Healthcare Travel Council.

Penang contributed 60.7% of total revenue in 2018 (Figure 3.31). The next-best-performer was Kuala Lumpur with 9.9%, followed by Selangor at 9.5%. Malacca, despite drawing more patients than the latter states, collected only 9.4% of total medical tourism revenue.

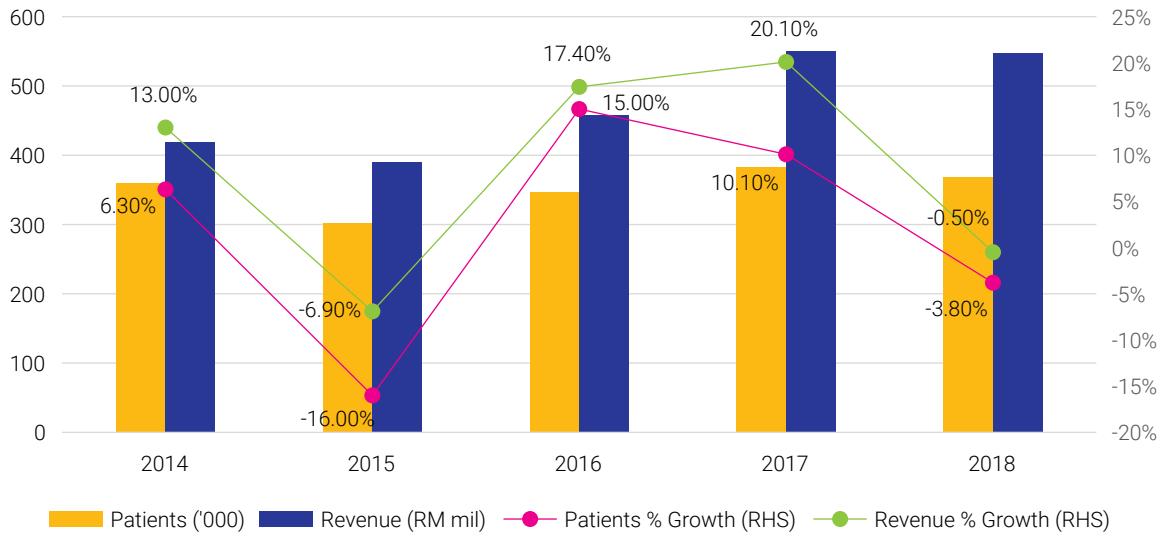
Figure 3.31 Percentage of revenue generated by healthcare travellers by state, Malaysia, 2018



Source: Malaysia Healthcare Travel Council.

The growth of patients and revenue in Penang, however, has fluctuated during 2014–18 (Figure 3.32). The state experienced a significant drop in total number of patients and revenue (-16.0% and -6.9%, respectively) in 2015, before recording growth for 2016 and 2017. In fact, there was a significant growth of 20.1% in patient revenue in 2017, although growth for patients slowed from 15.0% in 2016 to 10.1% the following year. A decline was observed in 2018, with the number of patients dropping by 3.8% and total revenue decreasing by 0.5%. However, it must be noted that PMED only collected the information from certain hospitals, and actual numbers may differ.

Figure 3.32 Number and annual growth of healthcare travellers and revenue generated for medical tourism sector in Penang, 2014–18



Note: The above figures are only provided by Loh Guan Lye, Pantai Hospital, Island Hospital, Mt Miriam, Adventist, Gleneagles, Bagan, and KPJ Penang Specialist Hospital, and may not be an accurate and comprehensive representation of total patients and revenue for Penang's medical tourism.
Source: Penang Institute estimates based on data from Penang Centre of Medical Tourism.

Indonesian patients accounted for more than 95% of Penang's medical tourists in 2018. With the availability of direct flights to Penang from Medan, Jakarta, Surabaya, and Banda Acheh, Penang is easily accessible to Indonesians medical tourists. The two countries are also culturally similar in some ways. Medan in particular shares many similarities with Penang; for instance, both peoples speak Hokkien.

PMED has stated that the more common procedures and medical treatments undertaken by patients are in the fields of oncology, cardiology, orthopaedics, and paediatrics. Aesthetic procedures are also becoming increasingly popular.

Penang's attractiveness as a medical tourism destination stems from the affordability of its private healthcare system. Additionally, Penang is also highly competitive when it comes to the quality of healthcare, and has a wide range of specialists and surgeons available. There are numerous hotels strategically located near hospitals. Furthermore, Penang is already well-known as a tourist destination, with George Town's inscription as a UNESCO World Heritage City, and has world-renowned local food.

PMED is actively working to diversify, and currently has a special focus on China and Singapore. The organisation attempted to tap into the Vietnamese

market, but has struggled to gain significant headways. Penang is also facing stiff competition from other countries, with PMED identifying Singapore and India as strong competitors. As a result, hospitals in Penang are actively striving to improve and upgrade their facilities. For example, Penang Adventist Hospital recently opened an oncology specialist centre, and Island Hospital's vision of an Island Medical City—consisting of a medical complex, suites, and a hotel—will enable it to become the largest private medical hub in Malaysia. Additionally, there has been ongoing discussions to incorporate plans to build hospitals and medical facilities in Batu Kawan, with the aim of establishing a medical hub in Seberang Perai (Hilmy, 2019).

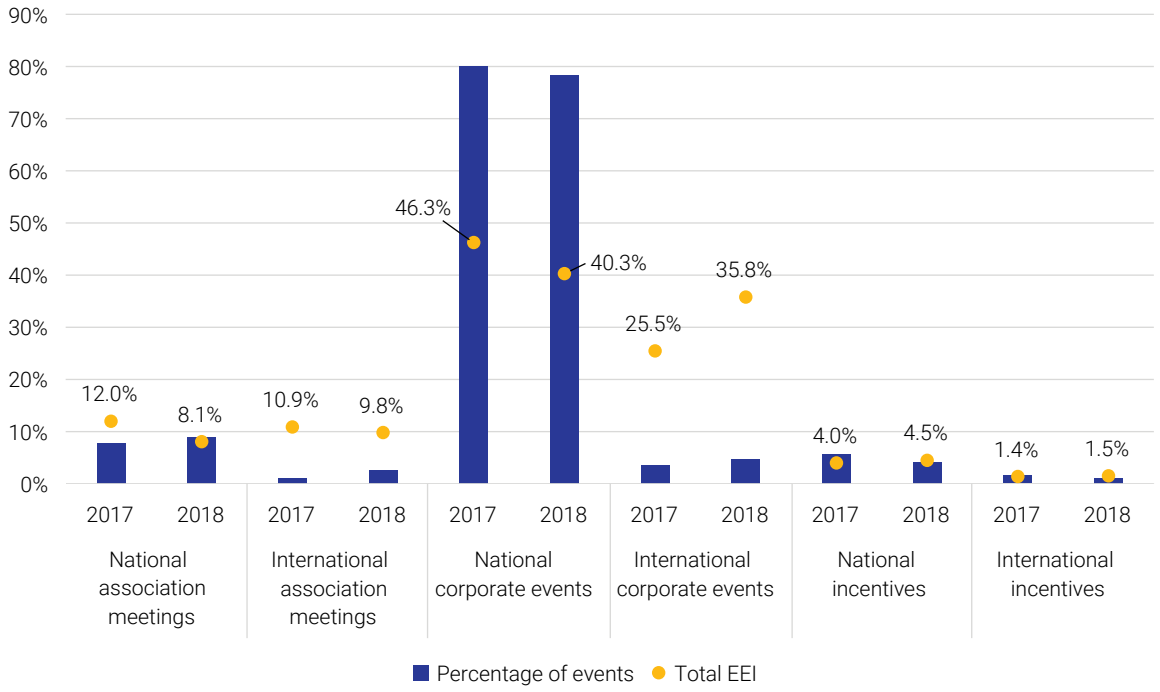
Medical tourism has not been exempted from the impact of the COVID-19 pandemic. Penang's private hospitals have experienced a significant decrease in patient numbers and revenue since the start of the pandemic. As with other sub-sectors within the tourism industry, the revival of medical tourism will hinge on containing the pandemic and the recovery of the global economy. With the Malaysian government allowing certain patients to apply for exemptions to enter the country on the basis of continuing treatment (Puvaneswary, 2020), medical tourism is on a slow path to recovery.

Meetings, incentives, conferences, and exhibitions (MICE) tourism

The globalisation and growth of international conferences and events have given birth to a specialised sub-sector of tourism, known as meetings, incentives, conferences, and exhibitions (MICE) tourism. MICE has been able to generate sizeable amounts of revenue to stimulate economic growth, especially where international delegations are concerned. MICE tourism involves large-scale movements of both individuals and companies for the purpose of partaking in meetings, exhibitions, and conferences for both professional and personal purposes.

Penang is a popular tourism destination and has emerged as a prime location for hosting international conventions and exhibitions. The SPICE Setia Convention Centre is a world-class facility with sizeable conference halls and meetings rooms, and is fully capable of hosting thousands of participants. Penang's established hospitality industry ensures the accessibility of five-star accommodations. Penang's state agency for the promotion of MICE tourism, Penang Convention and Exhibition Bureau (PCEB), is also responsible for coordinating these national and international events.

Figure 3.33 Percentage of events and EEI by type of event, Penang, 2017 and 2018



Source: Penang Institute estimates based on data from Penang Convention & Exhibition Bureau Annual Reports.

The number of events held in Penang saw an 8.8% overall growth in 2018, increasing from 2,511 events in 2017 to 2,733 events in 2018. The estimated economic impact (EEI) for MICE tourism increased significantly by 31.2%, growing from RM1.0 billion in 2017 to RM1.3 billion in 2018. As shown in Figure 3.33, national corporate events accounted for 78.3% of all events and generated an EEI of RM528.9 million, or 40.3% of total EEI. The EEI for national corporate events in 2018 held a lower share compared with 2017, but generated more revenue compared with an EEI of approximately RM463.0 million in 2017.

International corporate events ranked second in terms of number of events and EEI generated, where an increase was observed for both number of events and EEI. Although this type of event accounted for only 4.8% of total events, it recorded an EEI of RM470.1 billion, or 35.8% of total EEI.

Although there were fewer international association meetings in 2018 compared to its national association meetings, the EEI generated was higher for the former. This is in contrast with 2017, where the national type had more events and greater EEI. In terms of numbers, both events saw increases in 2018, despite holding a lower share as part of overall events. However, national meetings saw a decrease of 11.7% in EEI (dropping from RM120.0 million to RM106.0 million), while international meetings saw an increase of approximately RM20.0 million in EEI, marking an 18.3% increase.

Table 3.23 Total events and EEI by type of event and sector, 2017–18

Sector	National						International					
	Events			EEI			Events			EEI		
	2017	2018	% Growth	2017 (RM mil)	2018 (RM mil)	% Growth	2017	2018	% Growth	2017 (RM mil)	2018 (RM mil)	% Growth
Government	205	207	1.0%	71.9	69.4	-3.5%	0	10	N/A	0.0	5.0	N/A
Industry	319	332	4.1%	74.2	78.6	5.9%	44	26	-40.9%	9.0	15.3	70.0%
Education	166	238	43.4%	54.3	53.2	-2.0%	0	21	N/A	0.0	14.7	N/A
Economic	160	190	18.8%	47.1	56.6	20.2%	8	12	50.0%	12.4	5.0	-59.7%
Commerce	100	71	-29.0%	33.9	19.0	-44.0%	10	32	220.0%	264.4	386.6	46.2%
Corporate	616	399	-35.2%	86.7	60.2	-30.6%	25	6	-76.0%	34.7	1.8	-94.8%
Culture and arts	11	54	390.9%	13.4	34.9	160.4%	6	10	66.7%	25.0	64.2	156.8%
Management	213	471	121.1%	55.0	179.3	226.0%	10	36	260.0%	4.2	18.3	335.7%
General	108	133	23.1%	23.0	48.0	108.7%	4	10	150.0%	2.6	4.5	73.1%
Social Sciences	8	27	237.5%	2.7	7.7	185.2%	0	7	N/A	0.0	11.2	N/A
Science	0	8	N/A	0	1.5	N/A	2	1	-50.0%	0.9	0.4	-55.6%
Technology	90	86	-4.4%	41.2	15.2	-63.1%	6	12	100.0%	2.4	15.4	541.7%
Medical science	93	134	44.1%	28.9	37	28.0%	7	13	85.7%	7.0	52.3	647.1%
Transport and communications	28	25	-10.7%	4.7	5.1	8.5%	5	2	-60.0%	0.3	1.5	400.0%
Sports and leisure	26	78	200.0%	4.7	17.7	276.6%	7	29	314.3%	1.1	21.8	1,881.8%
Others	192	47	-75.5%	69.4	10.6	-84.7%	25	6	-76.0%	12.8	1.8	-85.9%
Total	**2,335**	**2,500**	**7.1%**	**611.1**	**694**	**13.6%**	**159**	**233**	**46.5%**	**376.8**	**619.8**	**64.5%**

Source: Penang Institute estimates based on data from Penang Convention & Exhibition Bureau Annual Reports.

Most sectors saw a growth in events and EEI for 2018, both nationally and internationally. However, a decrease in number of events was seen in corporate, transport and communications, and others for both types of events, where the EEI was also negatively affected. International events also saw a decrease of 40.9% in industry events, but its EEI increased by 70.0% (Table 3.23).

The best-performing sector for national events in 2018 in terms of numbers were management events, which saw a growth of 121.1%, as well as an increase of 226.0% in EEI. The biggest growth in events was culture and arts, which saw an increase of 43 events, or 390.9% growth. Sports and leisure events saw the biggest increase in EEI at 276.6% increase, or RM13.0 million.

For international events, the sports and leisure sector was the fastest-growing sector, with an events growth of 314.3% and an EEI growth of 1,881.8%. The commerce sector generated the most revenue, with an EEI of RM386.6 million (a 46.2% growth from 2017) from 32 events (220.0% growth from 2017).

International events have greater potential to generate larger returns to the economy, as they only accounted for 8.5% of total events held in 2018, but their total registered EEI was 41.7% of total EEI generated. Therefore, it will be important for PCEB promote Penang as a destination for MICE tourism for international audiences.

Table 3.24 Number of events and total EEI by region, Penang, 2017–18

Region	Events			EEI		
	2017	2018	% Growth	2017 (RM mil)	2018 (RM mil)	% Growth
Southeast Asia	76	119	56.6%	45.6	81.5	78.6%
APAC	38	57	50.0%	292.8	411.0	40.4%
Middle East	10	2	-80.0%	0.9	2.9	222.2%
Europe	15	7	-53.3%	5.5	4.4	-20.0%
Oceania	6	7	16.7%	2.2	2.7	22.7%
America	7	6	-14.3%	10.6	4.9	-53.8%
Others	8	35	337.5%	19.7	111.9	468.0%
Total	**160**	**233**	**45.6%**	**377.3**	**619.3**	**64.1%**

Source: Penang Institute estimates based on data from Penang Convention & Exhibition Bureau Annual Reports.

Southeast Asia remains as the region which contributed the most events for 2018, with an event growth of 56.6%, largely due to its proximity to Penang which concurrently recorded an increase of 78.6% in EEI. APAC countries also saw substantial growth of 50.0% in events and 40.4% in EEI. Within APAC countries, China was the biggest contributor, registering 36.8% of total EEI in international events (RM227.9 million). The number of events organised by Middle Eastern countries saw a decline of 80% in volume, but an increase in revenue. Other regions are smaller contributors, with most seeing decreases in number of events and EEI, with the exception of Oceanian countries and other uncategorised countries.

The evolution of MICE tourism has a lot of economic benefits for Penang's economic growth. It has positively impacted SMEs in the hospitality and the events-planning industries, potentially increasing the number of businesses in the corresponding industries. Its contribution to Penang's tourism industry is significant, and its potential for growth should be maximized.

However, this potential has been significantly impacted by the COVID-19 pandemic. There were no conferences and exhibitions held during the lockdown, and this situation is not expected to improve greatly with the lifting of the movement restriction orders. This is because international visitors have yet to be allowed into Malaysia at the time of writing, in addition to the severe limitation of prospective participants because of social distancing measures. Furthermore, digital platforms such as Zoom have been highly utilised during this period, reducing the need for face-to-face meetings and seminars even in a post-pandemic era. Therefore, the recovery of MICE tourism is expected to be sluggish.

Box 3.4 The overall effects of COVID-19 on Penang's tourism industry

By Yap Jo-yee

The COVID-19 pandemic that struck in January 2020 has crippled the global tourism sector. Its effects are being felt acutely by establishments in Penang that have made tourism their trade. All sub-sectors of tourism are expected to be heavily impacted.

The avoidance towards travelling is expected to remain even after the pandemic, as people will remain cautious and avoid any activity that may heighten their risk of infection. The medical tourism sub-sector, which generates high returns to the state's tourism industry, is expected to see a significant drop in health tourism. MICE tourism will also suffer as a result of the pandemic, as conferences, exhibitions, and conventions are cancelled or postponed, with postponement being the best-case scenario. Ecotourism, heritage tourism, and all other sub-sectors will also be negatively impacted.

In a survey done by Penang Institute at the end of March 2020, hotels and other accommodation operators said that bookings have plummeted to zero in April, and no bookings are being made for the future. Many were laying off workers to minimise variable costs, but operators still had to deal with fixed costs such as building rental, security and maintenance fees, and so on. Tour operators and travel agencies reported a similarly bleak situation. For a sector that is wholly reliant on human movement and physical interaction, the pandemic has wiped out all revenues.

The long-term outlook for tourism is ambiguous at best. While past outbreaks such as SARS and the H1N1 influenza have shown that business activity in the tourism sectors of affected countries rebounded within six months (IATA Economics, 2020), the downturn caused by this pandemic is likely to be deeper and longer.

According to the same survey, estimates from tourism firms in Penang suggest that it will take at least six to eight months after the end of the COVID-19 pandemic for businesses to operate at normal capacity. Many past disease outbreaks were limited to particular geographical regions. SARS for example was largely contained in mainland China, Singapore, Hong Kong, Canada, and Vietnam. Even though it was not a hotspot, Malaysia's tourism sector was severely impacted because of its proximity to Singapore. Tourism activity surged after the end of that pandemic, mainly because the pandemic had not affected the health or spending power of tourists outside of the contagion regions, and these tourists had simply postponed their spending. Average occupancy rates in Penang fell from 58.2% to 47.3% during the SARS outbreak in 2002, before increasing to 62.8% immediately after (Malaysia Tourism Data, 2020).

However, it is unlikely that a similar V-shaped recovery will take place this time. The COVID-19 pandemic has created a global recession. As disposable income falls, luxury goods like overseas holidays and vacations often see a large hit in demand. It will take time for consumers to recoup their incomes before they are comfortable spending on overseas travel again. The sector is more likely to see a pickup in domestic travel first. Fortunately, Penang's tourism sector is mostly dependent on domestic tourists. In 2018, 55% of the state's hotel guests were domestic (Malaysia Tourism Promotion Board, 2018).

Fiscal and monetary policies from the government will soften the blow to the sector. In order to provide insolvent businesses with liquidity, Bank Negara Malaysia is offering emergency loans to SMEs affected by COVID-19 (as of 2015, 99% of businesses in Penang were SMEs (Department of Statistics Malaysia, 2017)), and maximum financing rates have been decreased from 3.75% to 3.50% (Bank Negara Malaysia, 2020b).

On the supply side, recovery of the sector will depend on how many businesses outlast the pandemic, and how easily others can enter (or re-enter) the sector after the crisis. Supply-chain disruptions will also have an impact. Demand-wise, it will depend largely on tourist confidence, how well foreign countries manage their domestic contagion, and tourists' disposable income after the crisis.

In an effort to aid the recovery of the tourism industry, the state government has initiated a COVID-19 safety accreditation programme, where safety and hygiene will be prioritised (Dermawan A., 2020). Hotels, shopping malls, and attractions that comply to strict safety and hygiene procedures as decided by the state government, state health department, and local councils will be given certification. The certification will be displayed at the respective premises, and standards checks will be carried out to ensure consistent compliance. This is to regain the confidence of tourists and travellers in rebooting Penang's tourism industry.

3.2.6 Education

The Eleventh Malaysia Plan stated that human capital development is one of the main pillars of building an advanced nation, thus giving education a crucial role to play. The country's emphasis on education is reflected in rising expenditure in the sector. In 2018, RM46.5 billion or about 16% of the total federal government expenditure was invested in the education sector. The share of total expenditure allocated for education further increased to 19% in 2019 and 21% in 2020 (Ministry of Finance Malaysia, 2019).

As of 2019, there were more public schools than private at all levels of education in Penang except at the tertiary level (Table 3.25). Private institutions dominated the landscape in post-secondary education. There were 30 private universities and colleges compared with 12 publicly funded ones (three public universities, three polytechnics, and six community colleges).

Table 3.25 Number of schools in Penang by type as of June 2019

Type	Public	Private	Total
Pre-school	561	459	1,020
Total (Primary and secondary)	**399**	**28**	**427**
Primary	271	3	274
Secondary	128	8	136
Mixed-level	0	17	17
Tertiary	12	30	42

Note:

1. Public pre-schools include pre-schools annexed to the government and government-aided primary and secondary schools (under the Ministry of Education), KEMAS (under the Ministry of Rural and Regional Development), Perpaduan (under the Department of National Unity), and JAIN (under the State Religious Department), while private pre-schools include ABIM (Malaysian Islamic Youth Movement) and private kindergartens.

2. The number of private universities and colleges is as of 31 October 2019.

Source: Malaysia Educational Statistics 2019, Ministry of Education (MOE) Malaysia; Statistik IPTS sehingga 31 Oktober 2019, MOE Malaysia.

There are six types of pre-schools in Malaysia, namely the pre-schools annexed to the governmental primary and secondary schools (under the Ministry of Education (MOE)), KEMAS, Perpaduan, JAIN, ABIM, and private kindergartens[30]. Public pre-schools include pre-schools under MOE, KEMAS, Perpaduan, and JAIN, while private pre-schools include ABIM and other private kindergartens[31].

Although public pre-schools outnumbered private pre-schools, as shown in Table 3.25, early childhood education in Penang was mainly supported by private education providers, with fewer parents opting for public pre-schools. Parents' preferences are reflected in the higher number of enrolments in private pre-schools compared with public ones, with the share of enrolments in private kindergartens remaining stable at around 54% (Table 3.26). This is in stark contrast with the rest of Malaysia where public pre-schools were more popular.

In contrast with pre-school, most primary and secondary students were enrolled in public schools. However, there was a positive trend in enrolments in private schools. Between 2017 and 2019, private enrolments increased by 7% annually at the primary level, and 2% at the secondary level (Table 3.26). As for the public schools, a decline in student numbers was seen in secondary schools, mainly attributed to falling number of students in regular schools.

[30] The KEMAS kindergarten is under the purview of the Ministry of Rural and Regional Development, the Perpaduan under Department of National Unity, and JAIN under the State Religious Department. In addition, ABIM kindergartens are run by the non-governmental organisation of Malaysian Islamic Youth Movement.

[31] The categorisation of public and private pre-schools is as classified by the Penang Institute. In Malaysia Educational Statistics (published by the Ministry of Education (MOE)), pre-schools are categorised under MOE and others (other ministries/governmental agencies and private institutions).

Table 3.26 Number of enrolments for pre-school, primary, and secondary levels in Penang, 2017–19

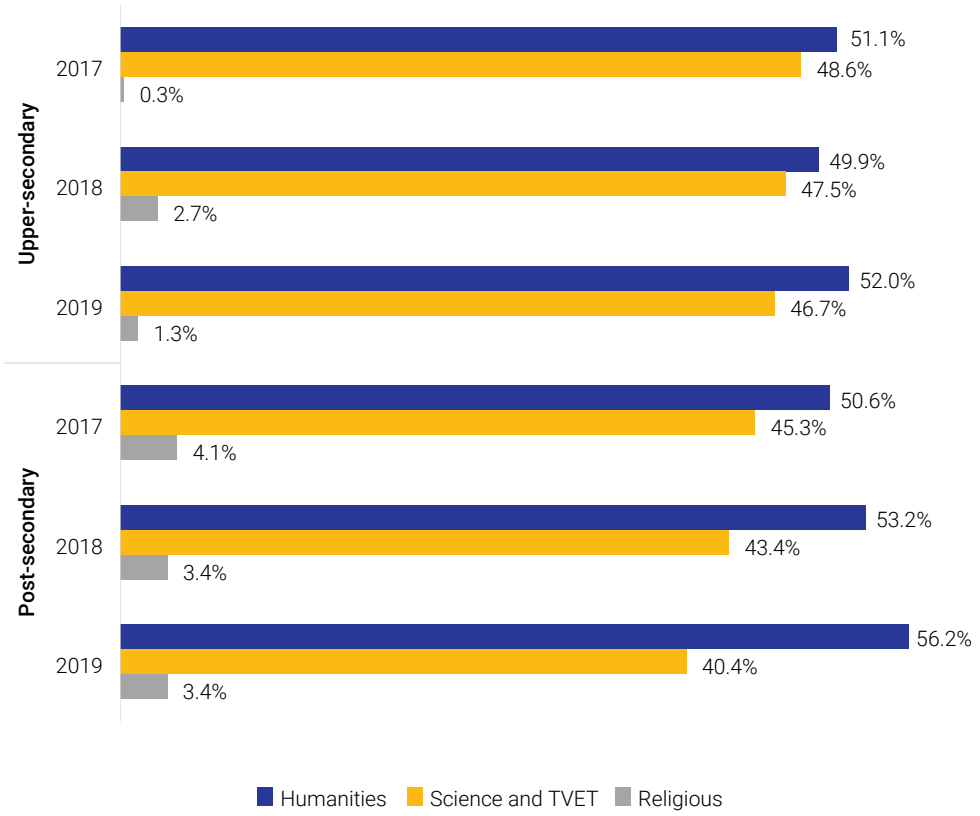
Type of school	2017	2018	2019
Pre-school			
Public	17,090 (46%)	17,099 (45%)	17,100 (46%)
Private	20,398 (54%)	20,522 (55%)	19,730 (54%)
Total	**37,488**	**37,621**	**36,830**
Primary			
Public			
National	78,532 (59%)	78,969 (59%)	79,565 (59%)
National Type (C)	46,187 (35%)	45,376 (34%)	46,080 (34%)
National Type (T)	5,264 (4%)	5,383 (4%)	5,470 (4%)
Government-aided religious school (GARS)	358 (0.3%)	357 (0.3%)	358 (%)
Special Education	114 (0.1%)	105 (0.1%)	102 (%)
Private	3,020 (2%)	3,293 (2%)	3,467 (3%)
Total	**133,475**	**133,483**	**135,042**
Secondary			
Public			
Regular	99,440 (83%)	96,296 (82%)	93,526 (82%)
Fully residential	1,232 (1%)	1,335 (1%)	1,305 (1%)
Religious	2,452 (2%)	2,364 (2%)	2,463 (2%)
Government-aided religious school (GARS)	3,467 (3%)	3,495 (3%)	3,499 (3%)
Special education	133 (0.1%)	141 (0.1%)	126 (%)
Technical	559 (0.5%)	509 (0.4%)	513 (%)
Vocational college	3,498 (3%)	3,322 (3%)	2,849 (2%)
Form six college	324 (0.3%)	316 (0.3%)	691 (1%)
Private	9,103 (8%)	9,382 (8%)	9,470 (8%)
Total	**120,208**	**117,160**	**114,442**

Note: The number of enrolments in regular schools includes special model schools, sports schools, arts schools, and Bimbingan Jalinan Kasih Schools (BJKS).
Source: Malaysia Educational Statistics 2017–2019, Ministry of Education Malaysia.

The proportion of students who opted for science and Technical and Vocational Education and Training (TVET)[32] declined at both upper and post-secondary levels[33], while the share for humanities has increased continuously (Figure 3.34). Given the increasing need for skilled workforce in the face of Industrial Revolution 4.0, the decline in enrolments for science and TVET is concerning. Appropriate policies need to be put in place to remedy this situation.

[32] Technical and Vocational Education and Training (TVET) includes MPV, PVMA, technology, technical, skills, and VCM programmes.
[33] Refers to government and government-aided schools only.

Figure 3.34 Share of students' enrolments by field of study at upper and post-secondary levels in government and government-aided schools in Penang, 2017–19



Source: Malaysia Educational Statistics 2017–2019, Ministry of Education Malaysia.

Within Malaysian public universities alone, the most preferred fields of Penang-born students were Social Science, Business, and Law. In 2018, 33.5% of total enrolments were in these fields, followed by Engineering, Manufacturing, and Construction (25.7%) and Science, Mathematics, and Computing (15.3%).

In 2018, graduating classes for the three-most-popular fields were smaller than their new intakes, leading to higher enrolment numbers (Table 3.27). The total number of graduates for all fields increased by almost 3% to 5,958. As expected, Social Science, Business, and Law; Engineering, Manufacturing, and Construction; and Science, Mathematics, and Computing made up the three-largest proportions of graduates. All fields experienced an increase except Social Science, Business, and Law and Science, Mathematics, and Computing, which decreased by 7.2% and 3.4%, respectively. The two fields with the lowest number of enrolments, Agriculture and Veterinary and Services, saw the largest increments of 66% and 59%, respectively.

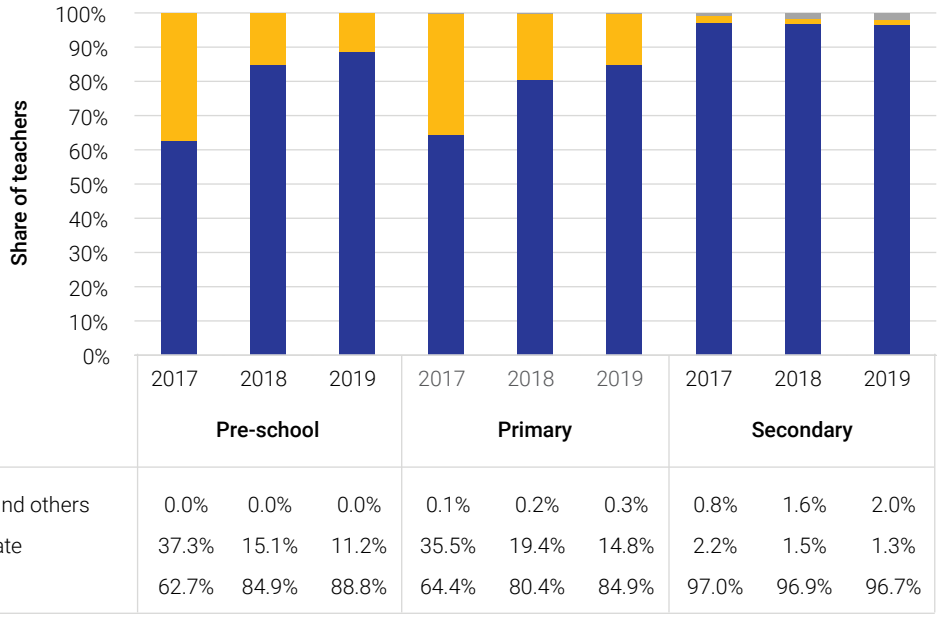
Although highly qualified teachers do not necessarily equate to good teaching outcome, having requirements for teacher qualifications shows a recognition of teaching as a profession and, to some extent, improves teaching quality. At pre-school and primary levels, the share of teachers with graduate backgrounds improved significantly, from slightly below 65% in 2017 to more than 80% in 2019. This suggests that more graduates are choosing to engage in the education sector, or that teachers proactively upskilled themselves while in service. On the other hand, while secondary schools had the largest share of graduate teachers, it also had the most number of untrained, reappointed, and contract teachers (Figure 3.35).

Table 3.27 Number of Penang-born intakes, enrolments, and graduates in all public universities in Malaysia by field of study, 2017–18

Field of study	Intakes (%)		Enrolments (%)		Graduates (%)	
	2017	2018	2017	2018	2017	2018
Social Sciences, Business, and Law	2,879 (35.1%)	2,776 (34.6%)	8,620 (32.9%)	8,825 (33.5%)	2,087 (36.1%)	1,937 (32.5%)
Engineering, Manufacturing, and Construction	1,932 (23.6%)	1,889 (23.6%)	6,747 (25.8%)	6,784 (25.7%)	1,424 (24.6%)	1,518 (25.5%)
Science, Mathematics, and Computing	1,387 (16.9%)	1,270 (15.8%)	3,933 (15.0%)	4,027 (15.3%)	876 (15.1%)	846 (14.2%)
Health and Welfare	517 (6.3%)	516 (6.4%)	2,050 (7.8%)	2,036 (7.7%)	433 (7.5%)	478 (8.0%)
Arts and Humanities	643 (7.8%)	593 (7.4%)	2,075 (7.9%)	1,995 (7.6%)	387 (6.7%)	470 (7.9%)
Education	414 (5.1%)	502 (6.3%)	1,461 (5.6%)	1,452 (5.5%)	375 (6.5%)	376 (6.3%)
Services	302 (3.7%)	334 (4.2%)	846 (3.2%)	875 (3.3%)	143 (2.5%)	227 (3.8%)
Agriculture and Veterinary	118 (1.4%)	114 (1.4%)	427 (1.6%)	362 (1.4%)	64 (1.1%)	106 (1.8%)
General programmes	2 (0.0%)	22 (0.3%)	2 (0.0%)	23 (0.1%)	0 (0.0%)	0 (0.0%)
Total number of students	**8,194**	**8,016**	**26,161**	**26,379**	**5,789**	**5,958**
Growth rate (%)	**6.2%**	**-2.2%**	**2.0%**	**0.8%**	**-14.1%**	**2.9%**

Source: Ministry of Education, Malaysia.

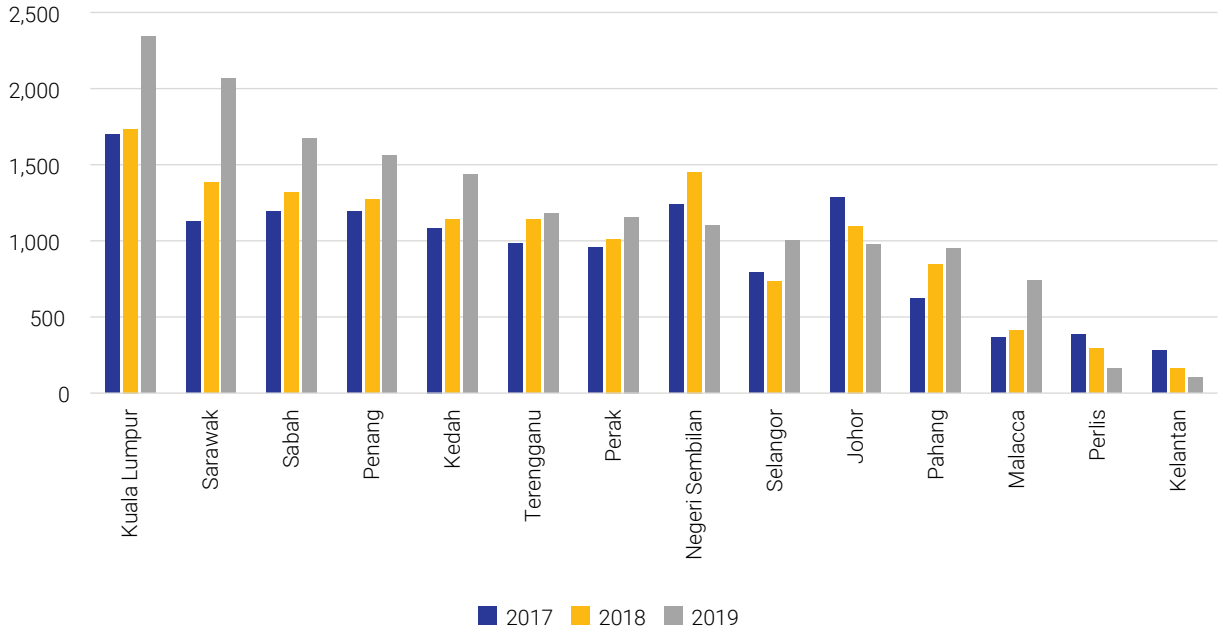
Figure 3.35 Share of teachers in government and government-aided schools in Penang for pre-school, primary, and secondary levels by qualification, 2017–19



	Pre-school			Primary			Secondary		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
Untrained and others	0.0%	0.0%	0.0%	0.1%	0.2%	0.3%	0.8%	1.6%	2.0%
Non-graduate	37.3%	15.1%	11.2%	35.5%	19.4%	14.8%	2.2%	1.5%	1.3%
Graduate	62.7%	84.9%	88.8%	64.4%	80.4%	84.9%	97.0%	96.9%	96.7%

Note: 1. Pre-school level includes pre-schools annexed to the public primary and secondary schools only.
2. Others are reappointed and contract teachers.
Source: Malaysia Educational Statistics 2017–2019, Ministry of Education Malaysia.

Figure 3.36 Number of enrolments in institutes of teacher education by state, 2017–19



Source: Malaysia Educational Statistics 2017–2019, Ministry of Education Malaysia.

Along with the increased share of graduate teachers, total enrolment in teacher education institutes in Malaysia increased by 11.6% per year on average, from 13,198 in 2017 to 16,441 in 2019. All states showed growing enrolments from 2017 to 2019, except Negeri Sembilan, Johor, Perlis, and Kelantan (Figure 3.36).

While there was a larger supply of teachers (proxy by enrolments in teacher education institutes), the share of young teachers in Penang was relatively low compared with the country. As of 2018, only 7.3% of the state's teachers were below the age of 30, compared with the national figure of 9.6%. On the other hand, the proportion of teachers in Penang aged above 50 accounted for about 23% (Table 3.28). However, there is no indication of an ageing workforce for both primary and secondary schools. Between 2016 and 2018, the share of older teachers fell while that of young teachers grew steadily[34].

Table 3.28 Share of teachers aged 30 years old and below (<=30) and aged above 50 years old (>50) against the total number of teachers in Penang and Malaysia, 2016–18

Level of education	Year	Penang		Malaysia	
		<=30	>50	<=30	>50
Primary	2016	5.5%	24.2%	9.9%	20.9%
	2017	5.8%	24.0%	9.4%	21.9%
	2018	7.1%	21.4%	10.5%	20.1%
Secondary	2016	6.3%	25.5%	7.0%	23.8%
	2017	6.6%	26.8%	7.2%	25.5%
	2018	7.5%	24.3%	8.5%	23.1%
Total	**2016**	**5.9%**	**24.8%**	**8.7%**	**22.2%**
	2017	**6.2%**	**25.3%**	**8.5%**	**23.5%**
	2018	**7.3%**	**22.8%**	**9.6%**	**21.4%**

Note: (A) Penang Institute estimates based on data from the Ministry of Education (data for number of teachers aged 30 years old and below and above 50 years old). (B) Malaysia Educational Statistics 2016–2018 (data for total number of teachers).
Source: Ministry of Education, Malaysia.

[34] The age groups of 30 years old and below and 50 years old and above were used to measure the ageing teacher workforce based on main reference to Education at a Glance 2019: OECD Indicators (https://www.oecd-ilibrary.org/education/education-at-a-glance_19991487).

3.2.7 Public safety and security

Public safety refers to the welfare and protection of the general public which is mainly expressed as a governmental responsibility. Public safety and security significantly affect well-being and quality of life. It plays an important role in supporting economic growth and development by minimising the cost of crime and improving the desirability of communities as places to live and locate businesses (Keeling & Cleverley, 2012).

There is an economic and social cost for each incident of crime and response. It includes direct costs (immediate impact) and indirect costs (e.g., fear of crime, lower life satisfaction level, psychological issues, decreased quality of life, and other non-monetary costs). Furthermore, dealing with crime adds a burden to the government expenditure which is mostly due to the costs of increasing the number of police officers, imprisonment, providing mental health services, and organising campaigns and programmes designed against criminal activities (Ishak & Bani, 2017).

Crime, drug addiction, and law enforcement

The crime index ratio per 100,000 population[35] in Penang in 2018 improved to 284.6 compared with 2017 (318.3), but this is still above the national level (273.8).

Crime index consists of two categories: violent crime and property crime. In 2018, the number of violent crimes dropped by 17.4% compared with 2017, which is mainly due to the result of a significant decrease in the number of gang robberies without firearms (37.4%), followed by robberies without firearms (11.1%) and rape (10%). However, the number of murders increased by about 23.5% during the same period. Timur Laut has the most number of violent crimes (283), followed by Seberang Perai Tengah (268). The total number of violent crimes declined in all districts in 2018 compared with the previous year (Table 3.29).

Table 3.29 Number of violent crimes by district and type of crime, Penang 2016–18

District	Year	Murder	Rape	Gang robbery		Robbery		Causing injury*	Total
				With firearms	Without firearms	With firearms	Without firearms		
Timur Laut	2016	10	10	2	92	-	84	111	**309**
	2017	6	13	-	140	-	107	104	**370**
	2018	6	15	-	78	-	106	78	**283**
Barat Daya	2016	3	11	-	28	-	17	31	**90**
	2017	-	11	-	35	-	10	33	**89**
	2018	1	7	-	18	-	6	32	**64**
Seberang Perai Selatan	2016	3	10	-	66	-	17	39	**135**
	2017	3	7	-	74	-	20	34	**138**
	2018	2	14	-	40	-	23	46	**125**
Seberang Perai Tengah	2016	8	23	-	151	-	69	87	**338**
	2017	6	35	-	168	-	62	51	**322**
	2018	7	12	-	129	-	38	82	**268**
Seberang Perai Utara	2016	4	11	-	69	1	37	44	**166**
	2017	2	14	-	64	-	26	53	**159**
	2018	5	24	-	36	1	27	57	**150**
Penang	**2016**	**28**	**65**	**2**	**406**	**1**	**224**	**312**	**1,038**
	2017	**17**	**80**	**-**	**481**	**-**	**225**	**275**	**1,078**
	2018	**21**	**72**	**-**	**301**	**1**	**200**	**295**	**890**

*Note: * "Causing injury" includes causing bodily injury, injury during gang robbery with firearms, gang robbery without firearms, robbery with firearms, and robbery without firearms.*
Source: Royal Malaysia Police.

[35] Crime index ratio per 100,000 populations = (Total crime index/Total population) * 100,000

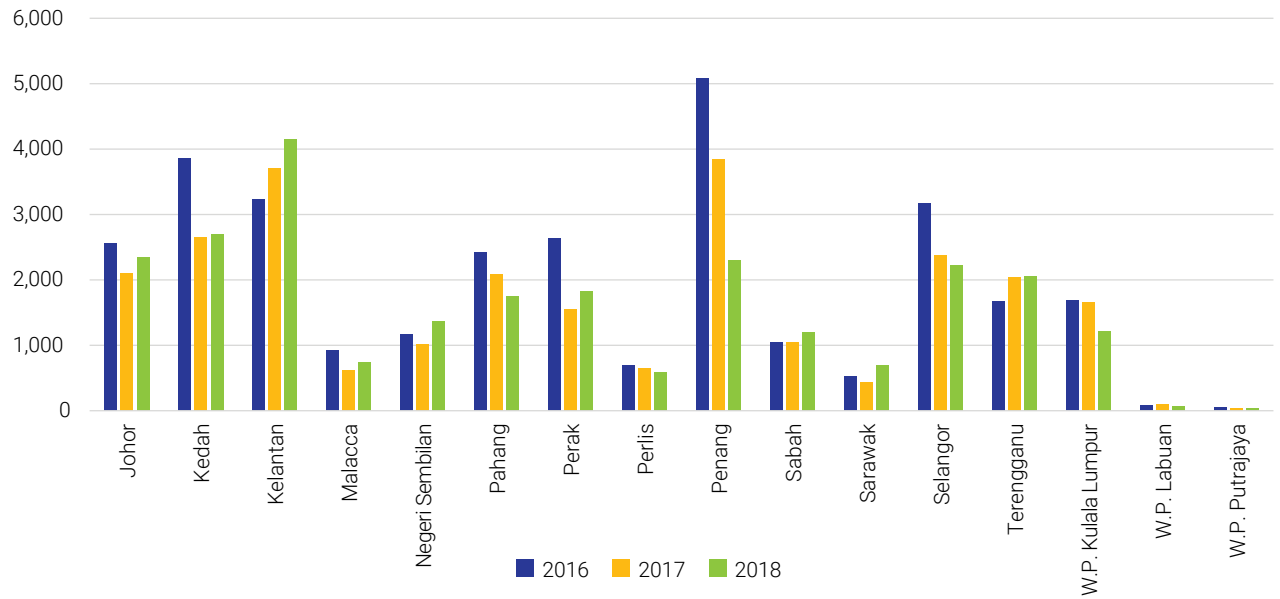
In 2018, property crime in Penang dropped by nearly 8% compared with 2017, largely owing to the decline in vehicle theft, particularly motorcycles/scooters. Vehicle theft contributed about 58% to overall property crime. All districts saw a notable reduction in property crime over the three-year period (Table 3.30).

Table 3.30 Property crime by district and type of crime, Penang, 2016–18

District	Year	House break-in and theft	Vehicles theft			Snatch	Other theft	Total
			Lorry/van	Motorcar	Motorcycle/ scooter			
Timur Laut	2016	210	12	116	627	77	358	**1,400**
	2017	194	17	67	629	-	271	**1,178**
	2018	193	25	92	485	1	284	**1,080**
Barat Daya	2016	55	7	39	224	15	108	**448**
	2017	81	6	43	225	3	74	**432**
	2018	70	7	53	189	3	105	**427**
Seberang Perai Selatan	2016	118	8	32	136	10	66	**370**
	2017	123	6	17	107	1	81	**335**
	2018	126	9	7	70	-	79	**291**
Seberang Perai Tengah	2016	336	58	191	917	61	309	**1,872**
	2017	305	22	149	817	3	285	**1,581**
	2018	306	20	140	754	1	255	**1,476**
Seberang Perai Utara	2016	198	25	71	497	28	169	**988**
	2017	165	15	81	544	4	139	**948**
	2018	160	15	58	488	7	125	**853**
Penang	**2016**	**917**	**110**	**449**	**2,401**	**191**	**1,010**	**5,078**
	2017	**868**	**66**	**357**	**2,322**	**11**	**850**	**4,474**
	2018	**855**	**76**	**350**	**1,986**	**12**	**848**	**4,127**

Source: Royal Malaysia Police.

Figure 3.37 Drug addicts by state, 2016–18

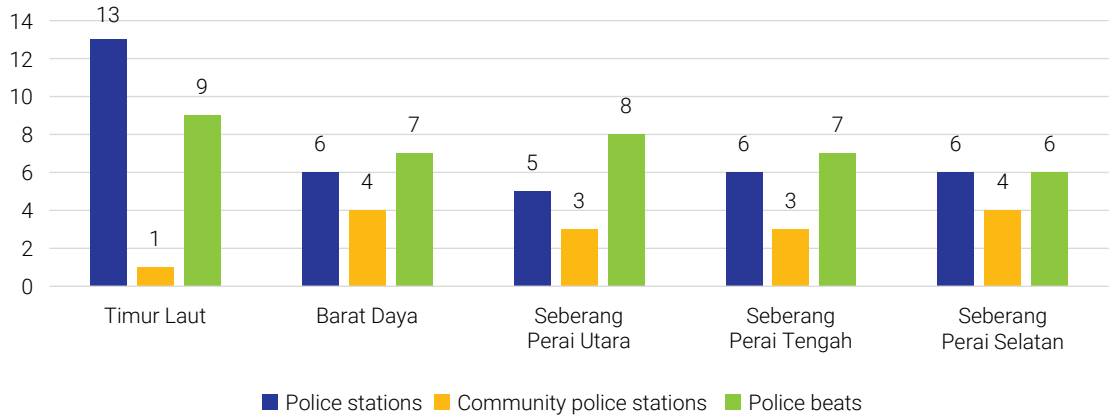


Source: National Anti-Drugs Agency.

Over the past three years, the number of drug addicts in Penang has halved, dropping from 5,081 in 2016 to 2,303 in 2018. The overwhelming majority of drug addicts were males (96.7%). In 2018, Penang recorded the fourth-highest number of drug addicts in the country after Kelantan (4,153), Kedah (2,693), and Johor (2,352) (Figure 3.37).

As presented in Figure 3.38, Timur Laut has the most police stations and police beats in Penang. However, there is only one community police station in this district compared with other districts. Community-oriented policing is an effective strategy for policing at the local level that engages ordinary citizens as well as retired police officers in a partnership approach to identify and prioritise crime and social disorder that affect the local neighbourhood. The number of police beats is almost constant across all districts.

Figure 3.38 Number of police stations, beats, and force strength, Penang, 2017

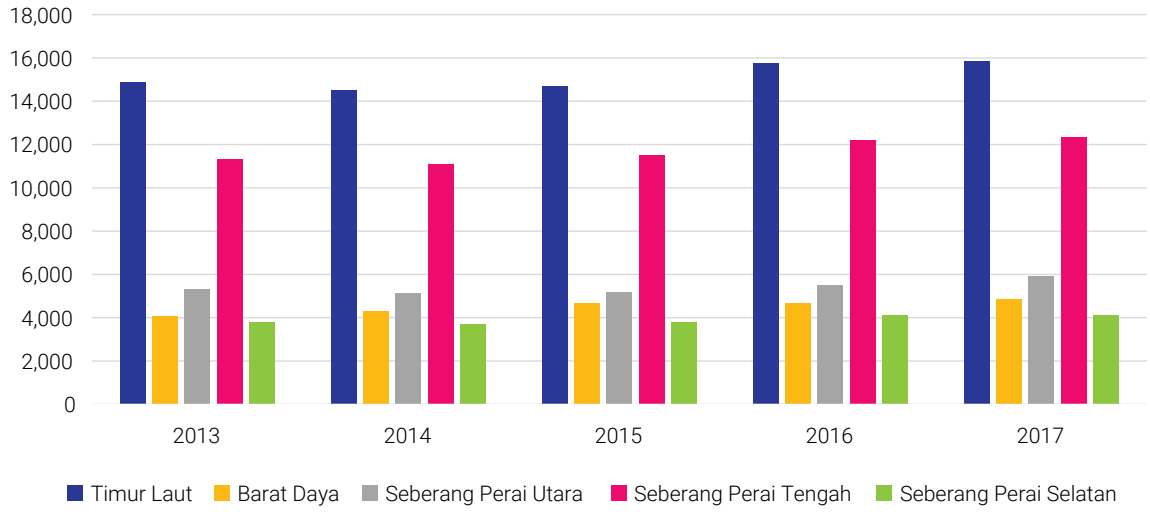


Source: Royal Malaysian Police, Penang.

Road accident and safety

Road accidents have been identified as the eighth-leading cause of death in the world (Ministry of Transport Malaysia, 2020). In 2017, the total number of road accidents in Penang increased by about 1.8% compared with 2016. The highest number of road accidents was reported for Timur Laut (15,840), followed by Seberang Perai Tengah (12,321) and Seberang Perai Utara (5,915) (Figure 3.39). Nearly 67% of road accidents in 2017 involved cars, followed by motorcycles (21.3%).

Figure 3.39 Number of road accidents reported by district, Penang 2013–17



Source: Royal Malaysian Police, Penang.

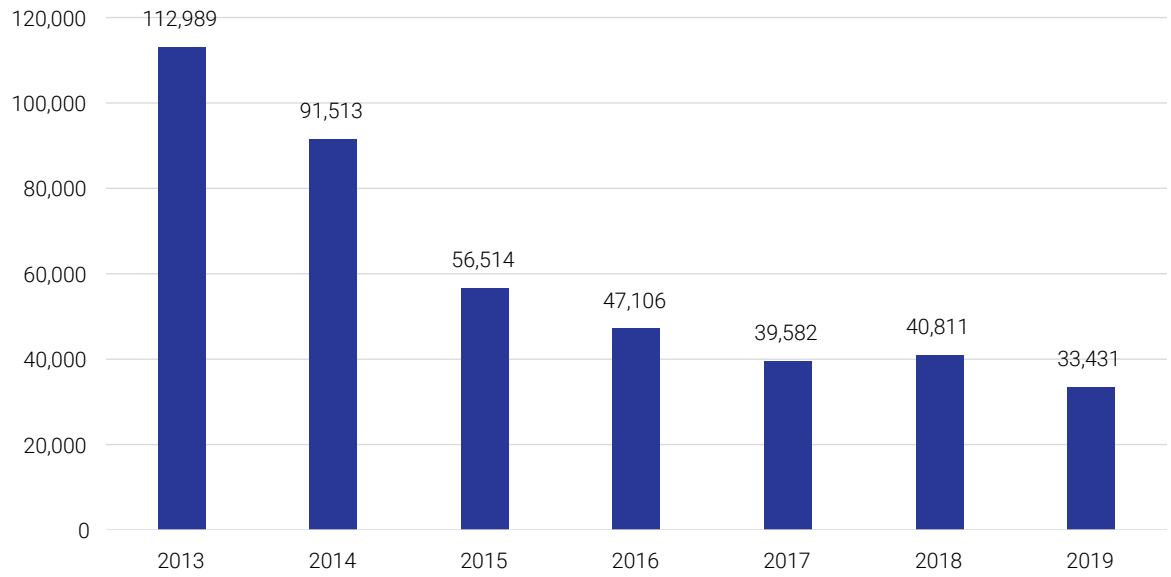
In 2017, despite the increase in total road accidents, the number of deaths and serious injuries due to road accidents in Penang declined by about 2.4% and 29.7%, respectively, compared with 2016, which is relative to the number of motor vehicles during the same period (Table 3.31 and Figure 3.40). This suggests some progress in mitigating the adverse effects of increasing motorised transport. In an effort to address the issue of road accidents, the federal government, through the relevant agencies, have been designing and implementing road safety initiatives that include five elements: education, enforcement, engineering, environmental, and evaluation (Ministry of Transport Malaysia, 2020).

Table 3.31 Number of death and injuries in road accidents reported, Penang 2013–17

Type of accidents	2013	2014	2015	2016	2017
Deaths	381	378	360	411	401
Serious injuries	147	178	186	259	182
Minor injuries	94	194	160	339	130
Total death/injuries	**622**	**750**	**706**	**1,009**	**713**
Total road accident	**39,361**	**38,747**	**39,856**	**42,244**	**43,007**

Source: Bukit Aman Traffic Department.

Figure 3.40 Number of motor vehicles, Penang 2013–19



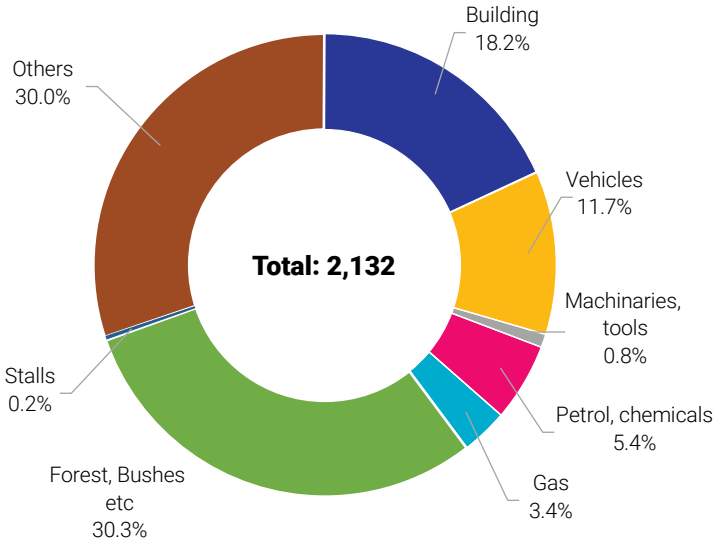
Source: Road Transport Department, Malaysia.

Fire and safety

There are 18 fire stations in Penang. In 2017, the highest number of firemen was recorded for Timur Laut (231), followed by Seberang Perai Tengah (199), while Seberang Perai Selatan (50) had the fewest. As presented in Figure 3.41, the majority of fire cases in Penang were caused by forest and bush fires (30%), followed by building fires (18%). The total number of fire cases in Penang dropped by nearly 39% in 2017 compared with 2016, mainly because of a significant decline (82.5%) in cases caused by issues of machineries and tools. The total number of crank calls also decreased by 42.4% during the same period.

Between 2016 and 2017, the number of injuries resulting from fires decreased negligibly from 34 to 32. However, the number of deaths increased from four to seven.

Figure 3.41 Fire cases by types in Penang, 2017



Source: Fire and Rescue Department, Penang.

3.2.8 Healthcare

There is a strong correlation between the performance of the health industry and the strength of the economy. A country with sustained economic development and growth will allow more investment into healthcare, as national income has a direct effect on healthcare spending and the improvement of health systems. A healthy nation ensures a strong workforce, which in turn raises productivity and promote economic growth.

Table 3.32 Principal statistics of health and social work services by state, Malaysia, 2015–17

States	Value of gross output (RM'000)			Value of intermediate input (RM'000)			Value added RM ('000)		
	2015	2017	CAGR	2015	2017	CAGR	2015	2017	CAGR
Johor	1,626,029	1,934,240	9.1%	882,284	1,033,693	8.2%	743,745	900,547	10.0%
Kedah	539,523	612,575	6.6%	291,326	326,377	5.8%	248,197	286,198	7.4%
Kelantan	218,919	264,192	9.9%	117,480	141,017	9.6%	101,439	123,175	10.2%
Malacca	777,128	891,744	7.1%	378,997	439,081	7.6%	398,131	452,663	6.6%
Negeri Sembilan	563,080	675,469	9.5%	316,481	383,620	10.1%	246,599	291,849	8.8%
Pahang	384,386	461,229	9.5%	216,895	250,632	7.5%	167,491	210,597	12.1%
Penang	**1,928,513**	**2,398,227**	**11.5%**	**1,053,915**	**1,297,322**	**10.9%**	**874,598**	**1,100,906**	**12.2%**
Perak	1,052,886	1,262,811	9.5%	559,322	669,015	9.4%	493,564	593,796	9.7%
Perlis	26,230	31,242	9.1%	13,122	15,654	9.2%	13,108	15,588	9.1%
Selangor	4,585,583	5,590,936	10.4%	2,348,312	2,879,842	10.7%	2,237,271	2,711,094	10.1%
Terengganu	143,976	172,103	9.3%	72,466	86,320	9.1%	71,510	85,783	9.5%
Sabah	447,638	542,766	10.1%	244,269	292,610	9.4%	203,369	250,156	10.9%
Sarawak	640,018	735,349	7.2%	320,561	360,335	6.0%	319,457	375,013	8.3%
*Kuala Lumpur	3,878,114	4,603,680	9.0%	2,021,072	2,414,711	9.3%	1,857,042	2,188,969	8.6%
*Labuan	18,933	21,351	6.2%	8,796	9,919	6.2%	10,137	11,432	6.2%
*Putrajaya	17,068	20,361	9.2%	7,157	8,425	8.5%	9,911	11,935	9.7%
Total	**16,848,024**	**20,218,274**	**9.5%**	**8,852,455**	**10,608,573**	**9.5%**	**7,995,569**	**9,609,701**	**9.6%**

*Note: * denotes Federal Territories*
Source: Penang Institute estimates based on data from Department of Statistics, Malaysia.

Based on Table 3.32, the value of gross output for Penang in terms of health and social work services was approximately RM2.4 billion in 2017, a 24.4% increase from 2015 and at a CAGR of 11.5%. The CAGR for Penang was the highest among all states, and it was also higher than the national CAGR of 9.5%. Selangor and Johor, which are similarly developed states, saw CAGRs of 10.4% and 9.1%, respectively, although Selangor's value of gross output was much higher. Kedah had the lowest CAGR for a state[36] at 6.6%.

For the same year, Selangor recorded the highest value-added for health and social work services, which amounted to approximately RM2.7 billion. This represented an increase of 21.2% and a CAGR of 10.1%. Penang, however, had a much higher CAGR of 12.2%, which again was the highest among all states. Perlis ranked the lowest with only RM15.6 million in value-added, but its CAGR of 9.1% is higher than Kedah and Malacca.

Medical tourism contributes substantial revenues towards Penang's economy; private hospital services account for a large share of total value-added for health and social work services for the state.

Healthcare facilities and allocation

There are seven public hospitals in Penang—one for each district except Seberang Perai Tengah, which has two (Table 3.33). Seberang Jaya had the highest number of community clinics (33.3%) in 2019, while Timur Laut had the lowest number (6.7%). Each district, with the exception of Seberang Perai Utara, had at least one maternal and child health clinic, with Timur Laut housing three such clinics. Timur Laut also had the highest number of health clinics (29.0%) and dental clinics (25.0%).

Table 3.33 Public health institutions in Penang by type and district, 2019

Health institution	Timur Laut	Barat Daya	Seberang Perai Utara	Seberang Perai Tengah	Seberang Perai Selatan
Hospital	1	1	1	2	1
1Malaysia clinic	4	3	7	5	4
Community clinic	4	12	20	13	11
Health clinic	9	3	7	7	5
Maternal and child health clinic	3	1	0	1	1
Dental clinic	7	4	6	6	5
Specialist dental clinic	5	0	3	6	0
Total	**33**	**24**	**44**	**40**	**27**

Source: Health Facts 2019, Penang State Health Department.

Table 3.34 Private health institutions in Penang by type and district, 2019

Health institution	Timur Laut	Barat Daya	Seberang Perai Utara	Seberang Perai Tengah	Seberang Perai Selatan
Hospital	12	2	1	5	0
GP clinic	199	92	83	152	54
Hospice	1	0	0	0	0
Private hemodialysis centre	11	5	9	12	5
Ambulatory Care Centre (ACC)	5	0	2	3	0
Private dental clinic	76	42	26	36	5
Total	**304**	**141**	**121**	**208**	**64**

Source: Health Facts 2019, Penang State Health Department.

[36] Federal territories are not included as states.

Private hospitals are highly concentrated in Timur Laut. There were 12 private hospitals in the district in 2019, or 60% of the state total. GP clinics and private dental clinics in the district also outnumbered the rest of its counterparts. Seberang Perai Tengah accommodated a large number of private health facilities, coming in second after Timur Laut. Seberang Perai Selatan, on the other hand, had the fewest private health institutions.

Table 3.35 Financial allocation for public hospitals in Penang, 2017–18

Hospital	2017			2018		
	Emolument (RM '000)	Expenditure (RM '000)	Development (RM '000)	Emolument (RM '000)	Expenditure (RM '000)	Development (RM '000)
Penang General Hospital	289,259.20	520,177.00	2,125.60	288,679.70	569,034.00	2,896.20
Seberang Jaya Hospital	122,381.30	60,849.10	971.50	119,852.90	198,019.10	1,576.10
Bukit Mertajam Hospital	49,788.60	32,096.00	581.30	54,890.20	90,288.30	1,016.40
Kepala Batas Hospital	31,183.00	19,858.90	79.50	35,371.50	61,313.60	684.50
Sungai Bakap Hospital	21,668.00	10,675.20	15.00	23,078.40	35,215.60	328.20
Balik Pulau Hospital	17,752.00	8,620.50	26.10	18,595.60	28,164.40	702.90
Total	**532,032.20**	**652,276.60**	**3,799.00**	**540,468.30**	**982,035.00**	**7,204.30**

Source: Health Facts 2018–2019, Penang State Health Department.

Penang General Hospital is the largest public hospital in the northern region of Malaysia; the hospital not only serves patients from Penang, but also patients from Perlis, Kedah, and Perak when they need specific medical services. Therefore, it is no surprise that the allocation for this hospital was the highest across emoluments, expenditure, and development for both 2017 and 2018 (Table 3.35). Seberang Jaya Hospital had the second-highest share of financial allocation, while Balik Pulau Hospital, being the smallest, had the lowest share.

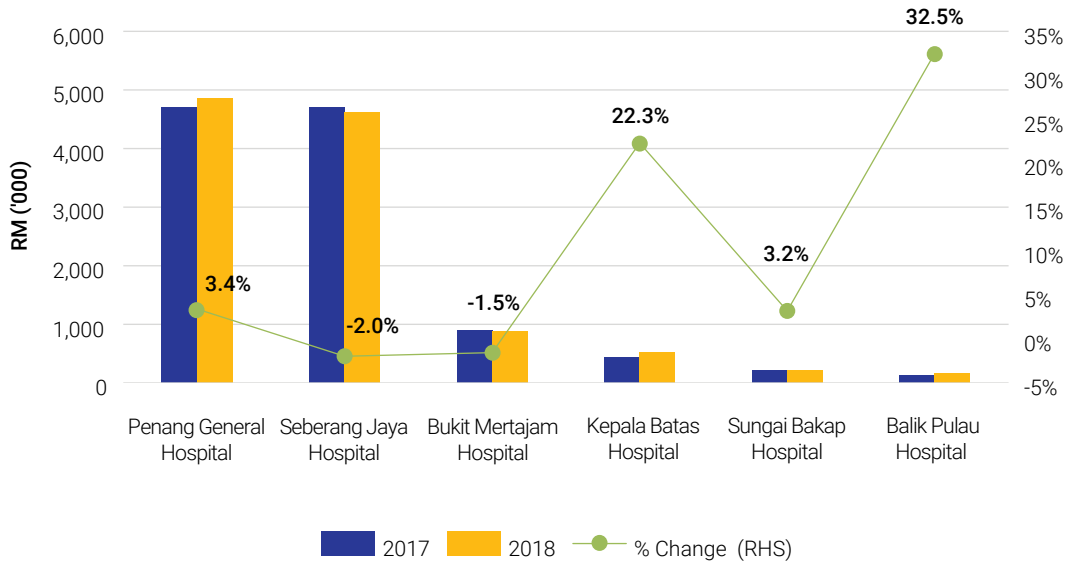
Table 3.36 Percentage change in financial allocation for public hospitals in Penang, 2017–18

Hospital	% Change		
	Emolument	Expenditure	Development
Penang General Hospital	-0.2%	9.4%	36.3%
Seberang Jaya Hospital	-2.1%	225.4%	62.2%
Bukit Mertajam Hospital	10.2%	181.3%	74.9%
Kepala Batas Hospital	13.4%	208.7%	761.0%
Sungai Bakap Hospital	6.5%	229.9%	2,088.0%
Balik Pulau Hospital	4.8%	226.7%	2,588.5%
Total	**1.6%**	**50.6%**	**89.6%**

Source: Penang Institute estimates based on data from Health Facts 2018–2019, Penang State Health Department.

Table 3.36 shows that allocation for public hospitals in Penang generally increased across the board for 2018, with the exception of negligible decreases in emoluments for Penang General Hospital and Seberang Jaya Hospital at 0.2% and 2.1%, respectively. This was to the result of an additional RM7 billion for the Ministry of Health in the federal budget for 2018. The increase in emoluments was the biggest for Kepala Batas Hospital at 13.4%, while Sungai Bakap Hospital saw the biggest increase for allocation in expenditure at 229.9%. As for development allocations, Balik Pulau Hospital saw a significant increase of 2,588.5%, going from RM26.1 million to RM702.9 million, largely due to the upgrading and expansion work scheduled for the Emergency and Outpatient Department of the hospital (Basyir, 2020). Despite being the biggest hospital in Penang, Penang General Hospital had the lowest increase in allocation.

Figure 3.42 Revenue collection by public hospitals in Penang, 2017–18



Source: Penang Institute estimates based on data from Health Facts 2018–2019, Penang State Health Department.

Penang General Hospital collected the most revenue in 2018 at approximately RM4.87 million, an increase of 3.4% over the previous year (Figure 3.42). Balik Pulau Hospital saw the biggest increase, but from a small base (RM169,660 in 2018). Elsewhere, decreases in revenue collection were seen for both Seberang Jaya Hospital (-2.0%) and Bukit Mertajam Hospital (-1.5%).

Healthcare demand and utilization

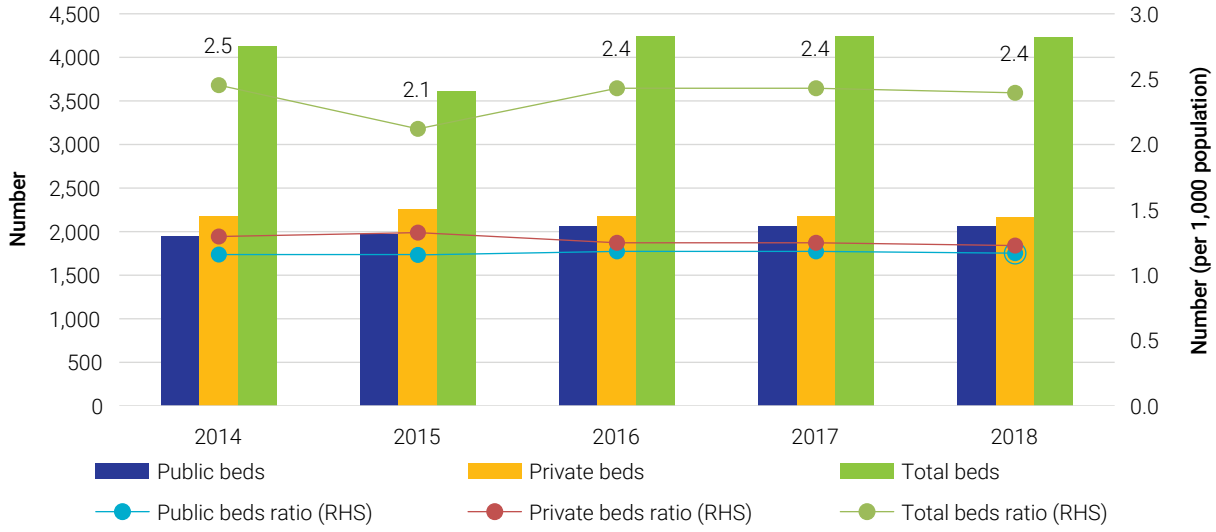
The availability of inpatient services is indicated by the number of hospital beds. The total number of beds in Penang increased in 2016, before seeing a negligible decline of 12 beds in 2018 (Figure 3.43). This decrease is attributed to private hospital beds. It interesting to note that there were more hospital beds in 2014 compared with 2018. For the latter year, there were 2.4 beds per 1,000 population[37] for both private and public hospitals combined; individually, public and private hospital beds had 1.2 beds to 1,000 population each.

Bed occupancy rates (BOR) are used to evaluate the capacity of a hospital to function safely and efficiently. Some clinical observations[38] have suggested that a BOR of above 85% indicates bed shortages, which could adversely affect hospital functions (Keegan, 2010). The BOR for public hospitals in Penang was the highest in 2014, at 76.8%. It gradually decreased over the next three years before increasing to 73.6% in 2018.

[37] The parameters of hospital beds per population is as defined World Health Organisation (WHO), retrieved from https://www.who.int/data/gho/indicator-metadata-registry/imr-details/3119#

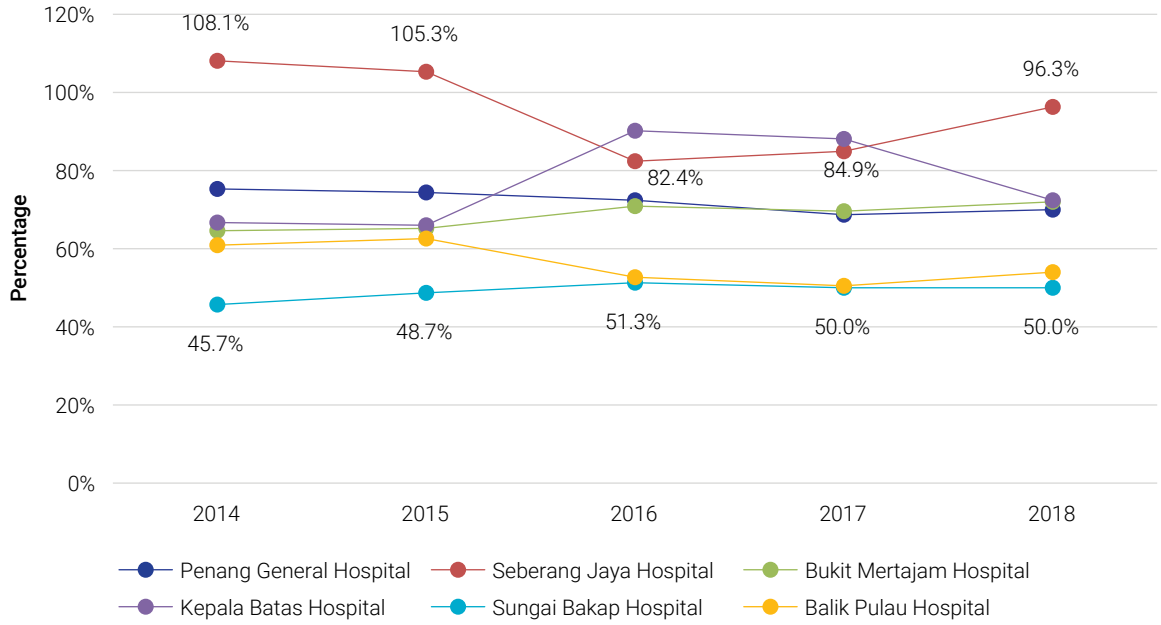
[38] The Australian Medical Association, Irish Medical Association, and the Australasian College for Emergency Medicine regard a bed-occupancy rate greater than 85% to be detrimental towards the safe and efficient operation of a hospital. Additionally, the United Kingdom Department of Health has indicated that bed-occupancy rates greater than 85% in acute care hospitals can potentially cause problems in handling both emergency and elective admissions (Keegan, 2010).

Figure 3.43 Number of beds per 1,000 population by sector, Penang, 2014–18



Source: Penang Institute estimates based on data from Health Indicators 2015–2019, Ministry of Health, Malaysia.

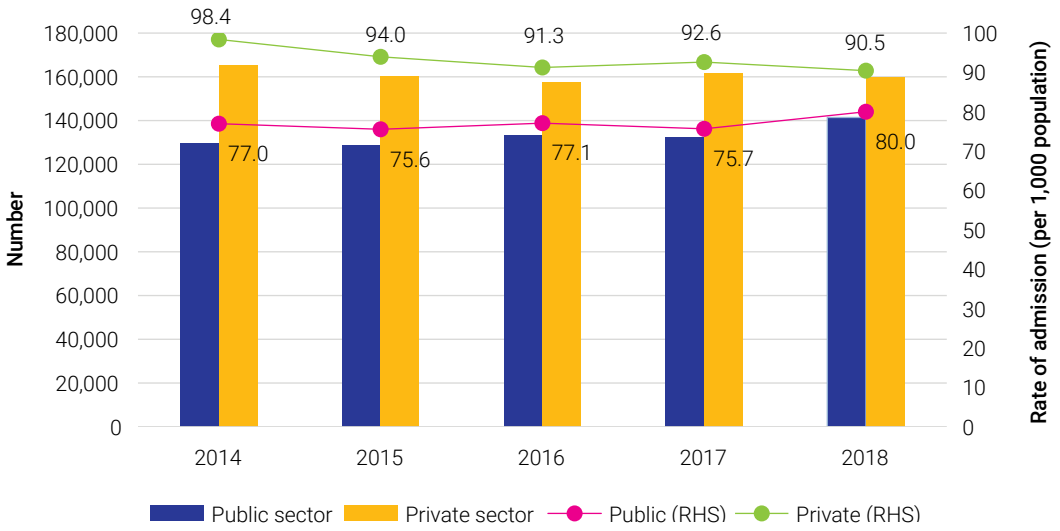
Figure 3.44 Bed occupancy rate (BOR) in public health by hospital, Penang, 2014–19



Source: Annual Health Report 2019, Penang State Health Department.

However, hospitals individually had different BORs. Penang General Hospital maintained a BOR of 72.2% over a five-year period. Seberang Jaya Hospital recorded high BORs of over 100% in 2014 and 2015, before declining to below 85% in the following two years. However, its BOR spiked in 2018 to 96.3%, an indication that Seberang Jaya Hospital may have been struggling with bed shortages. Some patients could potentially be redistributed to Bukit Mertajam Hospital (which is located in the same district), which had a more optimal BOR of 72% in 2018. Sungai Bakap Hospital had the lowest rate of bed occupancy during the five-year period, with a low of 45.7% recorded in 2014.

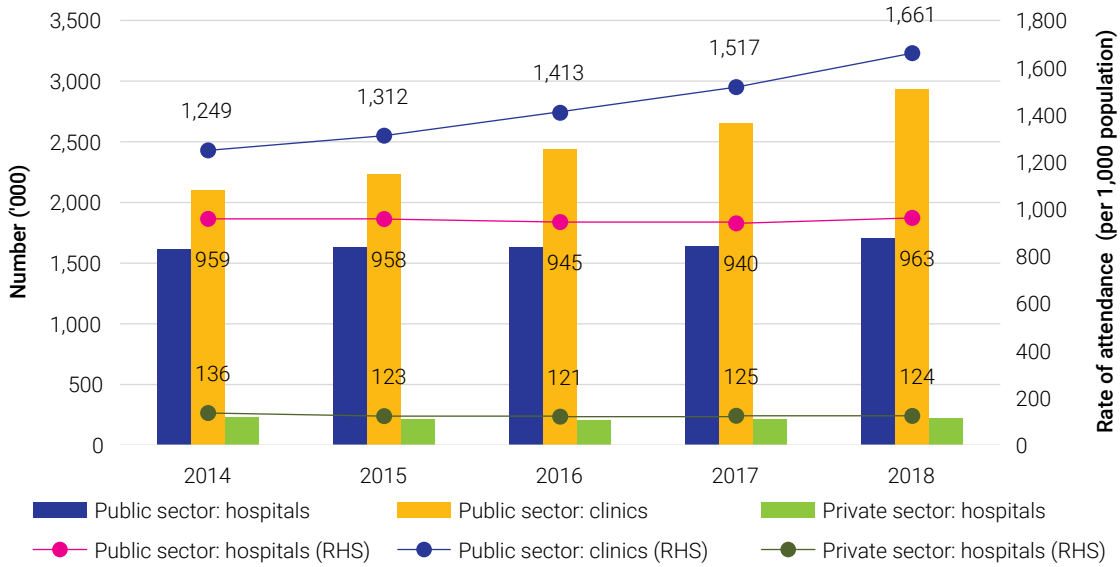
Figure 3.45 Number of admissions and rate of admission per 1,000 population in hospitals by sector, Penang, 2014–18



Source: Penang Institute estimates based on data from Health Indicators 2015–2019, Ministry of Health, Malaysia.

Figure 3.45 shows that there were more admissions into private hospitals compared with public hospitals. Private admissions accounted for 53.1% of total admissions in 2018—the lowest recorded over the five-year period. Both private and public health saw fluctuations in number of admissions. Naturally, the rate of admissions per 1,000 population followed the trend of total number of admissions. The highest rate of admissions for public hospitals (at 80 admissions) was seen in 2018, which also registered the lowest rate for private hospitals (at 91 admissions).

Figure 3.46 Number of outpatient visits and rate of attendance per 1,000 population in hospitals and clinics by sector, Penang, 2014–18

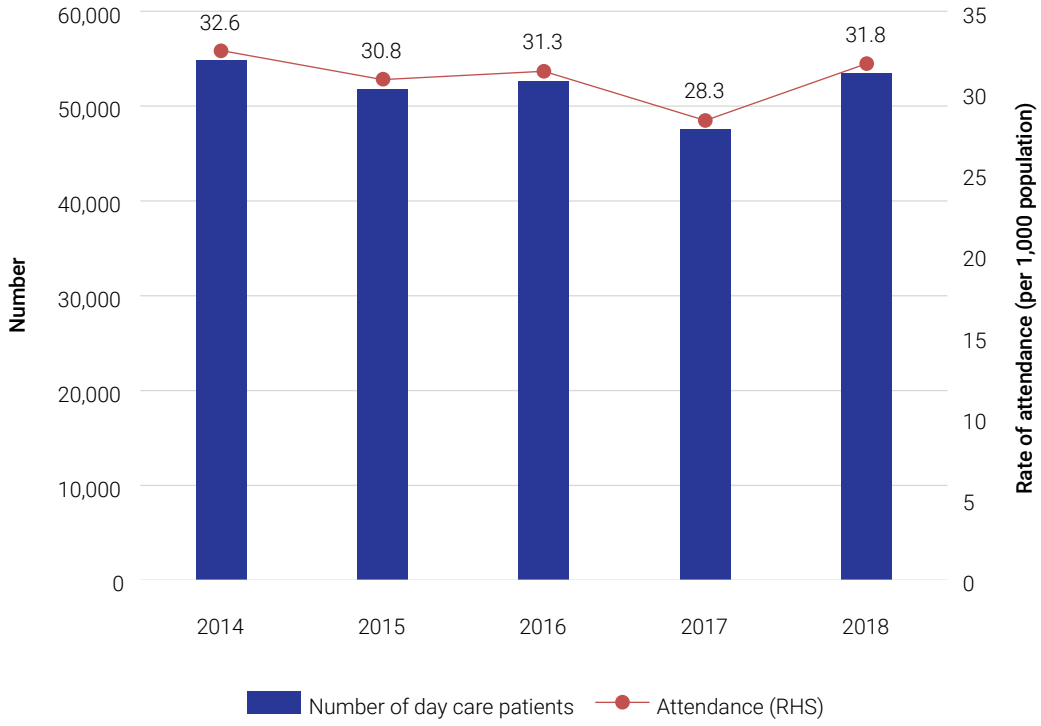


Source: Penang Institute estimates based on data from Health Indicators 2015–2019, Ministry of Health, Malaysia.

The reverse scenario is observed when it comes to outpatient visits, as the number of outpatient visits at public hospitals significantly exceeded private hospitals (Figure 3.46). In 2018, the share of private hospital visits was only about 4.5% of total hospital visits. However, public health clinics had the most outpatient visits, and the number of visits have been increasing at a much higher rate than public and private hospitals.

The 10.8% increase in outpatients in 2018 was the highest in five years. The rate of visits per 1,000 population for public and private hospitals remained constant, with negligible fluctuations. The rate of visits in public health clinics have continued to increase (along with total number of visits), peaking at 1,661 visits per 1,000 population in 2018.

Figure 3.47 Number of day care attendances and rate of attendance per 1,000 population in public hospitals, Penang, 2014–18



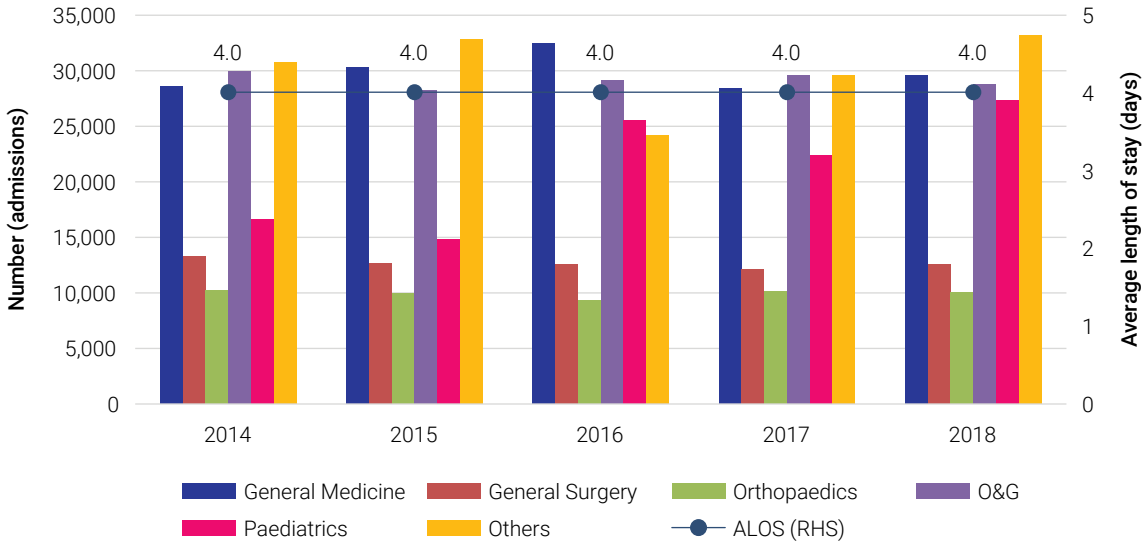
Note: Data for day care attendances at private health facilities are not available.
Source: Penang Institute estimates based on data from Health Indicators 2015–2019, Ministry of Health, Malaysia.

Day cares at public hospitals saw the lowest number of attendances and rate of attendance per 1,000 population in 2017 (in a five-year period) (Figure 3.47). It then saw a 12.4% increase in 2018, where the number of attendances per 1,000 population rose from 28 attendances to 32. This number peaked in 2014, when there were 54,788 day care procedures with 33 attendances per 1,000 population.

As seen in Figure 3.48, the departments for general medicine and obstetrics and gynaecology (O&G) saw the most number of admissions for public hospitals. There were more admissions for obstetrics and gynaecology for 2014 and 2016, but admissions[39] for general medicine were greater for the remaining years.

[39] This does not include the category "others", as this category encompasses numerous other departments.

Figure 3.48 Number of admissions and average length of stay (ALOS) in public hospitals, Penang, 2014–18



Source: Health Indicators 2015–2019, Ministry of Health, Malaysia.

The biggest increase in admissions can be seen in the paediatrics department, which had a 71.7% increase in 2016, then peaked in 2018. The average length of stay (ALOS) in all public hospitals remained constant from 2014 to 2018, with an average of four days per admission. However, looking at individual hospitals, it is found that the ALOS for all hospitals, with the exception of Penang General Hospital, was three days. The ALOS for Penang General Hospital was five days, and this held true during the five-year period[40].

Births and mortality rate

As per Table 3.37, Seberang Jaya had the highest number of births for 2017 and 2018, and this includes both live births and stillbirths. Sungai Bakap Hospital saw the lowest number of births. The total number of births decreased for all hospitals, with the exception of Kepala Batas Hospital, which recorded a 5.4% increase of 108 births in 2018. However, the hospital also saw an increase of 10 stillbirths; there were none in the previous year. Stillbirths accounted for 0.7% of all births in these six hospitals for both years.

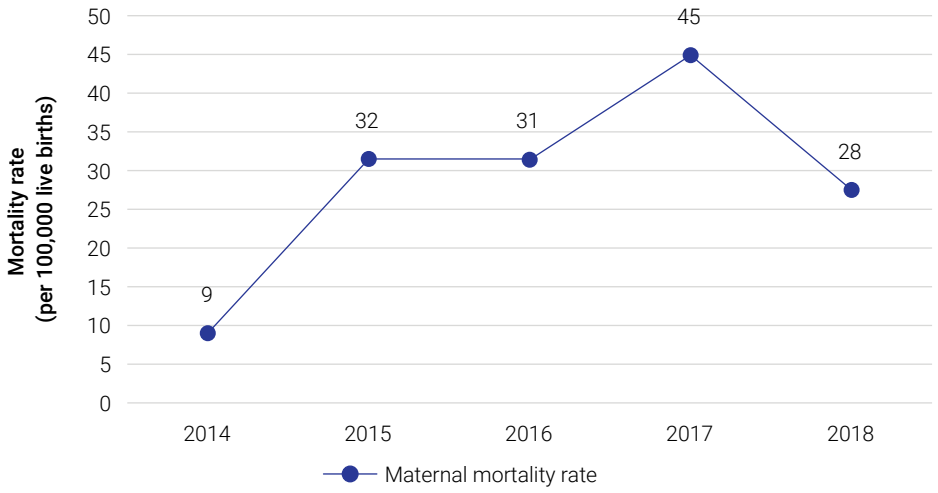
Table 3.37 Number of live births and stillbirths in public hospitals, Penang, 2017–18

Hospital	Births					
	Live		Stillbirth		Total	
	2017	2018	2017	2018	2017	2018
Penang General Hospital	4,592	4,418	38	39	4,630	4,457
Seberang Jaya Hospital	5,829	5,688	61	44	5,890	5,732
Bukit Mertajam Hospital	1,561	1,297	2	8	1,563	1,305
Kepala Batas Hospital	2,013	2,111	0	10	2,013	2,121
Sungai Bakap Hospital	183	123	0	1	183	124
Balik Pulau Hospital	230	203	0	0	230	203
Total	**14,408**	**13,840**	**101**	**102**	**14,509**	**13,942**

Source: Annual Health Report 2018, Penang State Health Department.

[40] Data obtained from Health Facts, published by the Penang State Health Department.

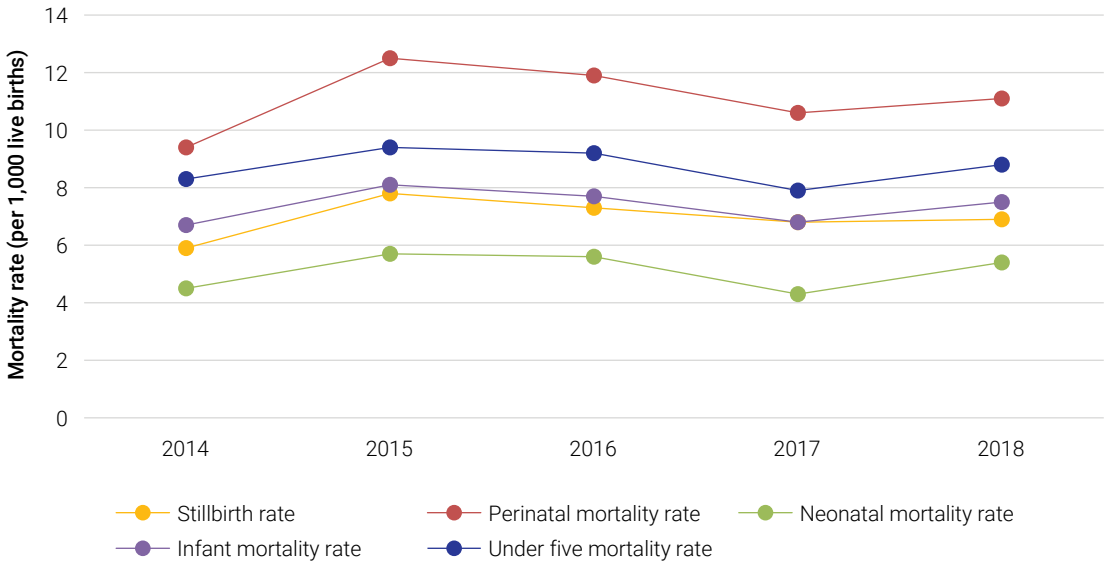
Figure 3.49 Maternal mortality rate per 100,000 births in Penang, 2014–18



Source: Annual Health Report 2018, Penang State Health Department.

Maternal mortality rate was the lowest in 2014, when there were 9 deaths per 100,000 live births. However, this increased by 255.6% to 32 deaths per 100,000 live births in the following year. It then peaked at 45 deaths in 2017, before seeing a 37.8% decrease to 28 maternal deaths in 2018. It is unclear as to what caused the spike in maternal deaths from 2014 onwards.

Figure 3.50 Infant and child mortality rate per 1,000 births in Penang, 2014–18



Source: Annual Health Report 2018, Penang State Health Department.

Figure 3.50 shows that neonatal mortality rates are generally the lowest when measured against other infant and child mortality rates. Neonates refer to infants in the first 28 days after birth and is generally considered to be the most vulnerable period for a child (UNICEF, 2019). The neonatal mortality rate was the highest in 2015 and 2016, with six deaths per 1,000 live births, before decreasing in 2017, and then increasing to five deaths in 2018.

The highest number of deaths is seen among the perinatal infants. The perinatal period is considered to begin after 22 weeks (154 days) of gestation and ends seven days after birth. Perinatal mortality rate refers to the number of deaths within seven days of birth. The number of perinatal deaths per 1,000 live births peaked in 2014 with 13 deaths, before decreasing to 11 in 2017; the rate held steady in 2018. As for stillbirths, the rate remained constant over the three-year period, with three stillbirths per 1,000 live births.

Disease

According to Table 3.38, dengue fever is generally the communicable disease with the most cases within the five-year period. The only exception was in 2016, when hand, foot, and mouth disease cases outnumbered dengue fever. Both diseases saw significant spikes from 2017 to 2018, with dengue fever cases seeing an increase of 127.1% (3,388 cases)—a five-year high.

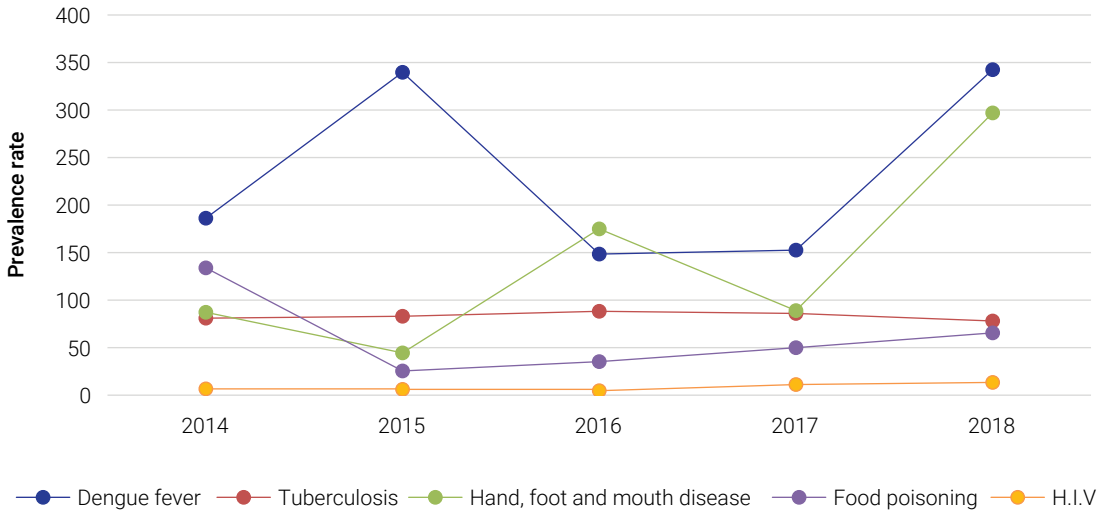
Table 3.38 Number of major communicable diseases by cases, Penang, 2014–18

Disease	2014	2015	2016	2017	2018
Dengue fever	3,096	5,790	2,562	2,664	6,052
Hand, foot, and mouth disease	1,450	758	3,019	1,553	5,248
Tuberculosis	1,347	1,415	1,523	1,501	1,379
Food poisoning	2,227	434	609	872	1,158
HIV	110	104	81	195	237
Syphilis	59	68	66	85	175
Leptospirosis	195	144	44	82	96
Hepatitis C	22	50	51	46	77

Source: Annual Health Report 2018, Penang State Health Department.

Hand, foot, and mouth cases rose from 1,553 in 2017 to 5,248 in 2018, an increase of 237.9%. Other major communicable diseases also recorded spikes in the two-year period, with the exception of tuberculosis, which saw a drop of 122 cases (0.81%). Another communicable disease that saw significant fluctuations is food poisoning, which had a decrease of 1,793 incidences (80.1%) in 2015, and it remained in the hundreds until 2018, which saw a 32.8% increase.

Figure 3.51 Prevalence rate per 100,000 population of top-five major communicable diseases in Penang, 2014–18



Source: Penang Institute estimates based on data from Annual Health Report 2018, Penang State Health Department.

Figure 3.51 shows that the prevalence rate for dengue cases was the highest in 2015 and 2018 (coinciding with the total number of cases) at 340 and 342 cases, respectively (per 100,000 population). The prevalence rate for hand, foot, and mouth disease peaked in 2018 at 297 cases per 100,000 population. The prevalence rate for the other major communicable diseases were significantly lower and considerably less volatile, with HIV being the lowest at 13 incidences per 100,000 population.

Box 3.5 COVID-19 in Malaysia and Penang

By Yeong Pey Jung

COVID-19 is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Common symptoms include fever, cough, shortness of breath, sore throat, and aches and pains (World Health Organisation, 2020). The spread of the virus is caused by droplets in the air produced by sneezing, coughing, and/or talking, and the virus can survive on a contaminated surface for as long as 72 hours. The incubation period for the virus is up to 14 days, although some patients may show symptoms within five days (World Health Organisation, 2020).

In Malaysia, the Ministry of Health has precise guidelines in detecting, testing, and treating COVID-19 cases. Certain public hospitals are selected to become screening hospitals, and there is typically one public hospital in each state responsible for treating positive cases. Testing is available in some private hospitals, but all positive cases must be referred to the designated public hospital for treatment.

In Penang, the four screening hospitals are Penang General Hospital, Seberang Jaya Hospital, Bukit Mertajam Hospital, and Kepala Batas Hospital, with Penang General Hospital acting as the admitting hospital for persons under investigation (PUIs) as well as positive cases. There are also five health clinics (Klinik Kesihatan) where screening is accessible: Jalan Perak health clinic, Bayan Baru health clinic, Sungai Dua health clinic, Seberang Jaya health clinic, and Bukit Panchor health clinic[41].

[41] *List of screening hospitals and health clinics retrieved are as published by the Ministry of Health, retrieved from http://www.moh.gov.my/moh/resources/Penerbitan/Garis%20Panduan/COVID19/Annex_3_Screening_centre_24032020.pdf*

Table 3.39 Number and percentage of COVID-19 cases and deaths by state, Malaysia, 23 July 2020

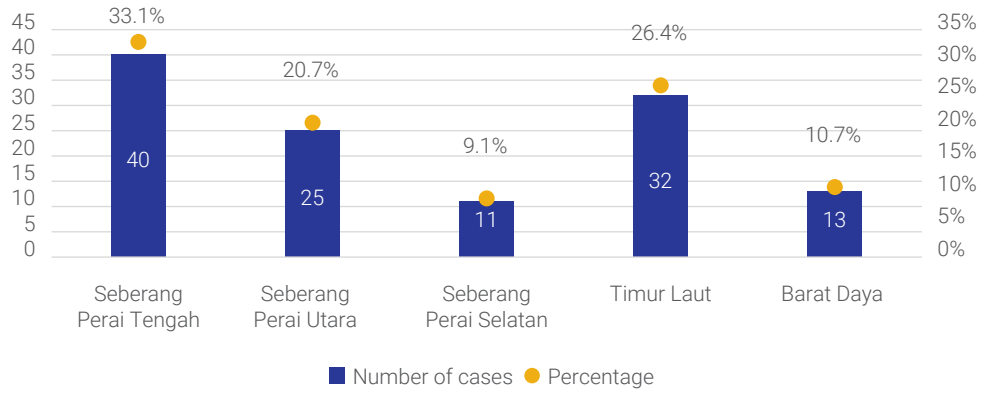
State	Number of cases	Percentage	Number of deaths	Percentage
Johor	718	8.1%	21	17.1%
Kedah	100	1.1%	1	0.8%
Kelantan	159	1.8%	3	2.4%
Malacca	258	2.9%	5	4.1%
Negeri Sembilan	1,028	11.6%	8	6.5%
Pahang	366	4.1%	7	5.7%
Penang	**121**	**1.4%**	**1**	**0.8%**
Perak	261	3.0%	6	4.9%
Perlis	18	0.2%	2	1.6%
Selangor	2,112	23.9%	24	19.5%
Terengganu	114	1.3%	1	0.8%
Sabah	384	4.3%	7	5.7%
Sarawak	632	7.1%	18	14.6%
*Kuala Lumpur	2,454	27.8%	18	14.6%
*Labuan	17	0.2%	0	0.0%
*Putrajaya	98	1.1%	1	0.8%
Total	**8,840**	**100.0%**	**123**	**100.0%**

** denotes Federal Territories*
Source: Penang Institute estimates based on data from the Ministry of Health, Malaysia.

At the time of writing[42], Malaysia has a total of 8,840 cases, with the highest number of cases found in Kuala Lumpur, which accounts for 27.8% of cases (Table 3.39). Selangor is second with 2,112 cases, or 23.9% of total cases. Penang is on the lower end of the spectrum with 121 cases (0.8%). The lowest number of cases can be found in Labuan (17 cases, 0.2%) and Perlis (18 cases, 0.2%).

With 123 deaths, Malaysia's COVID-19 fatality rate stands at 1.4%. Selangor has the highest number of deaths at 24 cases thus far, followed by Johor with 21 deaths. Sarawak and Kuala Lumpur are tied for third with 18 deaths each. These three states and federal territory have accounted for 65.2% of COVID-19-related deaths in Malaysia. All other states and federal territories have registered fewer than 10 deaths each. Only one death has been recorded in Penang.

Figure 3.52 Number and percentage of COVID-19 cases by district, Penang, 2020

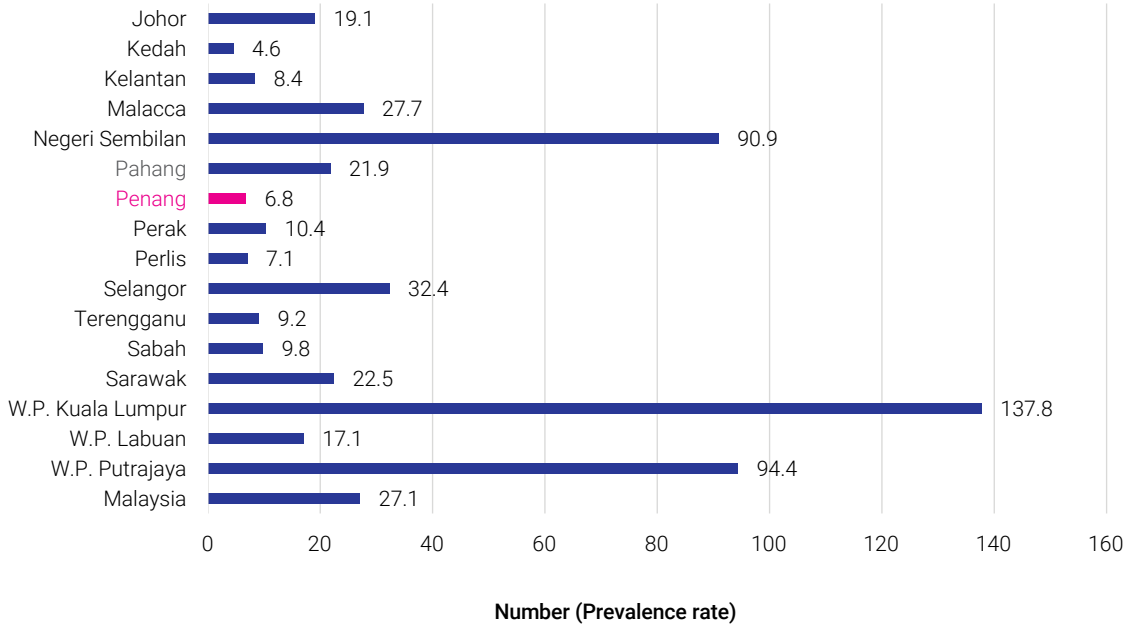


Source: Penang Institute estimates based on data from the Ministry of Health, Malaysia.

[42] All COVID-19 cases and deaths are as of 23 July 2020.

With 40 cases, Seberang Perai Tengah has the highest number of cases, followed by Timur Laut with 32 cases or 26.4% of overall cases in the state. These two districts account for more than half the cases in Penang. The fewest number of cases is found in Seberang Perai Selatan (11 cases).

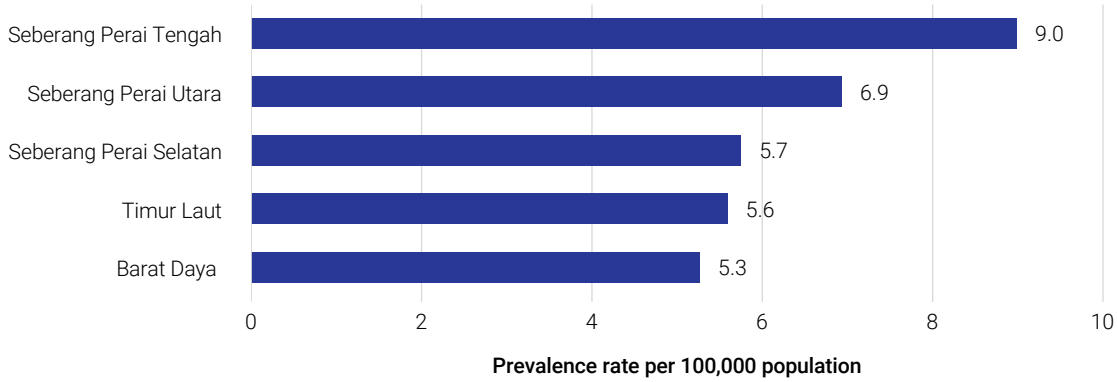
Figure 3.53 Prevalence rate per 100,000 population[43] for COVID-19 by state, Malaysia, 2020



Source: Penang Institute estimates based on data from Ministry of Health, Malaysia.

The prevalence rate for COVID-19 is the highest in Kuala Lumpur, where 137 cases have been recorded per 100,000 population. Putrajaya is second with 94 cases. Despite having the greatest number of positive cases, Selangor's prevalence rate is 32 cases per 100,000 population, owing to the state's status as Malaysia's most populous state. The prevalence rate for Penang is seven cases per 100,000 population. The lowest prevalence rate belongs to Kedah with five cases.

Figure 3.54 Prevalence rate per 100,000 population[44] for COVID-19 by district, Penang, 2020



Source: Penang Institute estimates based on data from the Ministry of Health, Malaysia.

In Penang, Seberang Perai Tengah is the district with the highest prevalence rate at nine cases per 100,000 population (Figure 3.54). Timur Laut, the state's most highly and densely populated state, has a lower prevalence rate of six cases. The prevalence rate is the lowest in Barat Daya, where five cases have been recorded against a population of 100,000.

[43] Total population for 2019 is used for calculations, as it is the latest available population data.

[44] Total population for 2018 is used for calculations, as it is the latest available population data categorised by district.

Table 3.40 Principal causes of deaths by disease in all hospitals, Penang, 2018

Causes	Number of deaths	Percentage of total deaths
Diseases of the respiratory system	874	20.3%
Diseases of the circulatory system	866	20.1%
Certain infections and parasitic diseases	696	16.2%
Neoplasms	469	10.9%
Diseases of the genitourinary system	277	6.4%
Endocrine, nutritional, and metabolic diseases	252	5.9%
Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified	248	5.8%
Diseases of the digestive system	184	4.3%
Diseases of the nervous system	82	1.9%
Diseases of the skin and subcutaneous tissue	80	1.9%
Subtotal	4,028	93.7%
Total deaths	**4,301**	**100%**

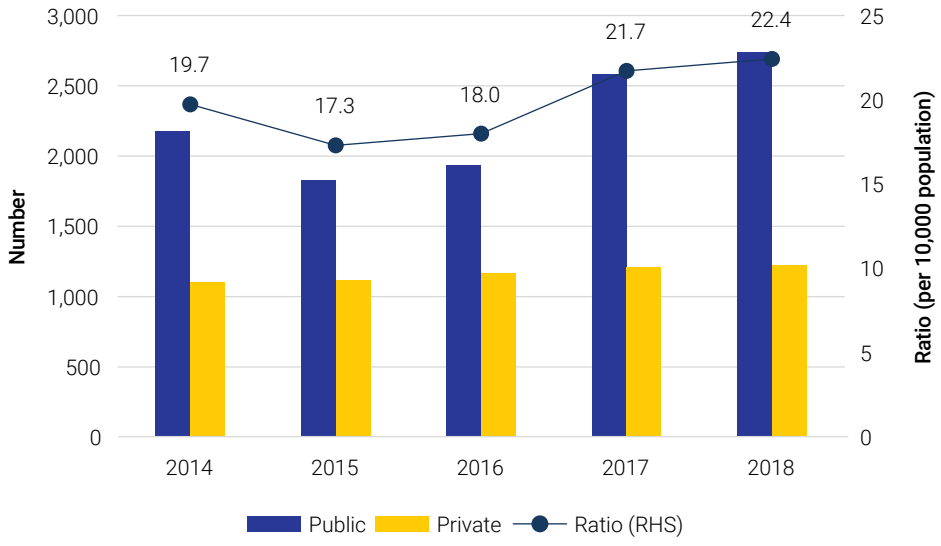
Source: Ministry of Health, Malaysia.

In 2018, the biggest cause of death in Penang was respiratory diseases (Table 3.40), which accounted for 20.3% of overall deaths. This includes asthma, acute pneumonia, and others. With 866 deaths, circulatory system diseases (hypertension, heart failure, stroke, and others) followed closely, accounting for 20.1% of total deaths. Diseases affecting the skin and subcutaneous tissue caused only 1.9% (80 cases) of total deaths.

Healthcare workforce

As illustrated by Figure 3.55, there are considerably more doctors working in the Penang public health sector. The ratio of doctors in public health to private was more than 2 to 1 in 2018—the highest in five years. Since 2016, the number of doctors in the public sector has been increasing at a much greater rate than the private sector, which registered increases of not more than 5.0%.

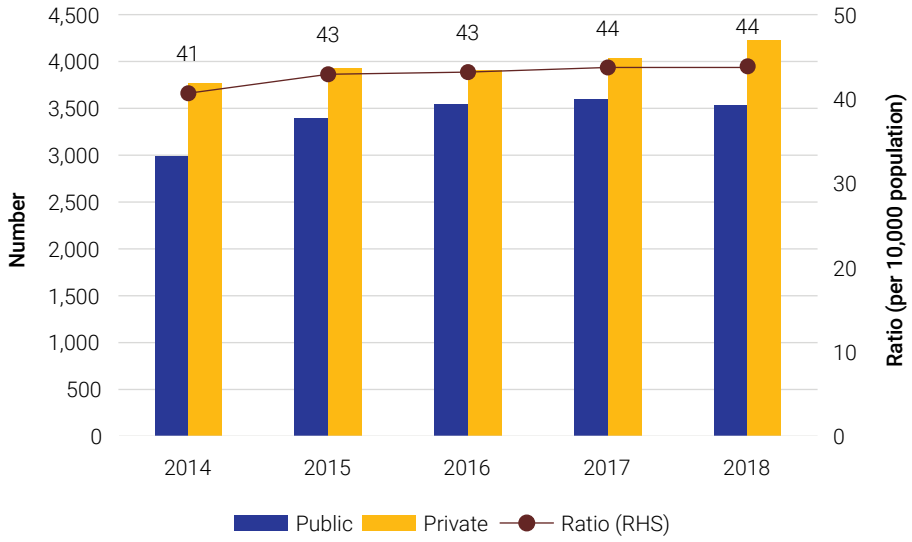
Figure 3.55 Total number of doctors by sector and ratio of doctors per 10,000 population, Penang, 2014–18



Source: Penang Institute estimates based on data from Health Indicators 2015–2019, Ministry of Health, Malaysia.

The number of doctors per 10,000 population[45] has been increasing since 2016, rising by 22.2% to 22 in 2018. It should be noted, however, that Malaysia currently faces an oversupply of medical graduates, and there are not enough placements at public hospitals for them to receive their training (Khor, 2019).

Figure 3.56 Total number of nurses by sector and ratio of nurses per 10,000 population, Penang, 2014–18

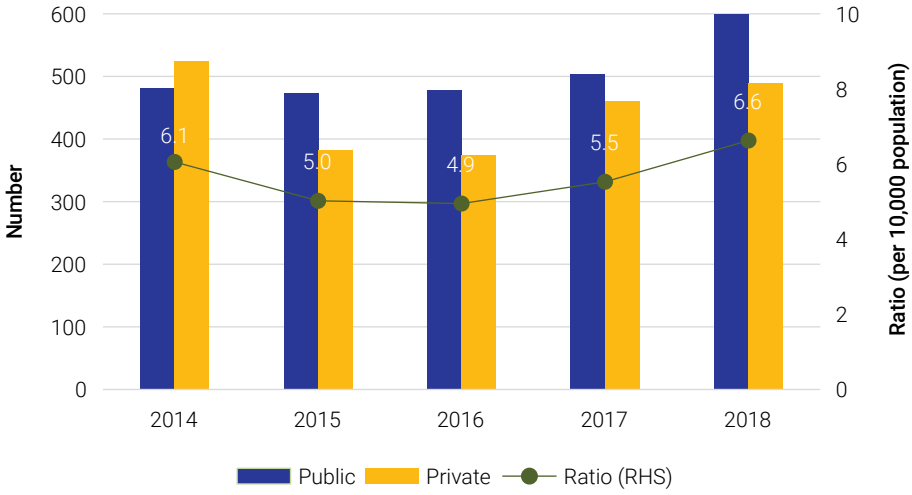


Source: Penang Institute estimates based on data from Health Indicators 2015–2019, Ministry of Health, Malaysia.

The number of nurses in the private sector exceeds those in the public sector, but at much smaller rates when compared with the public-private ratio for doctors (Figure 3.56). There were 19.8% more nurses in private health in 2018. The number of nurses in private health has been increasing since 2016, reaching 4,222 nurses in 2018, which was the highest in five years. Nurses in public health saw an upward trend, before registering a small drop in 2018. The number of nurses per 10,000 population have held steady over the period, and was at 44 nurses per 10,000 population in 2018.

There are more nurses in the health workforce versus doctors. In 2018, ratio of doctors to nurses in public health was 1:1.29. The ratio was much bigger when it came to the private sector, at more than three nurses to one doctor (1:3.46), due to the smaller number of doctors in private health.

Figure 3.57 Total number of pharmacists by sector and ratio of pharmacists per 10,000 population, Penang, 2014–18

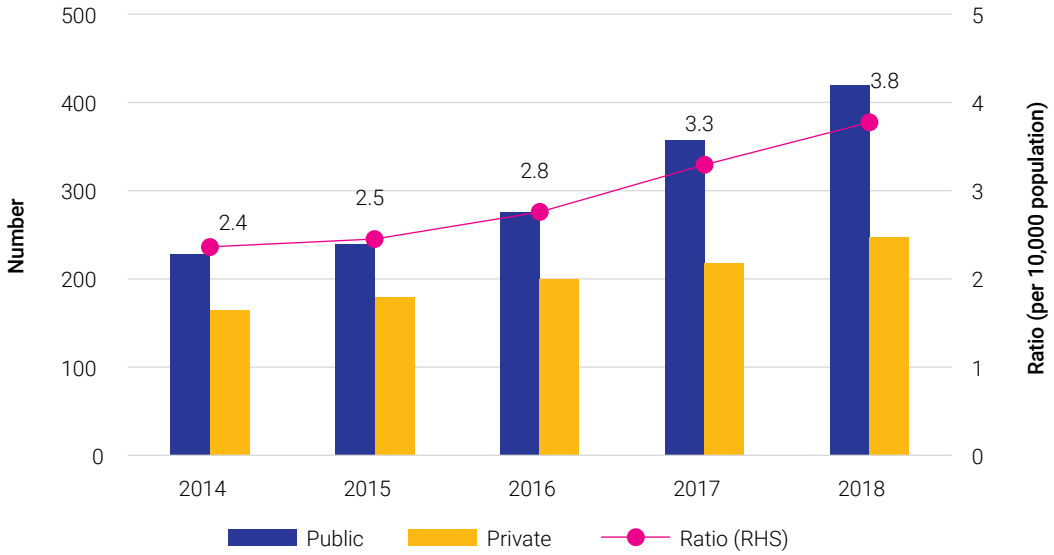


Source: Penang Institute estimates based on data from Health Indicators 2015–2019, Ministry of Health, Malaysia.

[45] The density of health workers per population is as defined by the World Health Organisation (WHO), retrieved from https://www.who.int/data/gho/indicator-metadata-registry/imr-details/3186

There are considerably fewer pharmacists and dentists in Penang's health workforce compared with doctors and nurses. Pharmacists in the public sector started to outnumber those in the private sector beginning in 2015. Pharmacists for both sectors have been increasing since 2016. The biggest increase in pharmacists in public health was 35.1% in 2018, while the highest increase for private health was 22.9%, in 2017. The number of pharmacists per 10,000 population have been trending upwards, increasing from five pharmacists to seven during 2016–18.

Figure 3.58 Total number of dentists by sector and ratio of dentists per 10,000 population, Penang, 2014–18



Source: Penang Institute estimates data from Health Indicators 2015–2019, Ministry of Health, Malaysia.

The number of dentists in both public and private health has been on the rise from 2014 to 2018. Public sector dentists have always exceeded those in the private sector. For instance, there were approximately 70% more dentists in public health in 2018. The number of dentists per 10,000 population has been increasing ever year, going from two dentists in 2014 to five in 2018.

3.3 Construction sector

The value of construction work done is an indicator used to assess the economic performance of the construction sector. It measures the value of completed work, namely new constructions, repairs, restorations, conversions, and maintenance works.

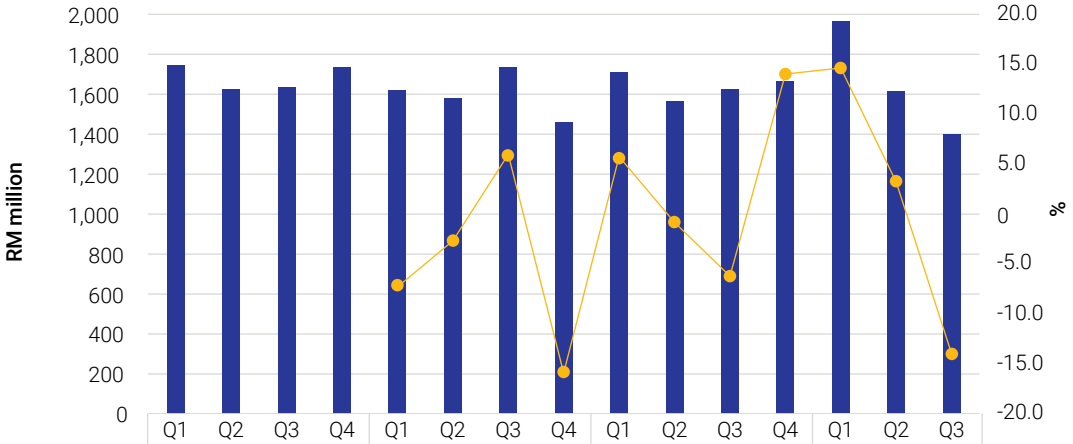
During the first three quarters of 2019, the total value of completed construction projects in Penang increased by 1.5% y-o-y to nearly RM5 billion (Figure 3.59), despite the fact that the construction sector's contribution to Penang's total GDP decreased from almost RM3 billion in 2016 to RM2.6 billion in 2018. The sector's growth was mainly driven by residential and non-residential sub-sectors. Residential projects contributed 46.3% to the total value of construction work done, and grew by 3.9% y-o-y. Non-residential projects contributed 38.6% in value, and saw a growth rate of 3.4% (Figure 3.60).

Growth in house prices in Penang has showed a strong recovery amid overall dismal trends in Malaysia. In Q2 2019[46], the average HPI in Malaysia grew by less than 1%, its lowest rate since 2010. Most states experienced declining growth rates, except for Kelantan, Pahang, and Penang.

Penang's HPI stood at 195.2 in Q2 2019, with a y-o-y growth rate of 3.3% (Figure 3.61). The average house price in Penang was RM437,632 during Q2 2019, an increase of RM13,701 from the previous year.

[46] The House Price Index (HPI) is based on the year 2010.

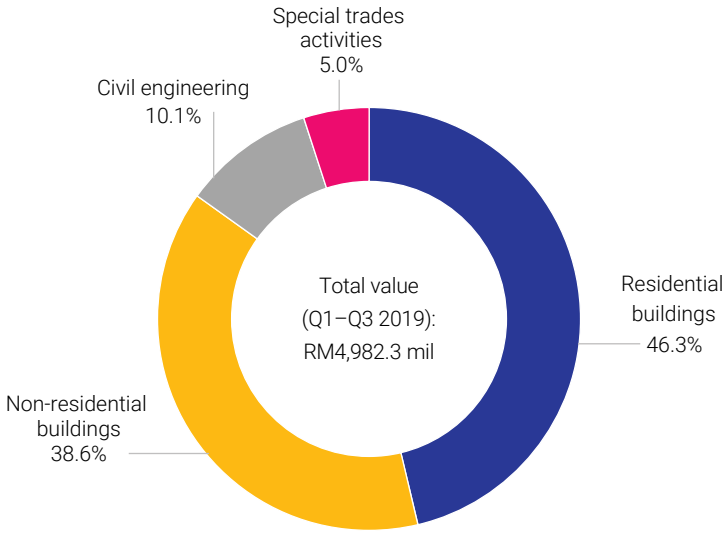
Figure 3.59 Total value of construction work done in Penang, Q1 2016–Q3 2019



	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
	2016				2017				2018				2019		
Total value	1,748	1,624	1,638	1,737	1,620	1,581	1,736	1,461	1,713	1,568	1,628	1,666	1,964	1,618	1,400
y-o-y growth rate (RHS)	-	-	-	-	-7.3%	-2.7%	6.0%	-15.9%	5.8%	-0.8%	-6.2%	14.0%	14.6%	3.2%	-14.0%

Source: Quarterly Construction Statistics, Department of Statistics, Malaysia.

Figure 3.60 Value of construction work done in Penang by sub-sector, Q1–Q3 2019

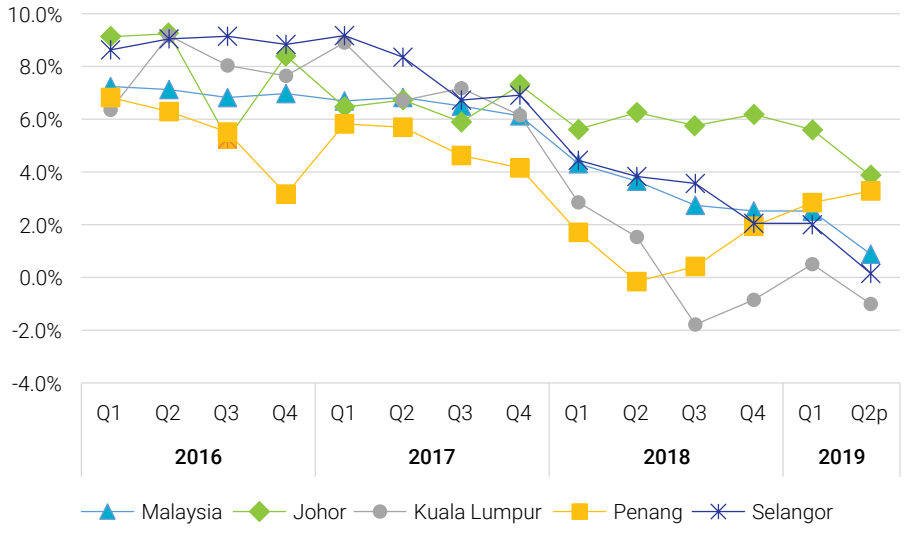


Source: Quarterly Construction Statistics, Department of Statistics, Malaysia.

All housing types in Q2 2019 experienced an increase in prices compared with the second quarter of 2018, except for the semi-detached segment which recorded a negative growth rate of 2.3%. In particular, high-rises and detached houses saw large growth rates of 5.7% and 5.4%, respectively, relative to other house types (Figure 3.62). On average, a high-rise unit was priced at RM342,130 in Q2 2019. The average price for detached houses was RM810,302, according to the National Property Information Centre (NAPIC).

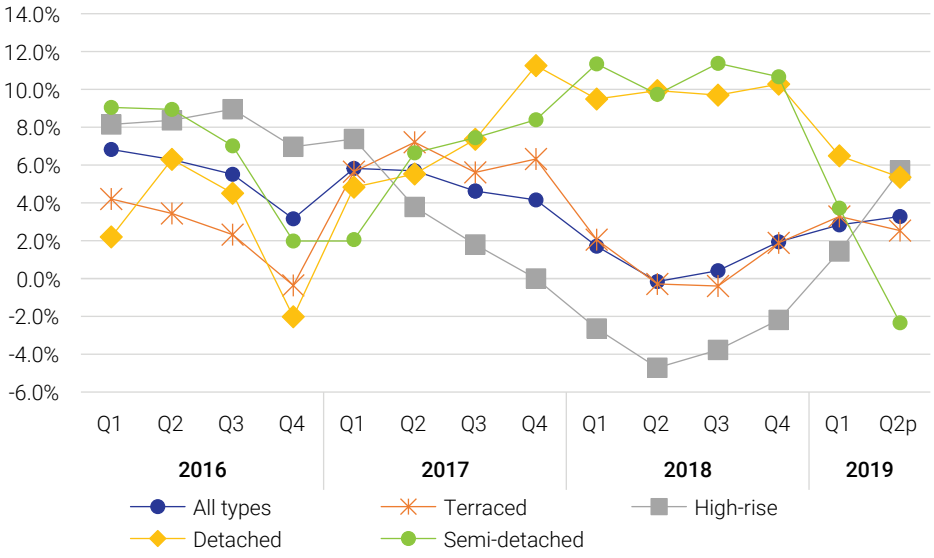
Terraced houses in Penang cost an average of RM483,997, but this was skewed by prices on Penang Island (RM927,614) where the average was triple those in Seberang Perai (RM322,482). However, prices on the mainland grew at a faster pace of 4.8% per year from Q2 2016 to Q2 2019 compared with 1.6% on the Island.

Figure 3.61 Year-on-year growth rate of HPI (2010 = 100) for selected states, Q1 2016–Q2 2019



Note: p = preliminary
Source: Malaysian House Price Index, National Property Information Centre (NAPIC).

Figure 3.62 Year-on-year growth rate of HPI by residential property type, Q1 2016–Q2 2019

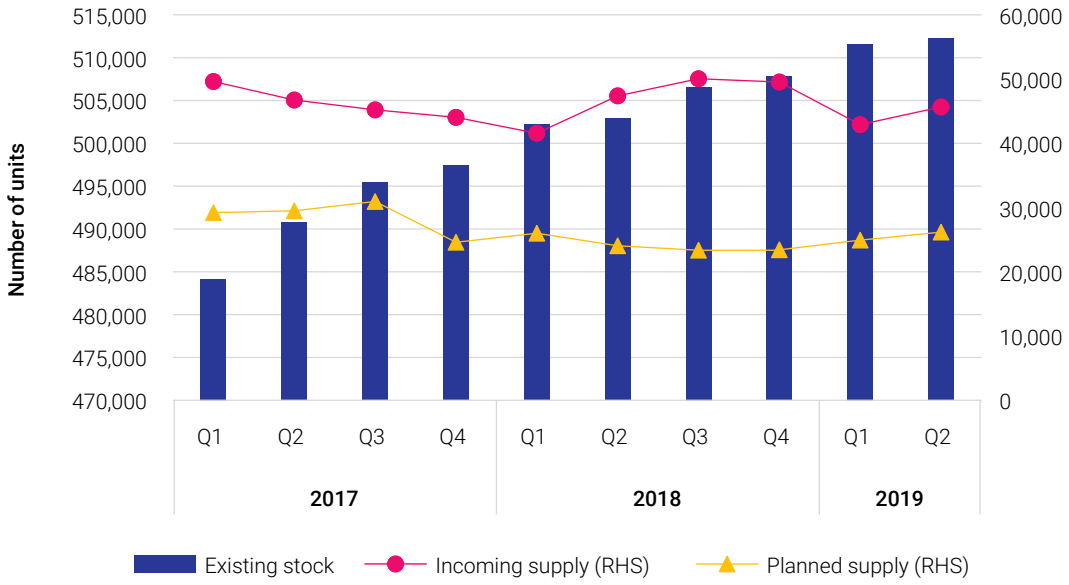


Note: p = preliminary
Source: National Property Information Centre (NAPIC).

Supply of residential property

Available residential stock in the market had been increasing gradually since 2017, as depicted in Figure 3.63. In the second quarter of 2019, cumulative stock increased by 1.9% y-o-y to 512,253. Timur Laut, as the most developed district, had the most houses. Total stock amounted to 176,137, with flats, condominiums, and apartments taking up the largest shares. This was followed by Seberang Perai Tengah (121,443), Seberang Perai Utara (84,846), Barat Daya (76,665), and Seberang Perai Selatan (53,162).

Figure 3.63 Number of residential existing stock, incoming supply and planned supply in Penang, Q1 2017–Q2 2019



Note: All the data presented are preliminary.
Source: National Property Information Centre (NAPIC).

Of the existing stock, 1,452 were new completions from H1 2019, where more than 70% were located in Seberang Perai Selatan and Seberang Perai Tengah. Condominiums and apartments accounted for about two-thirds of the total. Seberang Perai Selatan saw the largest y-o-y growth rate of 4% in Q2 2019, albeit from a small base. Single-storey terraced houses, condominiums, and apartments contributed the most to the growth.

By Q2 2019, 71,836 houses were expected to be added to Penang. This comprised incoming supply or units under construction (64%), and planned supply or units which were at different stages of planning.

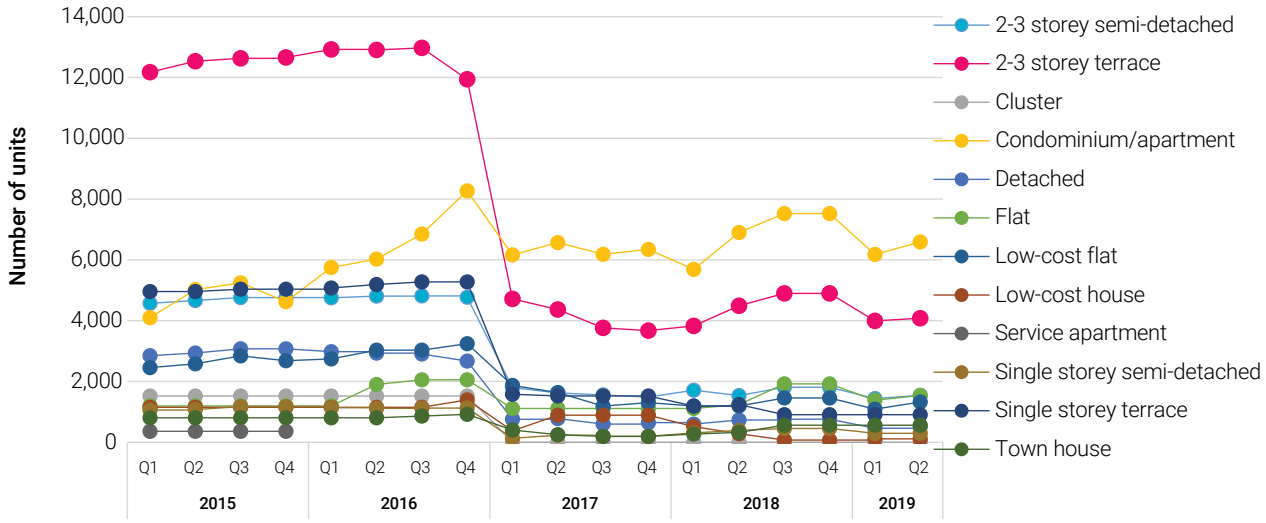
Incoming supply increased by 6.4% quarter-on-quarter (q-o-q), even though it dropped by 3.6% on a y-o-y basis. Penang Island had a total of 28,197 on-going projects, split fairly equally between Timur Laut (55%) and Barat Daya (45%), with condominiums and apartments accounting for more than two-thirds.

On the mainland, Seberang Perai Selatan, which saw the largest y-o-y growth in its housing stock in Q2 2019, is forecast to experience another strong increase relative to the other two districts. Seberang Perai Selatan accounted for 38% of upcoming residential properties, with two-to-three-storey terraced houses, condominiums and apartments, and two-to-three-storey semi-detached being the most popular types of properties built.

Looking at overall patterns of incoming supply on the mainland, housing supply will soon be dominated by condominiums and apartments. New landed housing developments have been on a downward trend since 2017[47] (Figure 3.64), being increasingly replaced by high-rise projects.

[47] The large difference in the data of Q1 2017 from Q4 2016 is primarily due to the different calculation method by NAPIC (refer to the note of Figure 3.64). However, it still reflects that fact that the share of terraced houses is falling below that of condominiums and apartments.

Figure 3.64 Incoming supply of residential properties in Seberang Perai by type of houses, Q1 2015–Q2 2019



Note: Since Q1 2017, the number of incoming supply was adjusted to exclude data on projects that have since been completed and issued with Certificate of Completion and Compliance (CCC). Adjustments were also made to reflect the actual number of units built on-site (which differs from total units in the initial plan).
Source: Residential Property Stock Report, National Property Information Centre (NAPIC).

Planned supply has been on a moderate upward trend since Q3 2018 (Figure 3.63). Planned supply in Q2 2019 rose by 8.8% y-o-y to 26,178 units.

Almost 70% of the approved projects in Penang have been for Seberang Perai as of Q2 2019. However, planned housing was not uniformly distributed when broken down by type. Most of the projects approved for Penang Island were condominiums and apartments. Low-cost flats, condominiums, apartments, and two-to-three-storey terraced houses were the major building types approved for Seberang Perai.

Demand for residential property

Demand, especially for condominiums and apartments, is not as strong as supply. There is a clear oversupply from the rising number of overhang[48] residential properties. According to the National Property Information Centre (NAPIC), Penang recorded a total of 3,929 overhang units valued at RM3.26 billion in Q2 2019. While it is common to see high-end properties take up a large proportion of the list, it is rare for low to mid-range housing to remain vacant for more than nine months, since these are heavily promoted by developers and are considered affordable by Penang residents[49]. The NAPIC data for Q2 2019 showed that houses priced between RM300,000 and RM400,000, as well as those below RM100,000, accounted for 569 (14%) and 413 (11%) unsold units, respectively, to Penang's overhang residential properties. Timur Laut had the most unsold units (39.6%), followed by Barat Daya (36%) and Seberang Perai Tengah (16%). More than two-thirds were condominiums and apartments, the majority of which were located in Timur Laut and Barat Daya.

In terms of sales performance, residential property continues to drive the sector. It accounted for 73% of the total transaction volume between Q1 and Q3 2019, peaking at 9,297 transactions—a marginal increase of 0.9% compared with January–September 2018. Homes valued at RM400,000–500,000 and RM150,000–250,000 contributed to the increase in transaction volume.

Despite overall rising transaction volume, the total transaction value saw a decline of 8.2% to RM3.68 billion. This is mainly because of the drop in transaction volume and value of condominiums and apartments, as well as vacant plots. In line with vigorous development on the mainland, the area saw growth in both transaction volume and value, especially in Seberang Perai Selatan. Meanwhile, the transaction volume is projected to decrease further in 2020 owing to weak demand for luxury and durable goods despite attractive financing packages, including

[48] Overhang property refers to a unit which remains unsold for more than nine months after completion.
[49] Based on the house price ranges of affordable houses (RMM) in Penang. There are five categories of RMM: RMM A (less than RM42,000), RMM B (less than RM72,500), RMM C1 (less than RM150,000), RMM C2 (less than RM200,000), and RMM C3 (less than RM300,000) (Source: Sistem Maklumat Perumahan Pulau Pinang). Previously, houses below RM400,000 were also included in the affordable housing scheme.

low lending rates, promotions, and rebates being rolled out. Box 3.6 explains the effects of the COVID-19 pandemic on the construction and real estate sectors.

The number of transactions gives a more nuanced picture of housing demand. The NAPIC data reveals that houses lying in the price ranges of RM500,001–1,000,000, RM50,001–150,000 and RM300,001–400,000 had the most transactions during January–September 2019. These price ranges coincide with those on the top of the list of overhang properties, suggesting that the "surplus" arose owing to non-price factors such as location or ancillary facilities. To build another 180,000 affordable housing units by 2030 (Bernama, 2020), the Penang state government should take this into consideration in order to avoid contributing to the stock of overhang units.

Box 3.6 The impact of COVID-19 on the construction sector

By Ng Kar Yong

The COVID-19 pandemic has impacted all economic sectors, including construction and real estate. Classified as non-essential businesses, all construction activities were not allowed to operate during the MCO, with the exception of critical and emergency repair works such as hill slope repairs, traffic management control, upgrading works at premises providing essential services, and emergency works, with prior approval from the Ministry of Works and the Ministry of International Trade and Industry (MITI) (Rajan et al., 2020).

During the MCO, 4,321 business establishments[50] and 62,000 persons[51] working in the Penang construction sector were affected, with nearly all construction and services related to construction works (97% and 99%, respectively) being small and medium enterprises[52]. Although some construction works have been allowed to operate during the third phase of the MCO, most construction services were only operating partially.

Job losses have also been prevalent. According to a survey carried out by the DOSM (2020b), 11.8% and 13% of employees in the construction and real estate sectors, respectively, reported job losses during the first phase of the MCO[53]. Another 15.6% and 7.9% in the respective sectors were asked to take unpaid leave. In terms of income loss, 45% of the workforce in the construction sector saw their incomes slashed by at least 50%, whereas 63% of the real estate workforce experienced a similar drop in income.

For the construction sector, on-going projects are expected to be delayed while the launch of new projects will likely be postponed in the short and medium term. Meanwhile, real estate businesses are brought to a standstill as consumers have been reluctant to spend on durable goods such as properties; some are adopting a "wait and see" approach in anticipation of a drop in prices.

As a result, there will be an increase in overhang properties, and house prices will moderate owing to the oversupply of residential and non-residential properties. In order to stimulate housing demand, several recovery measures such as the reintroduction of the Home Ownership Campaign (HOC), loosening financing entry criteria for third-home purchases, and exemption of stamp duty and the Real Property Gains Tax have been introduced (Kaur, 2020).

In the long run, the rental market will be significantly affected, particularly the non-residential segment. More retail spaces at shopping complexes and commercial units will be left unoccupied following the emergence of online shopping platforms during the MCOs (Foo, 2020). In the residential market, virtual showroom visits have been established by property developers and agents to entice potential house buyers through social media, along with lucrative promotions (Edge Property, 2020).

[50] There were 2,888 construction and 1,433 real estate establishments in 2015 (the latest data available). (Department of Statistics Malaysia, 2017)
[51] In 2018, there were 56,700 and 5,300 employments in the construction and real estate industries, respectively. (Department of Statistics Malaysia, 2020a)
[52] Taken from Profile of Small and Medium Enterprises (Department of Statistics Malaysia, 2017).
[53] The survey was conducted online from 23 to 31 March 2020.

Expansion in non-residential properties

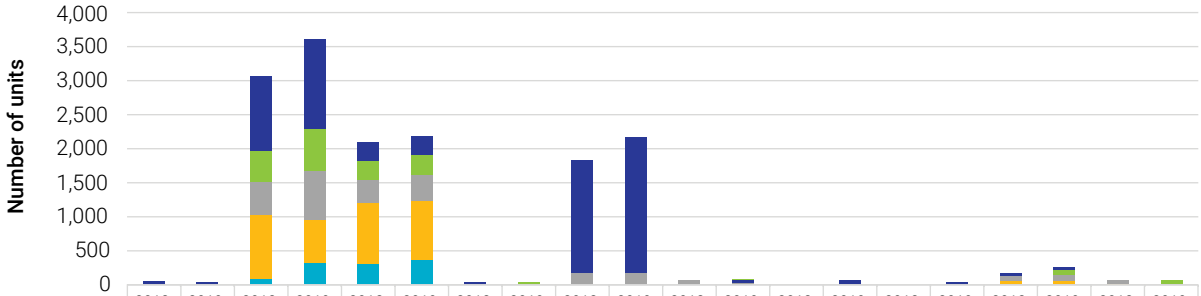
Compared with the first three quarters of 2018, the total value of completed construction work for non-residential properties between Q1 and Q3 2019 increased by 3.4% to RM1.92 billion (Figure 3.60).

Non-residential properties recorded 3,368 transactions valued at RM2.84 billion from January to September 2019. Transaction volume declined by 0.5% y-o-y, while transaction value declined by 18.4%. The transaction volume for commercial and industrial properties showed growth of 11.4% and 2.3%, respectively, while agriculture and development land fell by 6.6% and 4.9%, respectively. The significant decline in transaction value was primarily attributed to the drop in transaction value for development land priced above RM1 million. For commercial and industrial sectors, most of the transactions consisted of properties priced above RM500,000, constituting 45% and 61%, respectively. Agriculture properties were mostly transacted at the lower end of the price range — less than RM100,000.

By Q2 2019, the supply of non-residential properties had grown, mainly driven by commercial and industrial properties. The market saw a total of 43,526 commercial and 9,176 industrial units, up 3.5% and 0.2% from Q2 2018, respectively. Furthermore, the sector was anticipating an additional supply of 17,348 commercial units and 642 industrial units, mainly in Seberang Perai Tengah and Timur Laut.

In the commercial sector, Penang had only three purpose-built offices (PBO) under construction in Q2 2019: two privately owned buildings and one government-owned. Incoming shop units grew moderately at 4.5% y-o-y, reaching 2,185 units. Meanwhile, serviced apartments and small office-home offices (SOHO) saw the largest growth. The stock of serviced apartments increased by 17.7% and SOHOs by 18%, totalling 5,772 units (Figure 3.65). While most of the existing supply of these commercial units are concentrated in Timur Laut, Seberang Perai Selatan saw the largest increase: 312 newly completed units were built in the region in the first half of 2019.

Figure 3.65 Incoming supply of commercial and industrial properties in Penang by district, Q2 2018 and Q2 2019



	PBO		Serviced apartment		Shop		Shopping complex		SOHO		Detached		Flatted factory		Industrial complex		Semi-detach		Terraced	
	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
	Commercial										Industrial									
TL	3	2	1,088	1,310	277	270	2	-	1,660	1,991	0	1	0	22	0	1	2	2	0	0
SPU	-	-	462	616	270	302	1	1	0	0	0	3	0	0	0	0	0	68	0	16
SPT	-	-	480	720	343	376	1	1	175	175	28	28	0	0	0	0	76	94	14	14
SPS	1	1	952	640	888	872	1	1	0	0	0	0	0	0	0	0	52	52	6	6
BD	-	-	83	320	313	365	-	-	0	0	4	1	0	0	0	0	4	4	2	0

Source: Commercial Property Stock Table and Industrial Property Stock Table, National Property Information Centre (NAPIC).

Penang recorded 1,061 transactions for commercial properties in the first three quarters of 2019. Almost two-thirds of these were concentrated in Seberang Perai Tengah (29.4%) and Timur Laut (29.3%). Barat Daya saw the largest increase in transaction share, representing 14.0% of transactions compared with 9.6% in 2018. This is a y-o-y growth rate of 64% in transaction volume, most of which were shop or retail lots, hotels, and serviced apartments.

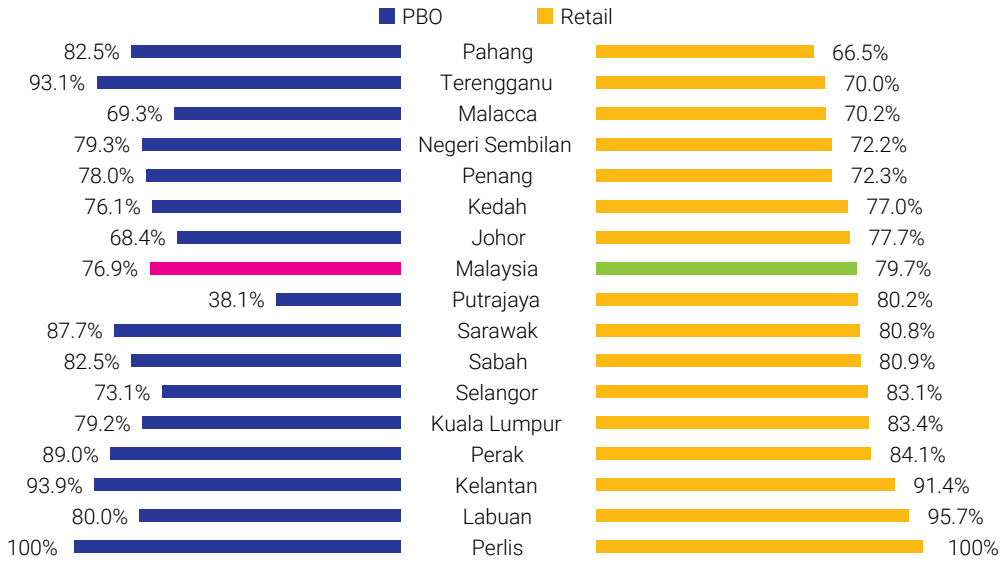
Timur Laut continued to record the highest transaction value, at RM388.3 million. In the first three quarters of 2019, the district accounted for almost 40% of total transaction value. However, Timur Laut was also the only district to see a drop in transaction value, at -8.5%, while all other districts recorded growth. The largest growth was seen in Seberang Perai Selatan, a four-fold increase from RM46.5 million (January–September 2018) to RM203 million (January–September 2019). Double-storey shops were the most popular properties, registering 357 transactions (33.7%) valued at RM200 million. This was followed by shop or retail units (24.4%) and three-storey shops (11.5%).

Incoming supply of industrial properties rose by 66% to 312 units in Q2 2019. Most of the units were located in Seberang Perai. Semi-detached remained the most favoured building type, accounting for about 70%, followed by terraced (11.5%) and detached (10.6%). About 75% of approvals were also issued to semi-detached industrial units, but demand for terraced units was higher compared with semi-detached. Despite having the second-fewest transactions, Barat Daya recorded the second-highest transacted value of RM230.7 million (35.4%) between Q1 and Q3 2019 owing to large, lumpy transactions, trailing Seberang Perai Tengah. Factories made up 67% of total sales value in the district.

Demand for commercial units have kept pace with increasing supply. The second quarter of 2019 saw the sales performance of commercial units improve y-o-y. Out of 911 launched commercial units, only about 17% or 158 units were unsold (Q2 2018: 40.6%)—over 60% of which were serviced apartments mostly situated in Barat Daya. On the other hand, demand for industrial properties on the mainland remained weak; 45.6% of 204 units launched, worth RM151.84 million, were unsold (Q2 2018: 46.6%). All unsold units were located in Seberang Perai Tengah and Seberang Perai Selatan.

In terms of take-up rate for privately owned PBOs, 78% of existing space (831,790 square meters) in Penang was occupied as of Q2 2019, slightly above

Figure 3.66 Occupancy rate of purpose-built offices (PBO) and shopping complexes (retail space) by state, Q2 2019



Source: Commercial Buildings: Occupancy and Space Availability Report, National Property Information Centre (NAPIC).

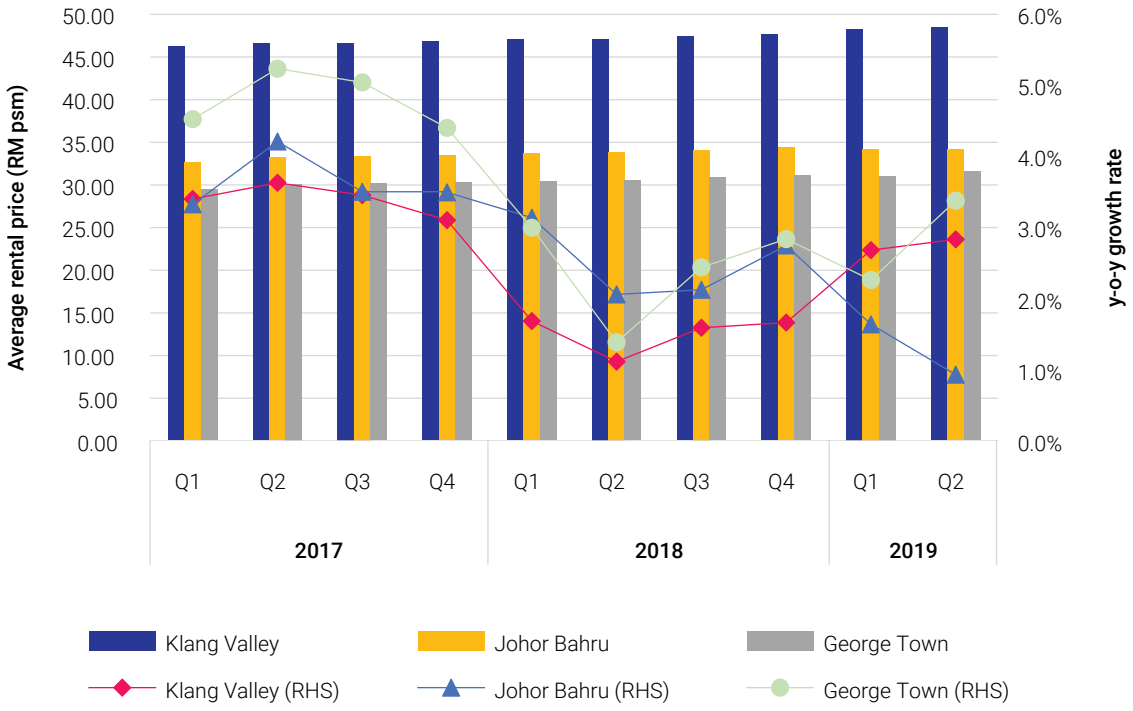
the national rate of 76.9% (Figure 3.66). Prime areas such as George Town, Bayan Baru, Sungai Nibong, and Gelugor saw high occupancy rates of more than 80%, while Bukit Mertajam, where four out of seven buildings had vacancy rates exceeding 50%, had the lowest rate of 43.3%.

As for retail space in shopping complexes, Penang had a lower occupancy rate of 72.3% in Q2 2019 compared with other major cities such as Kuala Lumpur (83.4%), Selangor (83.1%), Putrajaya (80.2%), and Johor (77.7%). The state's take-up rate was higher than Negeri Sembilan, Malacca, Terengganu, and Pahang (Figure 3.66). The remaining 482,690 square metres of vacant retail space were from 73 shopping complexes, mostly concentrated in Bukit Mertajam.

George Town had the highest occupancy rate of 82.9%, reflecting strong demand. Rental prices of PBOs in this area continued to see stable y-o-y growth of 3.4% in the second quarter of 2019, higher than the growth of prices in Klang Valley and Johor Bahru.

Nevertheless, George Town still enjoyed low rental prices relative to Klang Valley and Johor Bahru. As of Q2 2019, the average rental rate in Penang was RM31.55 per square metre (psm) (Klang Valley: RM48.48 psm, Johor Bahru: RM34.19 psm) (Figure 3.67).

Figure 3.67 Average rental price and y-o-y growth rate of the rental index for major cities in Malaysia, Q1 2017–Q2 2019



Source: Purpose-built Office Rental Index (PBO-RI), National Property Information Centre (NAPIC).

3.4 Agriculture and fishery sector

The Malaysian agricultural sector has not grown in tandem with the non-agriculture sector, as the value-add and productivity in this sector is far below the industrial sector. Although the agriculture sector contributes very little to Penang's GDP (2.2%), it offers a degree of food security and provides raw materials for resource-based industries. Furthermore, sustainable agriculture contributes a set of environmental goods and services such as cleaner air and water, as well as fostering wildlife habitat diversity.

3.4.1 Crops sub-sector

The total crop land use in Penang has dropped from 19,569.3 ha in 2014 to 17,946.4 ha in 2018, mainly owing to a significant decrease in coconut and fruits land use (Table 3.41). The majority of croplands are located in Seberang Perai Utara (51%) followed by Seberang Perai Tengah (20%), while only 1.5% are in Timur Laut (Table 3.42). Seberang Perai Utara (46%) and Seberang Perai Tengah (21%) have the most farmers in Penang (Table 3.42).

Table 3.41 Agricultural land use by crops (hectare), Penang, 2014–18

Crops	2014	2015	2016	2017	2018
Paddy	12,782.0	12,782.0	12,782.0	12,782.0	12,782.0
Fruits	5,298.1	4,816.1	4,715.7	5,570.0	3,660.1
Coconut	493.5	343.9	329.1	278.7	286.5
Cocoa	2.2	2.0	0.0	0.0	N/A
Vegetables	690.6	712.3	715.4	869.4	851.2
Cash crops	149.6	114.6	176.0	211.6	212.6
Spice crops	97.0	136.2	138.3	159.9	154.0
Sugar cane	45.0	44.6	42.9	42.6	N/A
Others	11.5	9.0	1.0	4.0	N/A
Total	**19,569.3**	**18,960.8**	**18,900.4**	**19,918.2**	**17,946.4**

Note: N/A=Not available.
Land use data for rubber and oil palm is not available.
Source: Department of Agriculture, Penang.

Table 3.42 Croplands and number of farmers by district, Penang, 2017

District	Area (km^2)	Crops area (ha)	No. of farmers
Timur Laut	119	268.8	403
Barat Daya	173	2,309.3	1,875
Seberang Perai Utara	272	9,034.8	6,521
Seberang Perai Tengah	236	3,563.7	2,959
Seberang Perai Selatan	241	2,617.1	2,419

Source: Department of Agriculture, Penang.

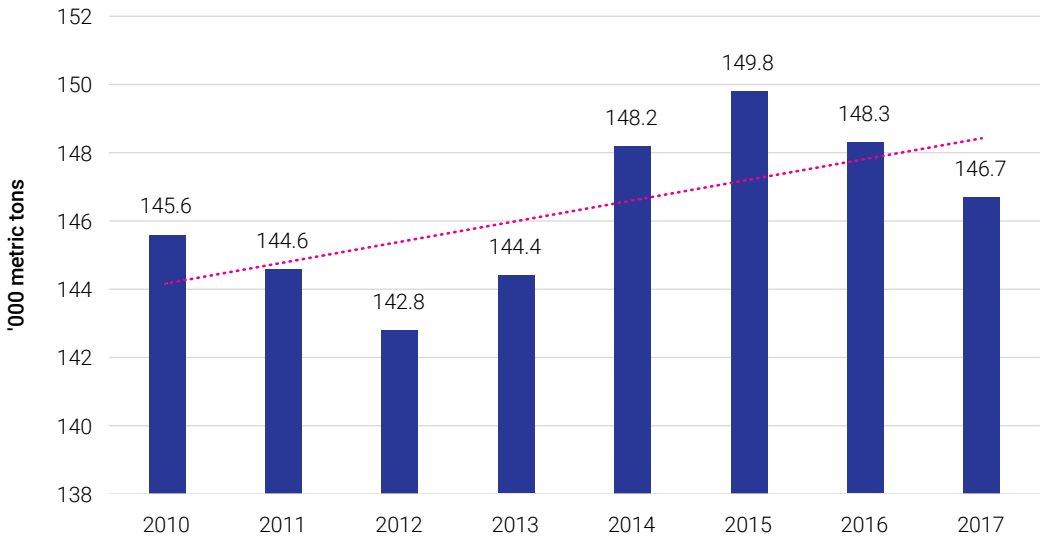
The rice industry

The rice industry in Malaysia has received special attention from the government, as rice is a staple food of the country. It is in fact considered a strategic industry and an important sector of the economy. Land utilisation for paddy production is currently at about 12,782 hectares—about 70% of total agricultural (crop sub-sector) land use[54] in the state. There are about 7,057 paddy farmers, mostly concentrated in Seberang Perai Utara (Mok, 2016).

In 2017, Penang produced 146,660 metric tons of paddy, up from 145,580 metric tons in 2010 (Figure 3.68). Rice production grew on average by about 1.3% from 2010 to 2017. In 2017, rice production in Penang dropped by about 1.1% compared with 2016, mainly as a result of the November 2017 flash floods.

However, its rice yield was the highest in the country in the same year (Table 3.43). Self-Sufficiency Level (SSL) plays an important role when it comes to food security issues. Based on the national rice per capita consumption (PCC) of about 74.4 kg/year (Department of Statistics Malaysia, 2018b) and Penang's total population of 1.7 million, rice demand in Penang in 2017 were estimated at 129,954.5 metric tons. With a total rice production of 95,329 metric tons[55] in 2017, Penang's rice SSL was calculated to be about 73%; the remainder had to be imported to fulfil market demand. With the increase in per capita income and changes in consumption patterns and lifestyle, the percentage share of the total caloric supply from rice has significantly declined (Khazanah Research Institute, 2019). However, rice remains the main source of carbohydrates in Malaysia and its consumption is expected to increase further.

Figure 3.68 Paddy production in Penang, 2010–17



Source: Department of Agriculture, Penang.

[54] Rubber and oil palm are not included.
[55] Assuming a paddy to rice conversion rate of 65%.

Table 3.43 Planted area, average yield and paddy production by state, 2017

State	Planted area (ha)	Average yield (kg/ha)	Paddy production (metric tonne)
Johor	3,000	2,854	8,563
Kedah	214,585	4,377	939,308
Kelantan	74,531	4,154	309,582
Malacca	3,510	3,457	12,135
Negeri Sembilan	2,040	5,030	10,261
Pahang	13,006	2,186	28,434
Perak	81,284	3,613	293,715
Perlis	51,531	4,489	231,328
Penang	25,564	5,737	146,660
Sabah	29,955	2,952	88,424
Sarawak	67,442	2,986	201,413
Selangor	36,708	4,510	165,571
Terengganu	16,919	4,002	67,745
Malaysia	620,075	4,037	2,503,109

Source: Department of Agriculture, Penang.

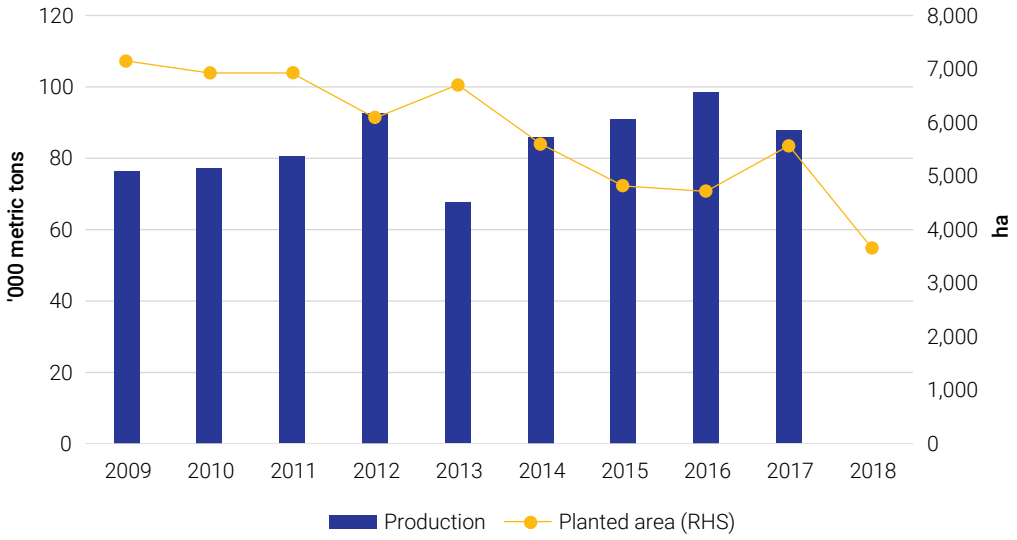
The rice industry in Penang is facing serious challenges. The conversion of paddy fields to non-agricultural or non-paddy agricultural purpose is a major threat to the rice industry as well as to food security, especially in Seberang Perai, which has undergone significant urbanisation over the past decade. Furthermore, the lack of acceptance of modern farming practices (particularly among farmers above 60 years old) and rice-processing equipment has resulted in slower production growth. Irrigation is another challenge; Penang draws most of its raw water for domestic use, industrial use, and irrigation of paddy fields from Sungai Muda in Kedah. Being so dependent on one source, particularly with increasing water demand in both Penang and Kedah, is risky, especially during water crises. This indicates the need to find alternative sources of water and to apply new approaches in water management.

The fruit industry

Among the economically important fruits that Penang produces are durians and pineapples, planted mainly in Barat Daya and Seberang Perai Selatan districts, respectively. However, land used for fruit cultivation in Penang has been steadily decreasing. The planted area of fruits in Penang has seen a 48.8% decline between 2009 and 2018 (Figure 3.69). This is mostly due to the increase in land allocation for residential and development purposes and competition from other sectors. Nonetheless, Penang's output has been steadily increasing since 2009, suggesting that there has been an increase in average yield per hectare. If this rise in productivity is coupled with an increased land allocation to the industry, the problem of self-sufficiency can be manageable.

The global PCC of tropical fruits has been growing steadily over the past decade (FAO, 2020); therefore, there is potential growth in export opportunities. Good agricultural practices and quality standards must be met in order to export tropical fruits. Integrated marketing that covers appropriate pricing, labelling, packaging, and branding (e.g., fresh, nutritious, high quality, and exotic) can help capture the growing global market.

Figure 3.69 Fruits production and planted area in Penang, 2009–18

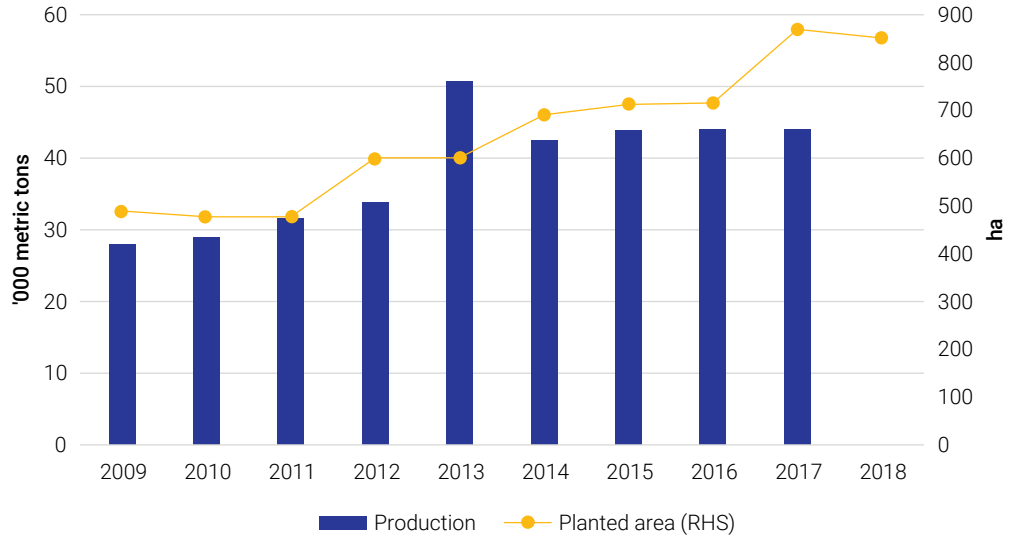


Note: Data on fruits production for 2018 is not available.
Source: Department of Agriculture, Penang.

The vegetable industry

In Penang, the planted area of vegetables has seen an average annual growth rate of about 6.1% between 2009 and 2018. Along with the growing planted area, vegetable production in Penang is also facing an upward trend at the same pace (Figure 3.70). The 57.2% increase in output from 2009 to 2017 indicates that Penang's vegetable sub-sector is expanding. Despite the robust growth, production is still below domestic demand. Most vegetables pass through middlemen—collectors, transporters, and/or wholesalers. A small number of farmers supply produce directly to markets or to the Federal Agricultural Marketing Authority (FAMA). This structural friction could affect the price of vegetables. Health awareness and the rise of the vegan/vegetarian culture are expected to drive demand for vegetables.

Figure 3.70 Vegetable production and planted area in Penang, 2009–18



Note: Data on vegetable production for 2018 is not available.
Source: Department of Agriculture, Penang.

Although vegetables occupy a relatively small share of the market, organic production represents one of the fastest-growing segments of the Penang vegetable sub-sector. Organic farming is a niche export market opportunity that can bring high revenues to the country, especially for fruits and vegetables. One of the strategies undertaken by the government is to encourage small-scale farmers to participate in organic farming to increase their income. In addition, organic agriculture avoids problems of chemical residue, minimises environmental pollution, and reduces food imports while having export potential.

3.4.2 Livestock sub-sector

The livestock sub-sector is an integral component of the agricultural sector in Malaysia, since it provides gainful employment and is the largest source of protein for Malaysians. In 2018, the Malaysian livestock industry accounted for 14.9% of the of the agriculture sector's contribution to the GDP, 3.5 percentage points greater than the previous year.

Penang's livestock sub-sector has grown gradually over the years. This sub-sector is divided into two main categories: ruminants including cattle, sheep, goat, and buffalo, and non-ruminants encompassing chicken, duck, pig, and egg. While the non-ruminant sub-sectors, especially poultry and pig, have grown over the years, the ruminants sub-sector has not. The non-ruminants sub-sector is marked by well-developed technology and the involvement of the private sector, in contrast to the ruminant sub-sector.

In 2018, the number of livestock farmers dropped by 27.3% compared with 2015. Yet the total number of livestock increased by 1.7% in the same period, mainly the result of the increase in the number of sheep and pigs (Table 3.44).

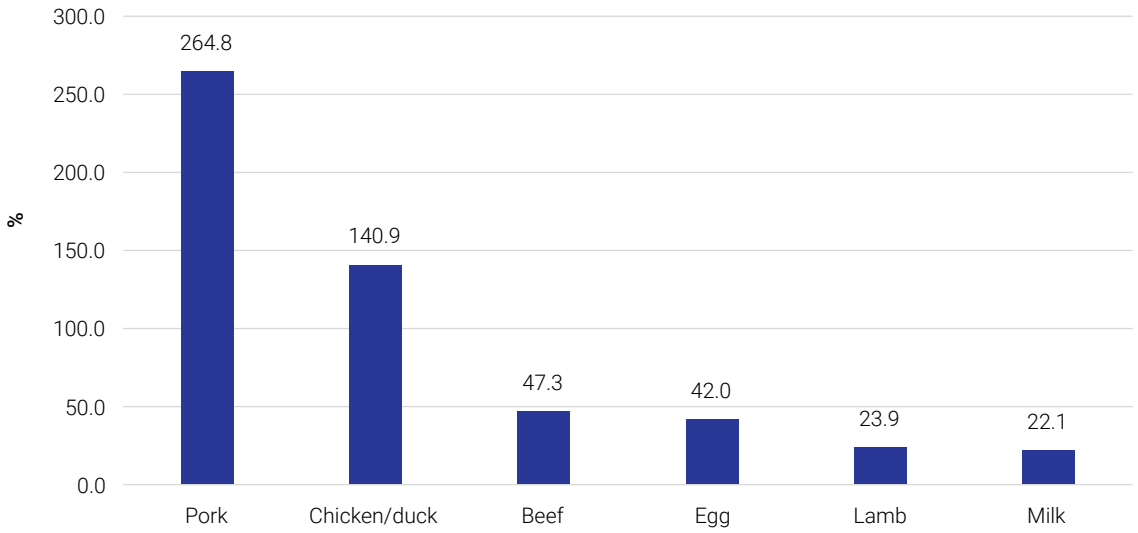
Table 3.44 Number of livestock farmers and livestock population in Penang, 2014–18

Commodity	2015		2016		2017		2018	
	Livestock farmers	Livestock population	Livestock farmers	Livestock population	Livestock farmers	Livestock population	Livestock farmers	Livestock population
Cow	803	14,766	485	11,689	470	11,642	502	17,633
Buffalo	43	601	44	592	39	574	35	622
Goat	372	8,854	345	8,779	368	10,215	333	8,686
Sheep	66	1,880	64	1,628	55	2,757	52	2,634
Pig	189	294,429	183	285,755	174	317,897	167	357,243
Chicken	386	12,475,540	334	12,539,480	324	10,739,513	281	12,802,065
Duck	52	485,058	38	460,510	30	235,033	20	318, 200
Total	**1,911**	**13,281,128**	**1,493**	**13,308,433**	**1,460**	**11,317,631**	**1,390**	**13,507,083**

Source: Department of Veterinary Services, Penang.

Poultry and pig farming make up approximately 82% of the total livestock production in Penang. The production of poultry meat and pork in Penang has exceeded local demand; in 2019, the SSL of poultry meat and pork were recorded at about 141% and 265%, respectively. However, the production of eggs, fresh milk, cow/buffalo meat, and goat/sheep meat were insufficient to meet local demand (Figure 3.71).

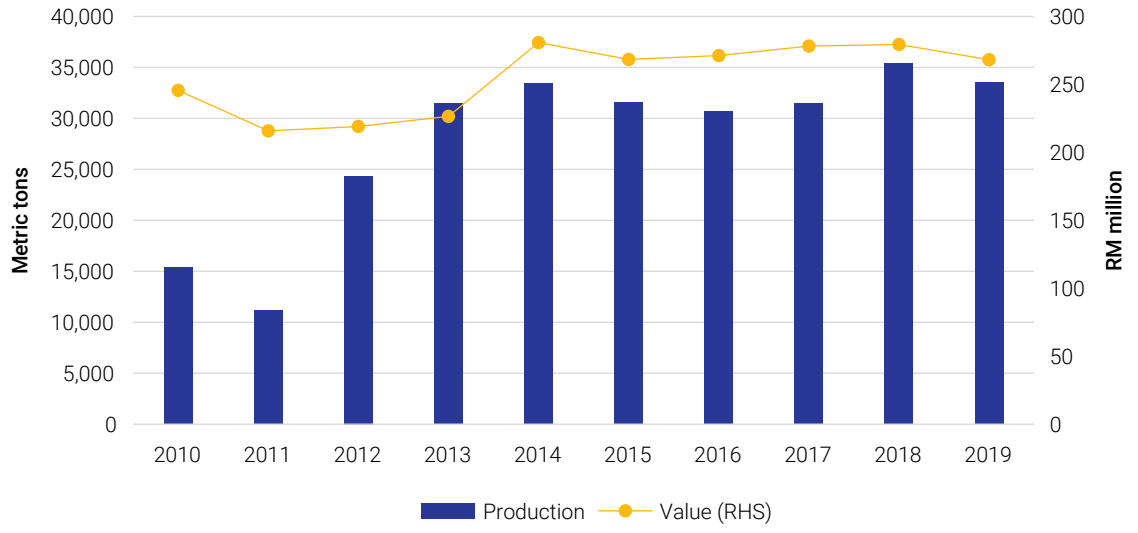
Figure 3.71 Self-sufficiency level of livestock products in Penang, 2019



Source: Department of Veterinary Services, Penang.

Over the past decade, the production and wholesale value of pork increased by 118.4% and 9.2%, respectively (Figure 3.72). However, in 2019, the production and value of pork dropped by 5.2% and 4%, respectively, compared with 2018. The pork industry is the most self-sufficient livestock commodity in Penang. By 2025, pork meat output is expected to reach 37,900 metric tons while demand will grow to 14,900 metric tons.

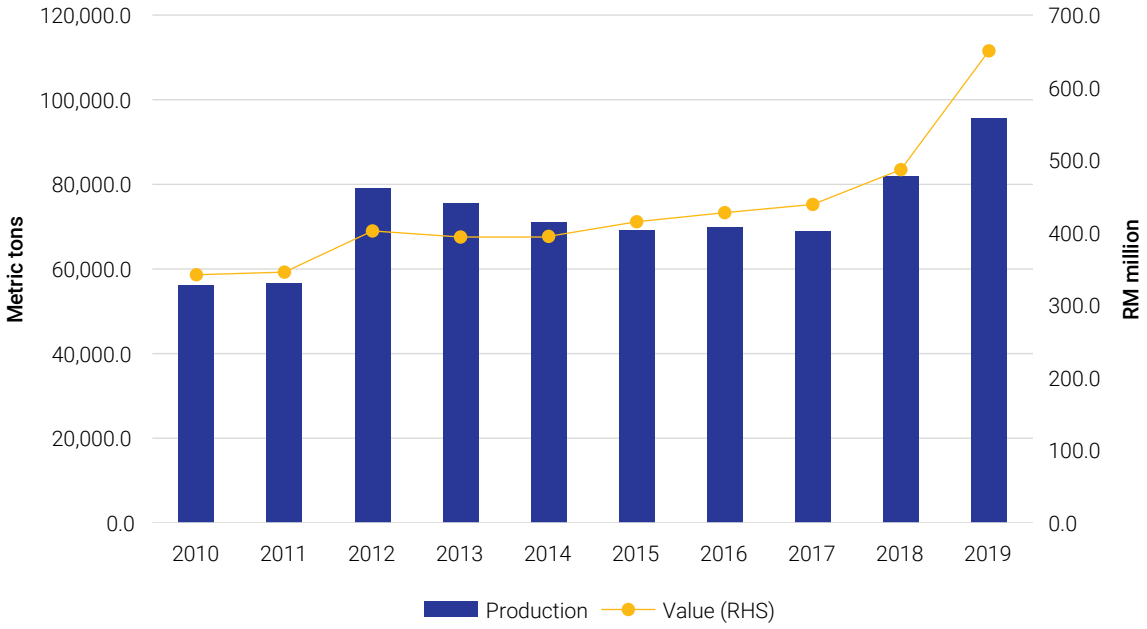
Figure 3.72 Production and wholesale value of pork in Penang, 2010–19



Source: Department of Veterinary Services, Penang.

The growth of poultry meat production has been steady between 2012 and 2018, with minor fluctuations. In 2019, chicken/duck production and wholesale value in Penang increased by 16.9% and 33.6%, respectively, compared with 2018 (Figure 3.73). The poultry sub-sector has grown significantly over the last few decades into a complex commercial industry. An integrated production system has been vital in the last two decades. Although duck meat production is significantly lower, it is still sustainable due to lower demand.

Figure 3.73 Production and value of chicken/duck in Penang, 2010–19

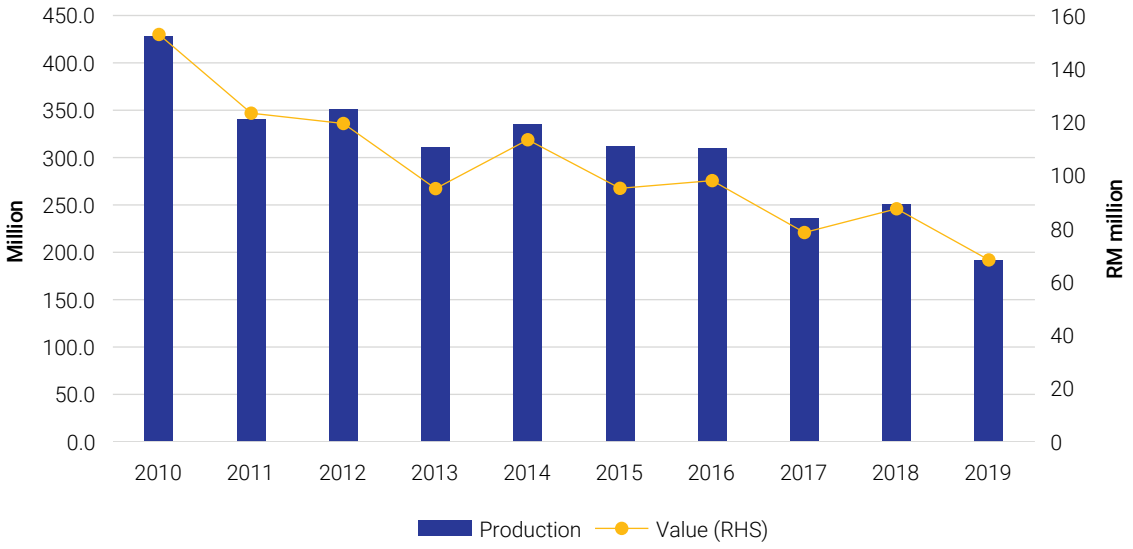


Source: Department of Veterinary Services, Penang.

The growth of both pork and poultry sub-sectors has required an increase in feed import since domestic feed production is insufficient. Meanwhile, major players in the poultry sub-sector are converting conventional breeding systems to closed house systems. This is because the closed house system offers better disease control (hence a decreased mortality rate) and better output quality.

Although the Malaysian egg industry has been self-sufficient since 1982, Penang has been struggling to satisfy domestic demand. As presented in Figure 3.74, the production and wholesale value of eggs has dropped significantly by 55.2% and 55.4% between 2010 and 2019. The increased cost of production is the main factor, fuelled by the rising price of chicken feed. Naturally, the SSL of the egg industry has decreased; in 2019, its SSL dropped to 42% from 117.2% in 2010. By 2025, Penang's production is expected to reach 281.5 million eggs compared with a demand of 491.4 million eggs.

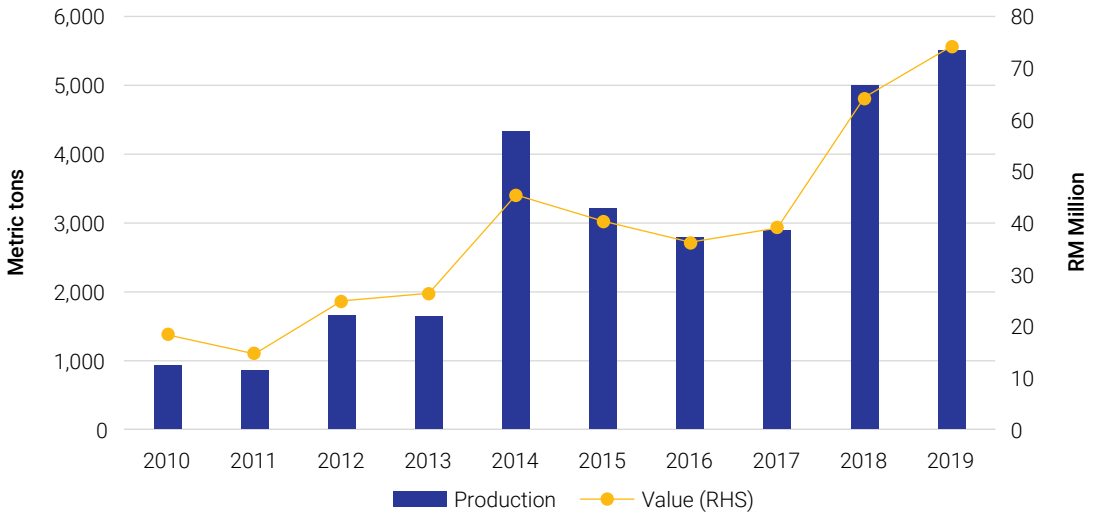
Figure 3.74 Production and value of egg (chicken/duck) in Penang, 2010–19



Source: Department of Veterinary Services, Penang.

Beef is produced from beef cattle, culled dairy cattle, and buffaloes. Production in Penang has risen by 493.2% from 2010 to 2019, growing from 927 to 5,499.2 metric tons. Its value has also increased by nearly 305% (Figure 3.75). In 2018, the production and value of beef increased by about 98.3% and 98.4%, respectively, compared with 2017, mainly owing to a significant increase (51.5%) in cow population. Despite this, the increase in demand for beef has outstripped production. By 2025, demand for cow/buffalo meat is expected to increase by 3% per year, while production is expected to increase by only 2%.

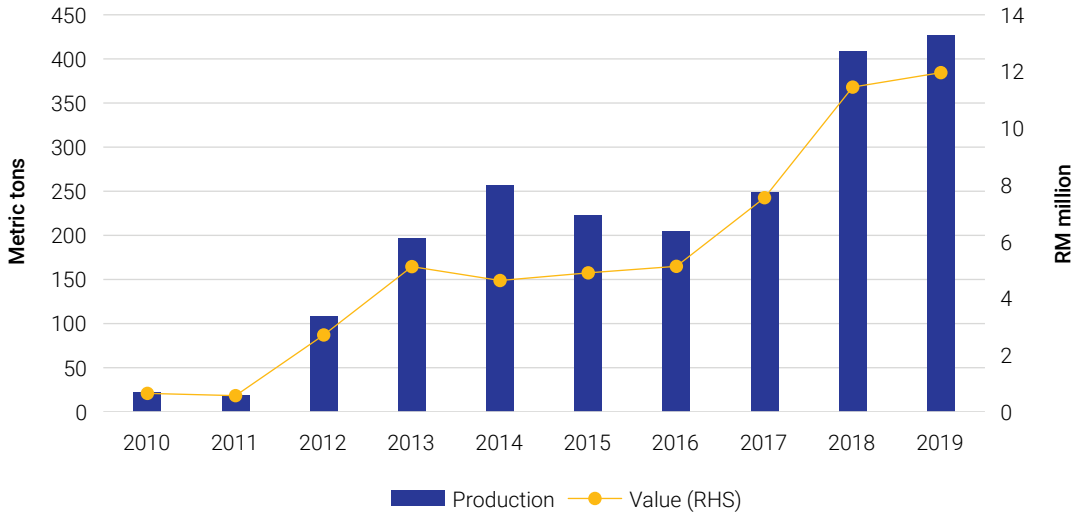
Figure 3.75 Production and value of beef/buffalo in Penang, 2010–19



Source: Department of Veterinary Services, Penang.

The sheep/goat industry in Penang is still in its infancy. The industry has experienced an extensive growth in production, from 21.7 metric tons in 2010 to 427.2 metric tons in 2019 (Figure 3.76). However, total production is still well below the projected demand of 1,700 metric tons. Given that the state government expects an average annual growth rate of 2% from 2019 to 2025, drastic measures need to be taken to revamp this industry.

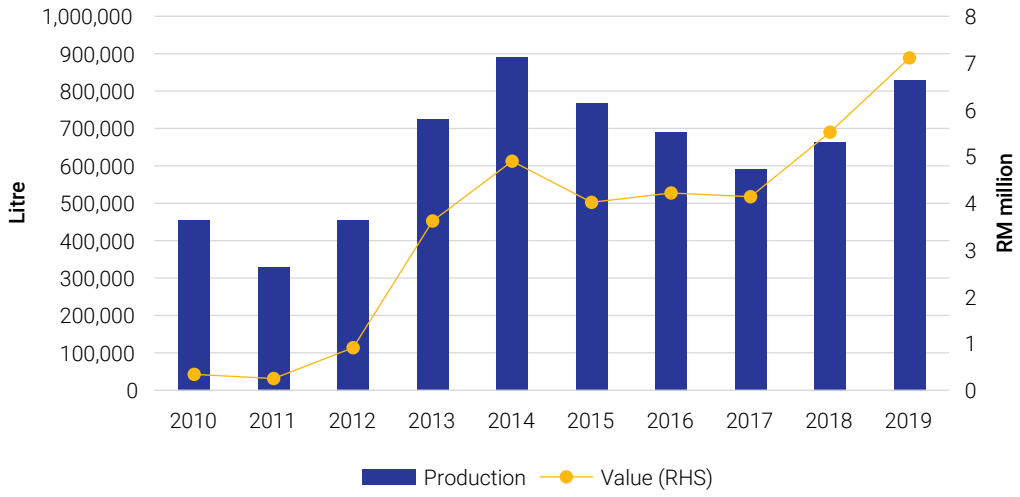
Figure 3.76 Production and value of goat/sheep in Penang, 2010–19



Source: Department of Veterinary Services, Penang.

Between 2010 and 2019, the production and value of fresh milk increased by 82.2% and 1,199.2%, respectively (Figure 3.77). In 2019, the SSL of the fresh milk industry was only 22.1%. In 2025, projected fresh milk output (0.6 million litres) is still expected to trail behind demand for fresh milk (64.8 million litres). Improved awareness over the nutritional benefits of fresh milk among consumers, coupled with the growing preference for dairy-derived products, has fuelled the rise in demand.

Figure 3.77 Production and value of fresh milk in Penang, 2010–19



Source: Department of Veterinary Services, Penang.

Overall, rapid economic and population growth in Malaysia and Penang has led to an increase in demand for livestock products over the last decade. However, the sector is facing serious challenges such as lack of land and labour, high feed costs, and lack of private sector involvement.

3.4.3 Fisheries sub-sector

Despite accounting for less than 1% of the national GDP and only 12.5% of the agriculture sector (Department of Statistics Malaysia, 2019c), the fisheries sub-sector provides employment for thousands of people, especially in rural communities. It also tackles poverty among coastal communities and contributes about 44% of the total animal-sourced protein intake, particularly of the poorer classes. The sub-sector therefore contributes to food and nutrition security, employment, and national economic growth.

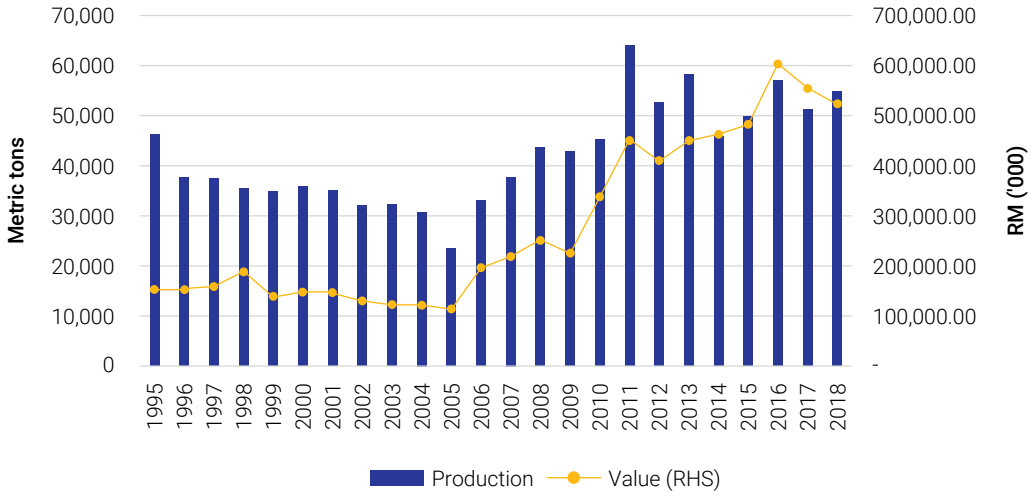
Production from marine capture fisheries on the west coast of Peninsular Malaysia are expected to become unreliable because many fish stocks have been overexploited. Therefore, various aquaculture techniques are being explored to increase production.

In 2018, Penang's food fish sub-sector (consisting of marine-capture fisheries, aquaculture fisheries, and inland fisheries) produced 83,917.7 metric tons valued at RM1.1 billion, but domestic demand for fish still outweighed supply. In 2018, the wholesale value of food fish production in Penang was the second-highest in the country (behind Perak), with marine-capture fisheries contributing about 65% to the state's food fish production (54,854 metric tons valued at RM522.6million), while aquaculture contributed nearly 35% (29,027.1 metric tons valued at RM551.2million) and production from inland fisheries contributed less than 0.04% of the total.

Marine-capture fisheries

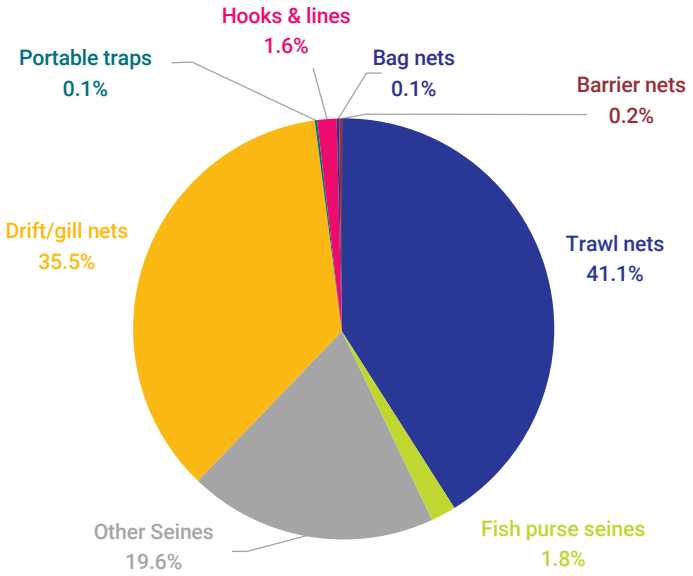
Despite a significant decline in marine-capture fisheries from 1995 to 2005, the quantity of marine fish landings peaked at 63,972 metric tons in 2011. In 2018, the production of marine-capture fisheries increased by about 7.2% over 2017, yet its wholesale value dropped by 5.6% (Figure 3.78). The decline in value may be due to smaller catches of high-value fish and larger catches of lower-priced fish. In 2018, the largest contribution to total landings in Penang was from trawl nets (41.1%), followed by drift/gill nets (35.5%) (Figure 3.79). However, these methods are not sustainable. Trawls, which are cone-shaped nets, scrape the seabed and catch not just adult fish, but also juveniles, while destroying their breeding or spawning grounds. More sustainable fishing practices are needed.

Figure 3.78 Marine landing fish production and value in Penang, 1995–2018



Source: Department of Fisheries, Malaysia.

Figure 3.79 Percentage catch by fishing method, Penang, 2018



Source: Department of Fisheries, Malaysia.

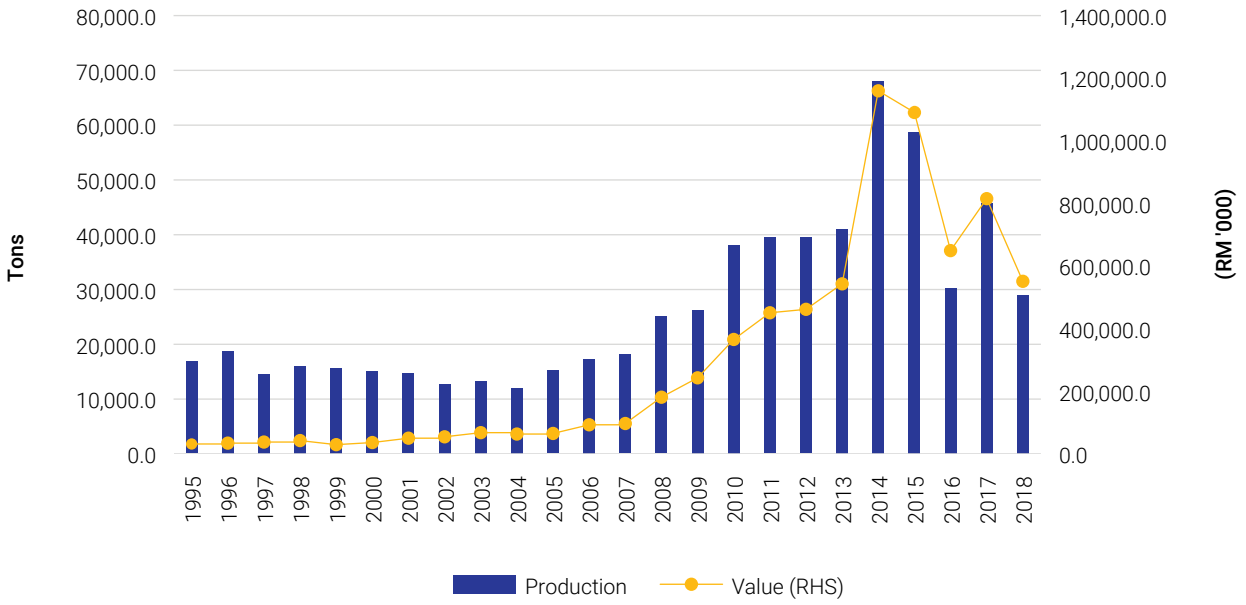
Aquaculture sector

Aquaculture is becoming a more economically viable method of increasing local fish production in anticipation of increased demand. In Malaysia, high-grade aquaculture products are mostly exported, while catches from marine landings are sold domestically.

From 1995 to 2018, Penang's aquaculture sector grew at an average annual growth rate of 5.7% and 18% in production and value, respectively (Figure 3.80). Yet the state's aquaculture production and value dropped by 36.5% and 32.4%, respectively in 2018 compared with 2017. This decline was mainly due to the November 2017 floods which significantly damaged aquaculture cages. Penang's aquaculture recorded the fourth-highest production in the country after Sabah, Perak, and Johor. However, its production gained the second-highest wholesale value behind Perak.

Brackishwater ponds and cages constitute the majority of Penang's aquaculture. In 2018, fisheries from brackishwater culture systems accounted for 31.7% of Penang's total fish production and nearly 50.4% of its wholesale value. Of these, sea bass and snapper recorded the highest production, followed by shrimp, cockle, and other brackishwater cages species, such as grouper and mackerel.

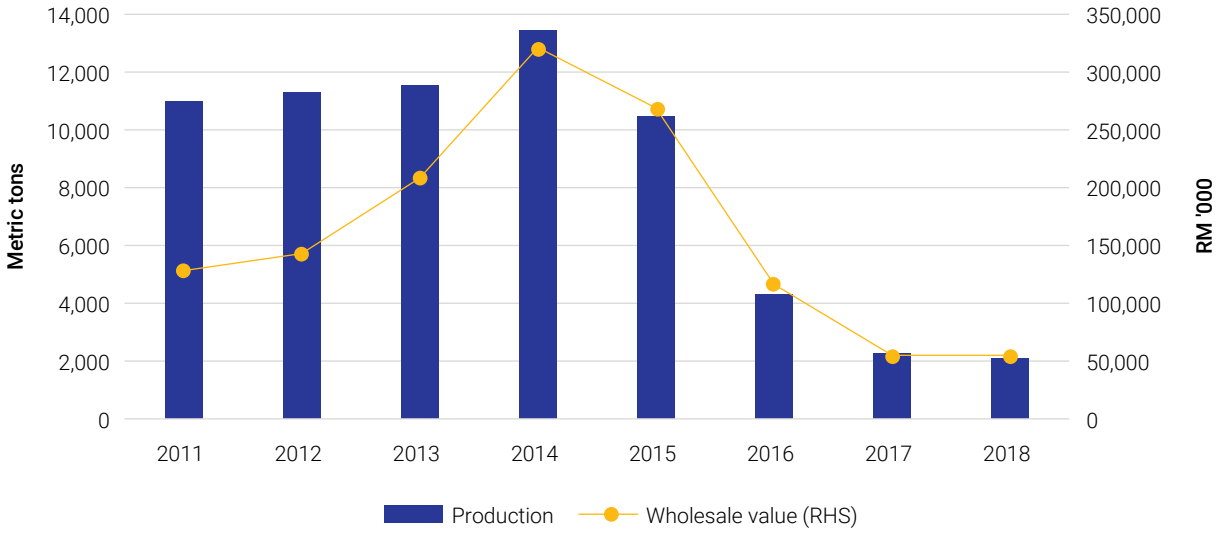
Figure 3.80 Aquaculture production and value in Penang, 1995–2018



Source: Department of Fisheries, Malaysia.

From 2011 to 2015, Penang's farmed shrimp has had the highest wholesale value in the country, and Penang was the second-largest producer of shrimp after Sabah. In 2016, its shrimp production dropped by 58.7% compared over 2015, mostly owing to disease (Figure 3.81). However, its wholesale value was the second-highest nationwide. Production and wholesale value of shrimp declined by 51.8% and 52.6%, respectively, in 2018 over 2016, possibly because of ongoing disease issues and the November 2017 floods.

Figure 3.81 Shrimp production and value in Penang, 2011–18



Source: Department of Fisheries, Malaysia.

Meanwhile, Penang's natural mangrove mudflats are suitable breeding areas for cockles. Penang is the third-largest cockle producer in the country, behind Perak and Selangor. In 2018, its wholesale value was the second-highest in the country after Perak. Cockle production in Penang dropped sharply from 7,330.8 metric tons in 2014 to 1,844.2 metric tons in 2018, mainly because of poor water quality, disease, and fluctuations in water temperature. The decreased supply and high demand increased the price of cockles in major markets in Penang.

Box 3.7 Agricultural transformation to achieve SDGs

By Negin Vaghefi

The agriculture sector plays a strategic role in the country's economic structural transformation. The sector contributes to economic development through providing food and employment—especially for the poor—while supplying raw material to non-agricultural sectors of the economy and contributing to exports.

Although major improvements in agricultural productivity have been recorded over the past several decades, progress has often come with societal and environmental costs, including water scarcity, soil degradation, ecosystem stress, biodiversity loss, decreasing fish stocks and forest cover, and high levels of greenhouse gas emissions. In addition, the sector is facing many challenges such as land and labour scarcity, high production costs, disease, and climate change. Overcoming these challenges requires transformative action and embracing the principles of sustainability. By adopting sustainable agriculture, we will be able to feed a growing population.

The agriculture sector can help achieve multiple Sustainable Development Goals (SDGs). The sector is important in achieving SDG1 (no poverty), SDG2 (zero hunger), SDG3 (good health and wellbeing), SDG4 (quality education), SDG5 (gender equality), SDG8 (decent work and economic growth), SDG10 (reduced inequalities), SDG14 (life below water), and SDG15 (life on land).

Sustainable agriculture needs to be mainstreamed into national development strategies and action plans. A transition to more sustainable agriculture should balance the economic, social, and environmental dimensions of sustainability. Besides increasing productivity, employment, and value-added in the food system, sustainable agriculture should also protect natural resources, enhance livelihoods, and increase inclusive economic growth. Because of its multi-dimensional nature, multi-stakeholder mechanisms are required to pool together resources and expertise.

Moreover, a public-private partnership (PPP) model for sustainable agricultural development needs to be developed. A successful PPP should clearly identify roles and responsibilities according to the unique skills and expertise that each partner can provide, with appropriate incentives designed to maximise their strengths. Unlocking the potential of the private sector is essential. More than just a source of financing, private sector partnership would bring technology development, knowledge transfers, and innovation, as well as creates jobs and alternative revenue streams.

Establishing SDG implementation platforms in the agriculture sector to develop more integrated programmes and policies, better interlink various goals, monitor progress, and identify and address barriers to change will be important to enable real transformation to sustainable agriculture.

Box 3.8 Impact of COVID-19 on the agriculture sector[56]

By Negin Vaghefi

The COVID-19 pandemic has posed challenges to all economic sectors, particularly agriculture. The lockdown to contain COVID-19 has affected food security and the food supply chain directly through impacts on food supply and demand, as well as reduced agricultural labour, and indirectly through changing consumer behaviour. During the Movement Control Order (MCO), road closures and transport restrictions slowed down agricultural services and prevented farmers, particularly smallholders, from selling their products or buying inputs, leading to wasted produce and loss of income.

According to the Department of Agriculture (DOA) Penang, various issues occurred in the crop sub-sector during the MCO, including the limited availability of fertilizers, pesticides, seeds, machinery spare parts, and farm equipment. In addition, farmers have had trouble marketing their products. Perishable and fresh produce such as vegetables were more affected, resulting in increased levels of post-harvest lost (PHL) and food waste. During the first phase of the MCO, vegetable and fruit production in Penang dropped at an average daily rate of 3% and 1.3%, respectively.

Although the supply of livestock products was sufficient during the lockdown, some sub-sectors were negatively impacted by the COVID-19 crisis. During the first phase of the MCO, some small-scale farmers and distributors had difficulties selling their products due to a lack of market access and logistical constraints. According to the Department of Veterinary Services (DVS) Penang, around 49 small-scale dairy farmers could not sell their milk products daily, which resulted in a total estimated loss of RM7,000 per day. A cost of RM4,320 and RM7,394 per day were borne by traditional poultry and large ruminant farmers, respectively. Furthermore, since 1 April, the price of livestock feed, especially cattle feed, has increased by about 3–6%, mostly because of the rising prices of molasses and palm kernel expeller (PKE) by 22% and 32–36%, respectively. This has had an impact on total production costs. The total loss of the livestock sector has been estimated at RM18,713.68 per day (RM261,991.52 per day during the first two weeks of MCO).

The fish supply chain in Penang was also adversely affected by the pandemic. According to the Department of Fisheries (DOF) Penang, during the first phase of the MCO, some fishermen and culturists faced difficulties in selling their products as the market demand for fresh fish and aquatic products saw a sudden decline, coupled with limited sales operations as a result of the closure of, or the limited opening hours, of morning and night markets. Many wholesalers also stopped buying fish and aquatic products because restaurants were ordered to remain shut except for takeaways. Many fishermen were therefore reluctant to go out to the sea. As a result, captured fish declined by about 70–90% in March 2020 compared with February 2020. Aquaculture production also dropped by nearly 80% in March 2020 compared with the previous month, mostly because of limited access to inputs such as seed and fish food, labour shortages, and limited operations of seafood restaurants and hotels. The decline in captured fishery and aquaculture products is expected to push the price of fish and aquatic foods up, which in turn would have a notable impact on the fishing industry and communities.

The COVID-19 pandemic has renewed a sense of urgency for the general use of automation. In fact, agriculture 4.0 and the digitisation of the supply chain is the way forward in assisting farmers in enhancing productivity as well as adopting labour- and input-saving practices. Technologies that link farmers to buyers and logistics services can help minimise the impact of a pandemic on the supply chain. Empowering e-commerce in agribusiness also facilitates trade, reduces transportation risks, and allows access to the market.

[56] Adapted from Vaghefi (2020).

4. Environment

Environmental quality is considered to be a public good. It affects the public and the community in terms of economic, social welfare, and quality of life. Ecological sustainability is a key factor for sustainable economic and social development. The most pressing environmental issues in Penang are air and water pollution, flash floods, waste management, and landslides. Short-term action is needed while maintaining a long-term perspective.

4.1 Pollution

Different types of environmental pollution have been reported in Penang, the major ones being open burning, air pollution, and water pollution. These pose serious risks to the environment, public health, and even the economy.

4.1.1 Air pollution

Malaysia uses the Air Pollution Index (API) to describe the ambient air quality based on the health risks of air pollution. The API reflects the air's effect on human health, ranging from good to hazardous. API levels of up to 50 are considered good, between 51 and 100 moderate, 101 and 200 unhealthy, 201 and 300 very unhealthy, and 300 and above hazardous. An API system includes the major air pollutants which may cause potential harm to human health if they reach unsafe levels. The air pollutants included in Malaysia's API are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), suspended particulate matter of less than 10 microns in size (PM_{10}) and suspended particulate matter of less than 2.5 microns in size ($PM_{2.5}$) (Department of Environment Malaysia, 2018).

The air quality of Penang is monitored at four stations, Seberang Jaya, Seberang Perai, Balik Pulau, and Minden. In 2019, the overall air quality in Penang worsened as the number of days with good API levels decreased and the number of unhealthy days increased compared with 2018 (Table 4.1). On average, the air quality was good 12.4% of the time, moderate 85.6%, unhealthy 1.7%, and very unhealthy 0.5% of the time. Over the years, the air quality has worsened mainly because of industrialisation, the rising number of motor vehicles, and the seasonal haze in the country.

Table 4.1 Air quality status in Penang, 2018–19

		Balik Pulau	Minden*	Seberang Jaya	Seberang Perai
2018	Good	122	50	11	39
	Moderate	241	285	352	322
	Unhealthy	2	2	2	2
	Very unhealthy	0	0	0	0
2019	Good	57	50	30	44
	Moderate	298	305	330	317
	Unhealthy	8	8	5	4
	Very unhealthy	2	2	0	0

** Minden has 28 days missing values in 2018.*
Source: Department of Environment, Malaysia.

4.1.2 Water Pollution

Rapid population growth and urbanisation have led to both increasing demand for water consumption and greater levels of water pollution in the country. Rapid development has produced significant amounts of wastes, including domestic, industrial, and commercial, which mostly end up in bodies of water. Therefore, access to a clean and safe water supply has become an important challenge for the government to overcome.

The Water Quality Index (WQI) is the most effective method of measuring water quality and level of pollution. According to the Department of Environment, WQI is computed based on six main parameters: biochemical oxygen demand (BOD), chemical oxygen demand (COD), ammonia nitrogen (AN), acidic and alkaline (pH), dissolved oxygen (DO), and total suspended solids (TSS). WQI levels of between 81 and 100 are considered good/clean, 60 and 80 moderate/slightly polluted, and 0 and 59 unhealthy/polluted.

The overall river basin water quality in Penang is moderately polluted. In 2018, within Penang's river basins, 8 (20.5%) were found to be clean, 21 (53.8%) slightly polluted, and 10 (25.6%) polluted. The overall WQI increased by about 5.4% in 2018 compared with 2017 (Table 4.2).

Marine environment is also exposed to pollution. The pollution can be from point or non-point sources. Point sources of pollution include sewage/municipal wastewater and industrial wastewaters. Non-point sources are runoffs from urban, agriculture, land clearing, construction activities, and deposition from atmospheric sources. In addition, the marine water is also exposed to threats from shipping activities, offshore oil and gas exploration, and exploitation activities. The Marine Water Quality Index (MWQI) is used to determine the marine water quality status and has seven main parameters: DO, nitrate (NO_3), phosphate (PO_4), unionised ammonia (NH_3), faecal coliform, oil and grease (O&G), and total suspended solid (TSS). These pollutants would pose threats to marine resources and endanger the stability and diversity of the marine ecosystem and wildlife, as well as affect the livelihood of coastal communities. The MWQI, with a scale between 0 and 100, defines the category of the marine water quality, ranging from "Poor" to "Excellent".

In 2018, the overall marine water quality in Penang with respect to coastal areas improved compared to the previous year. Five stations (29%) recorded as Excellent, two stations (12%) as Good, 10 stations (59%) as Moderate, and no stations were categorised as Poor (Table 4.3). The number of stations recording Excellent and Good increased from three stations in 2017 to seven in 2018. Areas such as Pantai Sungai Batu Ferringhi and Pantai Miami saw significant improvements in MWQI in 2018 when compared with 2017.

The overall marine water quality for estuaries in Penang improved slightly in 2018 compared with 2017. As presented in Table 4.4, the MWQI monitoring results for estuarine areas classified five stations as moderate and two stations as Poor in 2018. The most polluted estuaries were Kuala Sungai Tengah and Kuala Sungai Juru.

Table 4.2 River water quality status, Penang, 2017–18

	River basin	River	Number of stations	WQI	
				2017	2018
Clean	Pinang	Air Terjun	1	92	93
		Batu Feringghi*	2	-	84
	Kluang	Ara	2	80	82
	Perai	Kulim	4	79	85
	Kerian	Kechil	1	84	82
		Selama	2	76	86
		Kerian	4	81	82
		Terusan Bagan Serai*	1	-	91
Slightly polluted	Bayan Lepas	Tiram	2	69	74
		Bayan Lepas	1	65	70
	Jawi	Machang Bubok	1	71	72
		Junjong	1	70	67
	Juru	Ara*	1	-	70
		Permatang Rawa*	1	-	74
		Kilang Ubi	4	63	68
	Kluang	Relau	1	69	79
		Dua Besar*	1	-	65
		Kluang*	1	-	70
	Pinang	Dondang	1	69	71
		Pinang	2	57	70
		Jelutong	1	49	67
		Titi Kerawang*	1	-	65
		Air Itam	5	67	76
	Perai	Jarak	3	68	70
		Kubang Semang*	1	-	61
		Seluang*	1	-	62
		Keladi	1	70	76
	Kerian	Semang*	1	-	80
		Serdang*	1	-	75
Polluted	Jawi	Jawi	1	44	47
		Tengah*	1	-	49
		Chempedak*	1	-	39
	Juru	Juru	2	53	58
		Pasir	1	62	59
		Rambai	1	49	54
	Perai	Perai	2	57	59
		Seluang Bawah*	2	-	59
		Kereh	1	50	56
		Pertama	1	49	54

** New category.*
Source: Department of Environment, Malaysia.

Table 4.3 Marine water quality status for coastal areas in Penang, 2017–18

Area	MWQI value		Category (2018)
	2017	2018	
Gertak Sanggul	71	81	Good
Kawasan Perindustrian Bayan Lepas 1	67	59	Moderate
Pantai Bersih	50	66	Moderate
Pantai Miami	68	93	Excellent
Pantai Pasir Panjang	86	93	Excellent
Batu Feringgi (Casuarina)	67	67	Moderate
Luar Pantai Teluk Bahang	85	93	Excellent
Persiaran Gurney	63	66	Moderate
Rumah Pam Baru Perai	59	64	Moderate
Rumah Pam Lama Perai	64	65	Moderate
Selat PP Selatan (Jelutong)	49	59	Moderate
Tanjung Bungah	84	67	Moderate
Teluk Tempoyak	61	75	Moderate
Batu Maung	59	62	Moderate
Pantai Sungai Batu Ferringhi 1*	51	85	Good
Pantai Sungai Batu Ferringhi 2*	61	93	Excellent
Pantai Sungai Batu Ferringhi 3*	62	93	Excellent

Note: The MWQI is classified into four categories, namely Excellent: 90–100, Good: 80–<90, Moderate: 50–<80, and Poor: 0–<50.
** New station.*
Source: Department of Environment, Malaysia.

Table 4.4 Marine water quality status for estuaries in Penang, 2017–18

Estuary	MWQI		Category (2018)
	2017	2018	
Kuala Sungai Jawi	49	54	Moderate
Kuala Sungai Juru	49	47	Poor
Kuala Sungai Kerian	56	60	Moderate
Kuala Sungai Pinang	52	61	Moderate
Kuala Sungai Perai	52	59	Moderate
Kuala Sungai Tengah	58	37	Poor
Kuala Sungai Pinang (Balik Pulau)	55	64	Moderate

Note: The MWQI is classified into four categories, namely Excellent: 90–100, Good: 80–<90, Moderate: 50–<80, and Poor: 0–<50.
Source: Department of Environment, Malaysia.

4.2 Waste management

Rapid population growth and economic development, insufficient infrastructure and expertise, and land scarcity have turned solid waste management into one of Penang's most critical environmental issues. Poor waste management will result in land and air pollution, health issues for the communities, and bottlenecks to economic growth. To overcome this issue, a sustainable waste management and the increased use of technology are needed.

Municipal solid waste (MSW) includes all types of solid waste generated by households, industries, and commercial establishments. Landfilling is the only method of MSW disposal available in the state. However, this method is not sustainable and brings a host of issues if not managed. The generated landfill leachate should be appropriately treated before being discharged into the environment. Currently, aeration and recirculation systems are being applied to the landfill to flow the leachate out. A leachate collection pond has also been built.

4.2.1 Solid waste disposal and recycling

Over the past decade, the generation, recycling, and disposal of MSW in Penang has changed substantially. Generation of waste increased from 0.8 million metric tons in 2009 to 1.5 million metric tons in 2019—an average increase of 6.3% (Table 4.5). In 2019, the total waste disposed at landfills in Penang was about 2,220 metric tons per day (705 metric tons per day on Penang Island and 1,516 metric tons per day in Seberang Perai), an increase of nearly 13% over 2018 (Figure 4.1). In 2019, the per capita waste generation rate was about 2.4 kilograms per person per day[57], of which domestic waste was the primary source. Rising living standards and changes in household consumption patterns have greatly accelerated the rate and amount of domestic waste generation.

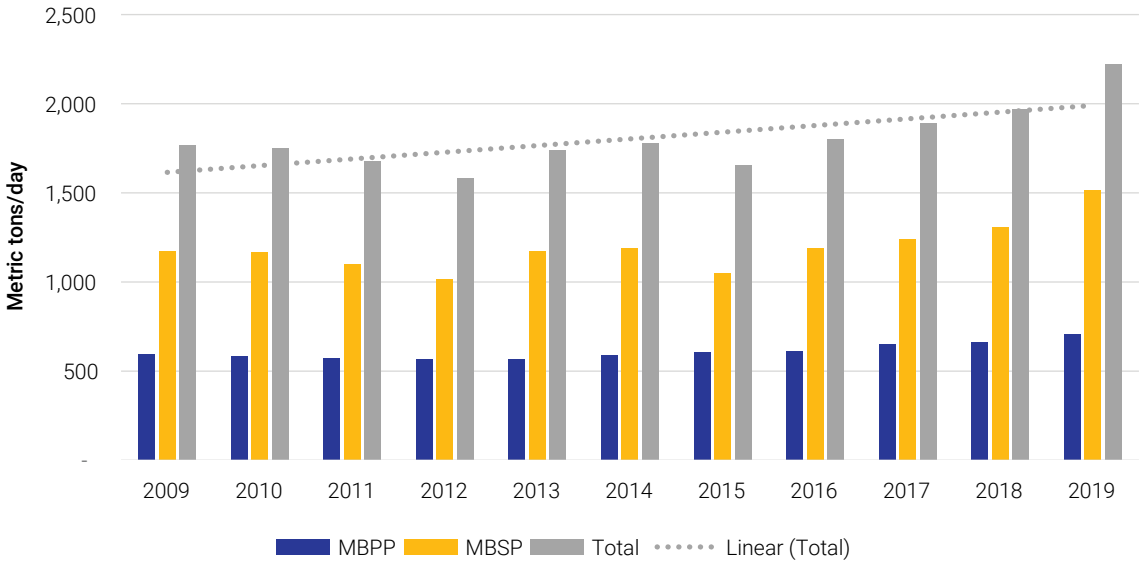
Table 4.5 Total waste generation in Penang, 2009–19

	Waste disposed at landfill (metric tons)			Recycling (metric tons)			Total waste generation (metric tons)	Recycling rates (%)
	MBPP	MPSP	Total	MBPP	MPSP	Total		
2009	216,456	428,563	645,019	61,307	132,039	193,346	838,365	23
2010	213,591	426,152	639,743	63,756	129,804	193,560	833,303	23
2011	209,701	401,663	611,364	72,314	144,682	216,996	828,360	26
2012	205,972	370,989	576,961	82,405	157,286	239,691	816,652	29
2013	207,968	427,706	635,674	80,050	207,849	287,899	923,573	31
2014	214,609	434,164	648,773	80,233	233,791	314,024	962,797	33
2015	221,576	383,528	605,104	84,100	282,932	367,032	972,136	38
2016	222,386	434,009	656,395	86,465	322,189	408,654	1,065,049	38
2017	237,236	453,035	690,271	100,123	345,329	445,452	1,135,723	39
2018	241,078	476,991	718,069	109,349	425,640	534,989	1,253,058	43
2019	257,237	553,223	810,460	116,777	590,773	707,550	1,518,010	47

Source: Penang Island City Council (MBPP) and Seberang Perai City Council (MBSP).

[57] Includes domestic and industrial waste disposed at landfills and recycling items.

Figure 4.1 Waste disposed at landfill per day in Penang, 2009–19



Source: Penang Island City Council (MBPP) and Seberang Perai City Council (MBSP).

The sorting and segregating of MSW at the source is one of the most important and traditional methods in solid waste management. Over time, recycling rates have increased from 23% of solid waste generated in 2009 to nearly 47% in 2019. In 2019, the total solid waste recycled in Penang was about 707,550 metric tons (116,777 metric tons on Penang Island and 590,773 metric tons in Seberang Perai)—an increase of about 32.3% compared with 2018.

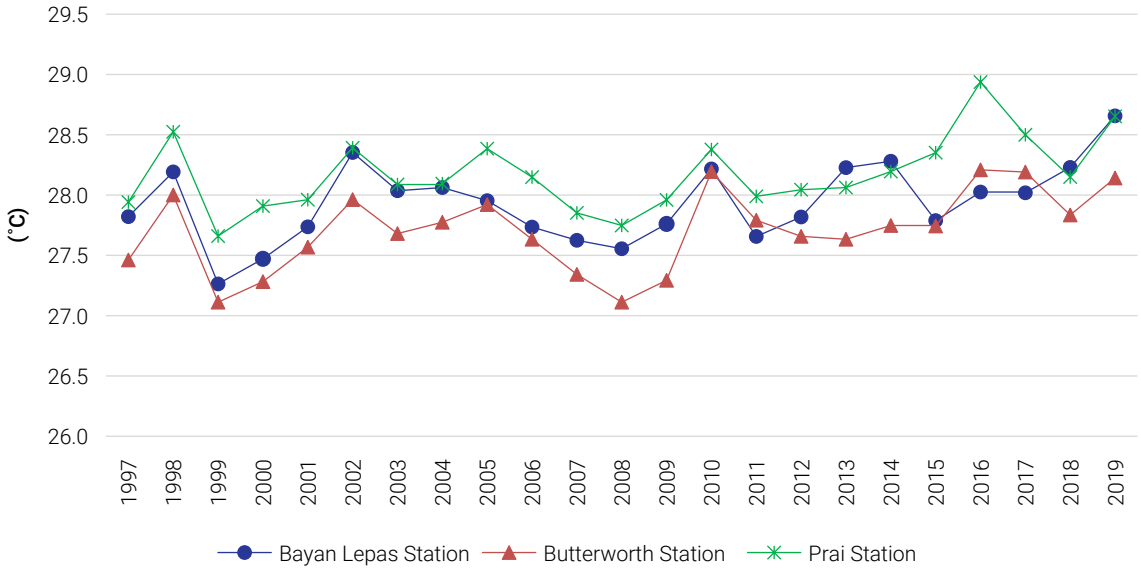
The quantity and composition of MSW are important to determine the proper handling and management of these wastes. MSW generally comprises food waste, plastics, glass, paper, metal, landscape waste, and others. Food waste accounts for the largest share of MSW in Penang (Universiti Sains Malaysia, 2014). Significant amounts of food waste end up in the landfill which leads to many environmental issues such as methane emission, leachate, groundwater contamination, and the potential release of toxic gases and odors. A more sustainable and integrative food waste handling system is needed. In addition, changes have to be made at every stage, from farmers and food processors to supermarkets and consumers. Recycling food waste into new products such as fertilizer and biogas in a responsible manner will also help reduce food waste sent to the landfill. The state has introduced various programmes and initiatives to minimise the amount of food waste entering the landfill. For instance, the state has launched a food waste-to-energy biogas project at the Batu Maung solid waste transfer station in June 2019. Under this project, all biogas created would be used to fuel a gas-powered generator to generate electricity that will be fed into the power grid (Sekaran, 2019). The state had installed bio-regen food waste machines in several locations to convert such waste into bio-liquid soil enhancers since 2011.

4.3 Climate change

The regional climatic trends in Malaysia are in line with the increases in average surface temperature as well as large variations in rainfall trends. Penang has experienced temperature and rainfall variations, especially in the last two decades (Figure 4.2 and Figure 4.3). Over the past two decades, the average temperature in Penang has increased by 0.13˚C per year, with the mainland experiencing slightly higher

average temperatures than the island. The historical temperature data in Penang indicates that 2019 was the warmest year since 1997. This is in line with global mean temperature changes, as 2019 was the second-hottest year since 1880 (NOAA, 2020). In 2019, the average temperature in Penang increased to 28.5˚C from 28.1˚C in 2018, an increase of 0.4˚C. The year 2019 began with a weak El Niño event and ended with neutral conditions. Internal weather variability, such as El Niño and La Niña, creates year-to-year temperature changes which occur alongside the long-term warming trends (Berkeley Earth, 2020). The temperature increase brings significant consequences such as endangering flora, fauna, and human beings; rising sea levels; floods and droughts; threatening coastal environments; and the destruction of the food chain and economic resources.

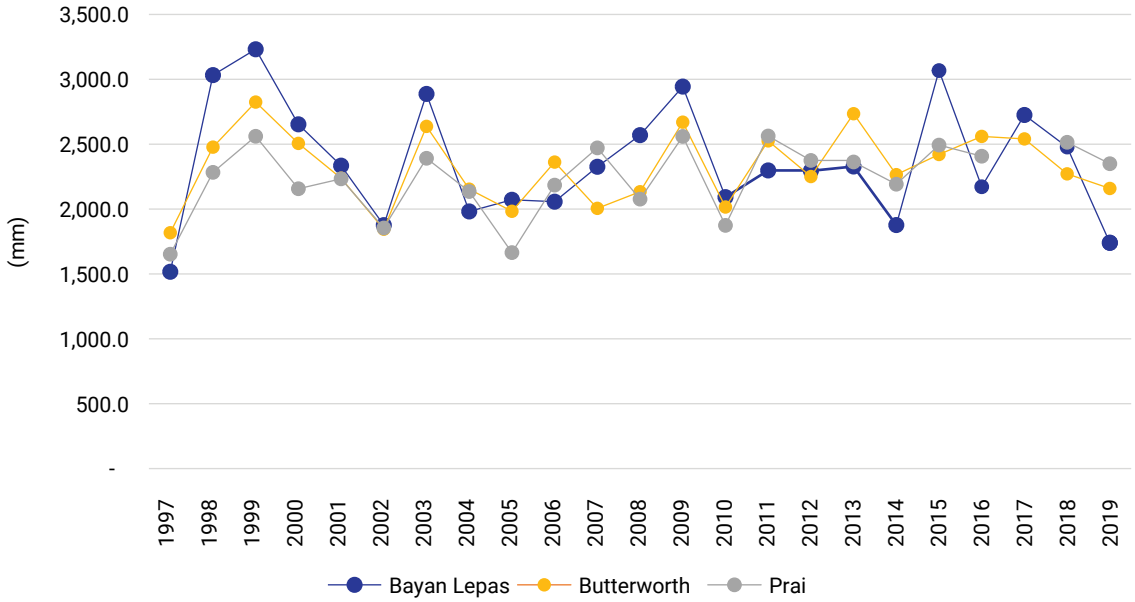
Figure 4.2 The average annual temperature in Penang, 1997–2019



Source: Malaysian Meteorological Department.

As temperatures rise, more moisture evaporates from land and water into the atmosphere, affecting overall rainfall patterns. Historical rainfall data shows an increase in the variability of rainfall during the past 20 years. Over the last decade, the number and size of extreme wet and dry spells in different parts of Penang have significantly changed. In 2019, the average rainfall and the number of rainy days in Penang decreased by about 14% and 17.8%, respectively, compared with 2018.

Figure 4.3 The average annual rainfall in Penang, 1997–2019



Note: Data for 2017 is not available for Prai station.
Source: Malaysian Meteorological Department.

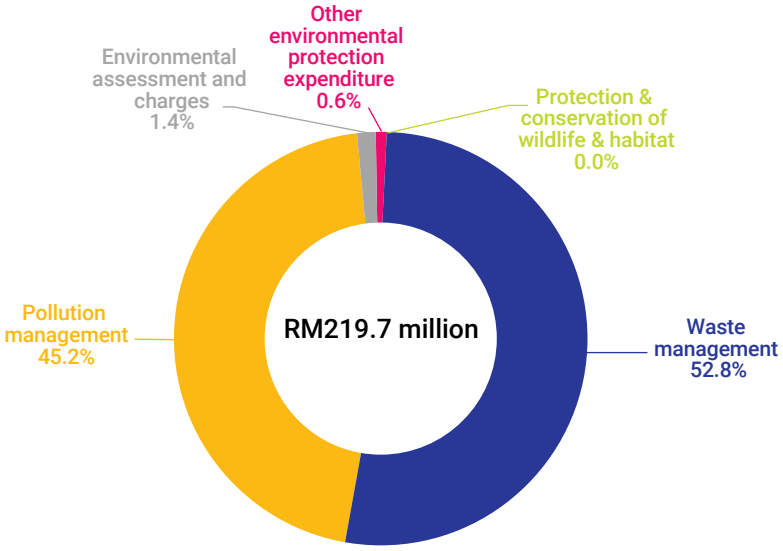
Future projections show a continuous increase in temperature, highly variable rainfall, and increased frequency of extreme weather events until the end of the 21st century (Tang, 2019). Climate change is a global challenge with no borders. Mitigating and adapting to this phenomenon would be highly dependent on policy, enforcement of laws, formulation and implementation of plans, and global and regional collaborations.

4.4 Environmental protection expenditure

In 2018, Penang spent about RM219.7 million on environmental protection, a decrease of 22.2% over 2017. The state contributed about 8.2% of the country's total environmental protection expenditure in 2018. As presented in Figure 4.4, waste management expenditure was the largest contributor at RM116 million (52.8%), followed by pollution management at RM99.3 million (45.2%). Overall, operating expenditure[58] was the largest contributor at 83.7%, while 16.3% was spent on capital expenditure[59]. Pollution management was the highest capital expenditure at 98.6%, while for operating expenditure, waste management recorded the highest share at 62.9%, followed by pollution management at 34.8%. Penang recorded the sixth-highest environmental protection expenditure in the country after Selangor, Johor, Kuala Lumpur, Negeri Sembilan, and Terengganu (Figure 4.5).

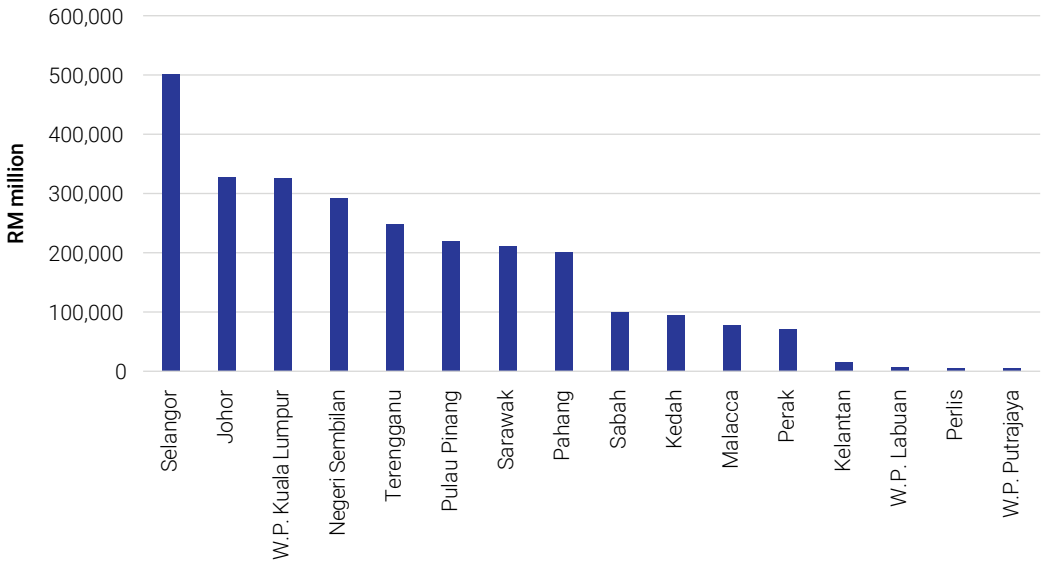
[58] Operating expenditure includes all expenses related to environmental protection incurred for labour, materials and supplies, maintenance and repair, and purchased services (include fuel and electricity expenses for machinery and equipment with the sole purpose of protecting the environment).
[59] Capital expenditure includes all relevant outlays for machinery and equipment and their installation and repair that have been capitalised, as well as for the construction of non-residential facilities (contractors or own employees).

Figure 4.4 Environmental protection expenditure by type of expenditure, Penang, 2018



Source: Department of Statistics, Malaysia.

Figure 4.5 Environmental protection expenditure by state, 2018



Source: Department of Statistics, Malaysia.

5. State financial performance

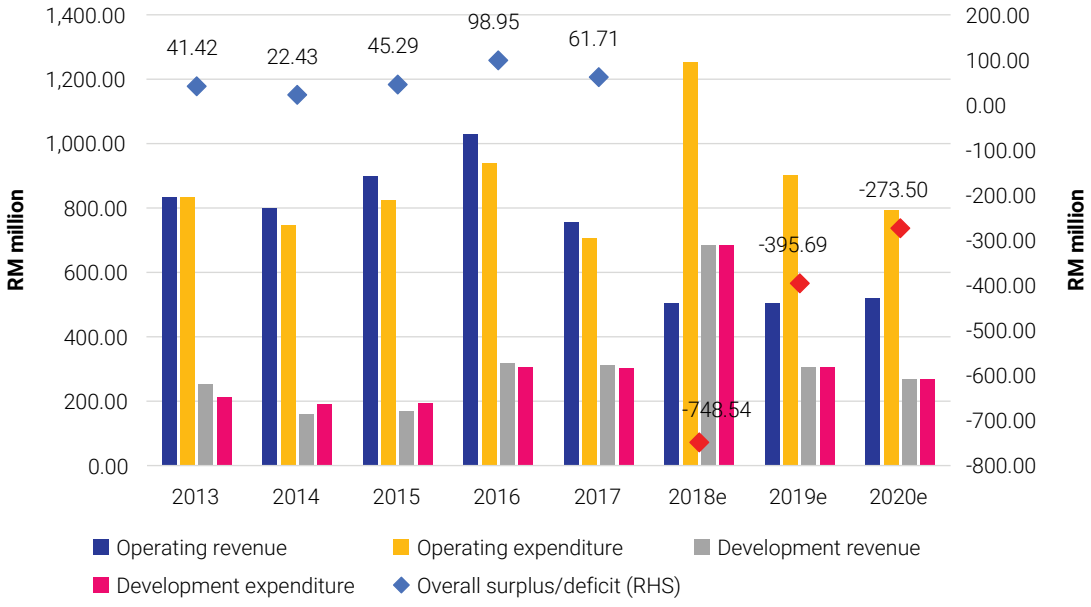
5.1 Financial position

In Budget 2020, Penang's core focus is to work towards achieving "a family-focused, green and smart state that inspires the nation" as deliberated in Penang2030. Funding will be allocated towards projects that realise the state's mission. Penang2030 looks to improve quality of life by empowering people through economic upgrades and built environment, while retaining the state's core value proposition on competency, accountability, and transparency (CAT) governance. Box 5.1 explains the 4 themes and 16 key thrusts of Penang2030.

The Penang government is estimated to have a smaller budget deficit of RM273.5 million in 2020 compared with RM395.7 million in 2019—a decrease of about 31% (Figure 5.1). This is attributed to a smaller projected expenditure for activities and development projects, which saw a drop of 12%, though it will be offset by an increase of 2.7% in operating revenue collection.

The state budgets for a fiscal deficit each year. However, the state's actual public expenditure has been lower than its estimated expenditure since 2011. As a result, it has recorded an overall surplus between 2011 and 2017. Based on the latest financial statements, the state government budgeted a deficit of RM667.1 million for 2017. However, actual public expenditure was 55% lower than the projected figure, leading to a surplus of RM61.7 million.

Figure 5.1 Penang state financial position, 2013–20



Notes:

1) The red diamond signifies overall budget deficit, and "e" refers to estimated budget.

2) The overall budget is calculated by subtracting the government revenue with government expenditure.

3) The 2018 state financial statement is not available at the time of writing.

Source: Penang State Financial Statements, 2013–2017 and Penang State Budgets, 2018–2020.

Compared with the previous year, the total revenue to be collected in 2020 by the state government is estimated to decrease by 2.9% to RM788.5 million, primarily because of a projected decrease of about 12% in development revenue (Table 5.1). The operating revenue is expected to increase by 2.7% to RM519.2 million in 2020, which is the result of a 14% increase in tax revenue—specifically direct tax (quit rent) and indirect tax (entertainment duties). In contrast, a smaller development revenue of RM269.3 million has been budgeted this year, with a 34.8% decrease in transfers from the operating expenditure account to RM150 million in 2020.

Total expenditure for 2020 is also estimated to decrease by nearly 12%, from RM1.21 billion in 2019 to RM1.06 billion in 2020 (Table 5.1). The state government has allocated a smaller budget for development expenditure, which will account for about one quarter of the total state expenditure in 2020. Operating expenditure is also projected to decrease by 12% in 2020 and its share will remain at about 75%, signifying a constant emphasis on public development projects while enhancing public-private partnerships (PPP) in state projects.

Table 5.1 Penang state finance position, 2017–20

	RM million				% Change			
	2017	2018[e]	2019[e]	2020[e]	2017[e]	2018[e]	2019[e]	2020[e]
Operating revenue	757.01	503.76	505.50	519.16	-26.5	-33.5	0.3	2.7
Operating expenditure	705.85	1,252.30	901.19	792.66	-25.0	77.4	-28.0	-12.0
Operating balance	**51.16**	**-748.54**	**-395.69**	**-273.50**				
Development revenue	311.93	684.97	306.38	269.34	-1.7	119.6	-55.3	-12.1
Development expenditure	301.38	684.97	306.38	269.34	-2.0	127.3	-55.3	-12.1
Development balance	**10.55**	**0.00**	**0.00**	**0.00**				
Total revenue	1,068.94	1,188.74	811.88	788.50	-20.6	11.2	-31.7	-2.9
Total expenditure	1,007.23	1,937.28	1,207.57	1,062.00	-19.3	92.3	-37.7	-12.1
Overall balance	**61.71**	**-748.54**	**-395.69**	**-273.50**				

Note: [e] Estimated budget
Source: Penang State Financial Statement, 2017 and Penang State Budgets, 2018–2020.

Box 5.1 Penang2030: A family-focused green and smart state that inspires the nation

By Ong Wooi Leng

Penang2030 (2019) sets the direction of Penang's development in the next decade, taking into consideration sociological, political, economic, and cultural challenges that the people of Penang now face.

The four themes of Penang2030 are:

a. Increase liveability to enhance quality of life
b. Upgrade the economy to raise household income
c. Empower people to strengthen civic participation
d. Invest in the built environment to improve resilience

Each theme has four key overarching strategies that seek to achieve specific targets in the next 10 years. Figure 5.2 summarises the 4 key themes in Penang2030, followed by 16 strategic initiatives.

Figure 5.2 Penang2030: Overarching strategies

Source: Penang2030

Within each theme, a foundational project has been identified by the state government to achieve the targets set in Penang2030. These projects are as follows:

Theme A: Green Connectors and Sponge City

This project aims to link different components of urban green spaces to create a network that will benefit biodiversity. This involves a comprehensive green infrastructure plan that links coastal parks to pedestrian waterfronts, as well as urban river corridors to biodiverse rural-urban green spaces.

Theme B: SME Advancement

The government continues to offer SMEs interest-free loans (maximum of RM5,000) with a repayment tenure of two years. This policy aims to encourage business start-ups among low-income groups. The scheme, "Skim Pinjaman Harapan", is tailored to meet the needs of different categories of SMEs. Some of the loans can be scalable to low-interest loans or be accompanied by a matching grant of up to 50% of total investment required by qualified SMEs to invest in digitisation or automation.

Theme C: Happiness in Penang (HIP) Index

A happiness index for Penang has been developed to measure the social well-being of the people in Penang. It will help the state government monitor general happiness and satisfaction levels for programmes and policies developed under Penang2030. The HIP index consists of four pillars: freedom and governance (F), environmental sustainability (E), economic well-being (E), and liveability and social well-being (L), or FEEL. A public survey will be carried out to gather the sentiments of the people in Penang according to the indicators of these four pillars.

Theme D: Digital Penang

Penang Institute has assisted the state government in completing the Penang Digital Transformation Masterplan, with the aim of creating a "Digitally Enabled and Enabling Penang". The Digital Penang Corporation was established to act as a coordination unit on behalf of the state government to ensure that economic enablement through digital technologies is made possible in Penang. Five pillars of the theme are as follows:

1. Innovative society
2. Digitally friendly workforce
3. Digitally enabled businesses
4. Digitally enabling infrastructure
5. Digitally supported government

While public sector efforts are important to meet people's needs, the success of the plan depends just as much on having a set of core values shared by all stakeholders:

a. Involving as many levels of stakeholders as possible in pushing not only for economic and infrastructural advancement in Penang but also for cultural development
b. Coordinating projects and communicating positive chances and setbacks to the public
c. Upholding principles of good governance to inspire the nation

5.2 Revenue

State revenue consists of operating revenue and development revenue. According to the 2020 Penang state budget, a total of RM788.5 million is to be collected in 2020 (Table 5.2). Of this, operating revenue is estimated to constitute about two-thirds of the entire revenue collection, an increase of 3.5% from its estimated share in 2019. Development revenue, on the other hand, accounts for about one-third of total revenue.

Table 5.2 Breakdown of state government revenue, 2018–20

	RM million			% Change			% Share		
	2018e	2019e	2020e	2018e	2019e	2020e	2018e	2019e	2020e
Operating revenue	503.76	505.50	519.16	-33.5	0.3	2.7	42.4	62.3	65.8
Development revenue	684.97	306.38	269.34	119.6	-55.3	-12.1	57.6	37.7	34.2
Total revenue	**1,188.74**	**811.88**	**788.50**	**11.2**	**-31.7**	**-2.9**	**100.0**	**100.0**	**100.0**

Note: e Estimated budget
Source: Penang State Budgets, 2018–2020.

The total estimated revenue collected in 2020 is to drop by nearly 3% compared with the total estimated revenue collected in 2019 of RM811.9 million. The decline is primarily attributed to a decrease in development revenue—where the state will experience an estimated decline of about 12%—to be used for development expenses. The decrease in development revenue is due to a smaller amount of funds estimated to be disbursed by the operating expenditure account. Meanwhile, there will be a slight increase in total operating revenue of 2.7% from an estimated RM505.5 million in revenue recorded in 2019.

Operating revenue

The state government shares similar broad categories of operating revenue with the federal government: tax revenue, non-tax revenue, and non-revenue receipt. However, sources of revenue under state jurisdictions are different.

Non-tax revenue will continue to take the lion's share of total operating revenue collection in Penang (51.2%), and will be the main source of state government revenue. This will be followed by tax revenue (32.8%) and non-revenue receipt (16.0%). The state anticipates a larger non-tax revenue in 2020, with an increase of 2.7% from RM258.8 million in 2019 (Table 5.3). Service payment receipts will constitute the largest share of non-tax revenue collection (35.4%), followed by receipts of goods sold (29.1%) and investment income (22.1%). Compared with 2017, receipts from goods sold will no longer be the top non-tax revenue item collected in the state. While services payments—which partly comprise land application fee (2020e: RM38.4 million; +15.0%) and registration fee for land transfer (2020e: RM37.9 million; +6.2%)—are projected to increase by 7.8% to RM94.2 million, the state is expected to see a decline of 7.4% in fines and penalties to about RM7 million. This is because fines and confiscations by the Land and Mines Office are expected to significantly decrease.

Within service payments, land application fee and registration fee for land transfer will account for about 40% each. Receipts of goods sold, on the other hand, will primarily be made up of issuance of land title (54% or RM42 million). Investment income is to be the third-largest component of non-tax revenue, with a bulk its income to come from interest earned through fixed deposits. The main contributor to rental receipts will be rental of government quarters and buildings, which will constitute about RM4.4 million in 2020. With regards to licenses and permits, brick removal permits (RM3.5 million) and recreational licenses such as liquor stores (RM1.9 million), cinemas (RM1.6 million), and short stays (RM1.55 million) are expected to be key sources of revenue.

Table 5.3 State government operating revenue, 2018–20

	RM million			% Change			% Share		
	2018[e]	2019[e]	2020[e]	2018[e]	2019[e]	2020[e]	2018[e]	2019[e]	2020[e]
Tax revenue	**134.77**	**148.74**	**170.13**	**-0.6**	**10.4**	**14.4**	**26.8**	**29.4**	**32.8**
Direct tax	118.77	132.74	153.13	0.3	11.8	15.4	23.6	26.3	29.5
Indirect tax	16.00	16.00	17.00	-6.7	0.0	6.3	3.2	3.2	3.3
Non-tax revenue	**273.64**	**258.83**	**265.81**	**-19.8**	**-5.4**	**2.7**	**54.3**	**51.2**	**51.2**
Licenses and permits	14.35	11.10	11.03	7.6	-22.6	-0.6	2.8	2.2	2.1
Service payments	80.99	87.39	94.22	-15.1	7.9	7.8	16.1	17.3	18.1
Receipts from goods sold	103.63	77.35	77.42	-22.0	-25.4	0.1	20.6	15.3	14.9
Rentals	7.08	16.75	17.42	-58.2	136.6	4.0	1.4	3.3	3.4
Investment income	60.35	58.58	58.62	-20.4	-2.9	0.1	12.0	11.6	11.3
Fines and penalties	7.25	7.66	7.09	14.3	5.7	-7.4	1.4	1.5	1.4
Local contributions1	0.01	0.01	0.01	-97.1	42.5	0.0	0.0	0.0	0.0
Non-revenue receipts	**95.35**	**97.93**	**83.22**	**-66.0**	**2.7**	**-15.0**	**18.9**	**19.4**	**16.0**
Returned expenditure	0.34	0.93	0.13	-99.0	173.5	-86.0	0.1	0.2	0.0
Receipt from federal government agencies	95.01	97.01	83.09	-61.5	2.1	-14.3	18.9	19.2	16.0
Total operating revenue	**503.76**	**505.50**	**519.16**	**-33.5**	**0.3**	**2.7**	**100.0**	**100.0**	**100.0**

Note: [e] Estimated budget
1 Includes donations from firms, voluntary organisations, and individuals
Source: Penang State Budgets, 2018–2020.

Tax revenue collection will continue to be the second-largest source of state revenue. With an estimated growth of 14.4%, its share is estimated to increase by 3.4% in 2020 to about one-third of total operating revenue (Table 5.3). The increase in tax revenue will primarily be due to the introduction of parcel rent[60] in January 2020. This parcel rent will add an extra RM14.5 million on top of the existing quit rent. As a result, direct tax is expected to grow by 15.4%. At the same time, indirect tax is to increase by 6.3%, with entertainment levies contributing RM17 million; both are expected to grow at a faster rate than in 2019. Quit rent will remain the main source of tax revenue for the state, accounting for about two-thirds of total tax revenue or RM114.2 million in 2020.

The final component of state operating revenue is non-revenue receipts, which make up two sub-components: returned receipts from expenditure account and receipts from federal government agencies. The collection of non-revenue receipts is expected to decrease by 15% to RM83.2 million in 2020 (Table 5.3). Receipts from federal government agencies make up the largest share of non-revenue receipts, where the amount will have decreased from RM97 million in 2019 to RM83 million in 2020. This is attributed to a lower amount of estimated revenue to be received from the federal government in the form of payments from federal projects implemented in the state and grants for increased revenue generated in the previous year.

Development revenue

Development revenue is collected from two main sources: state and federal grants. In 2020, Penang is estimated to collect a total of RM269.3 million for development revenue, a decrease of 12.1% compared with RM306.4 million estimated in 2019 (Table 5.4). The state will remain the main source of

[60] Parcel rent was introduced in 1 January 2020, and it is only applicable to property owners who have separate strata titles. This means that owners of flats, apartments, condominiums, commercial units, and small offices/home offices (SOHOs) will have to pay directly to the land office. This replaces the quit rent that property owners used to pay through their respective management corporations and joint management bodies (JMB). The parcel rent takes into account the floor area or size of the main parcel of a strata building.

income for development projects, representing 95% of the total development income. It will be followed by federal grants, consistently set at RM13.5 million per year since 2012, with a slight decrease of 0.1% in 2020. As seen in Figure 5.3, a large share of the state's development projects has been supported by state resources since 2008.

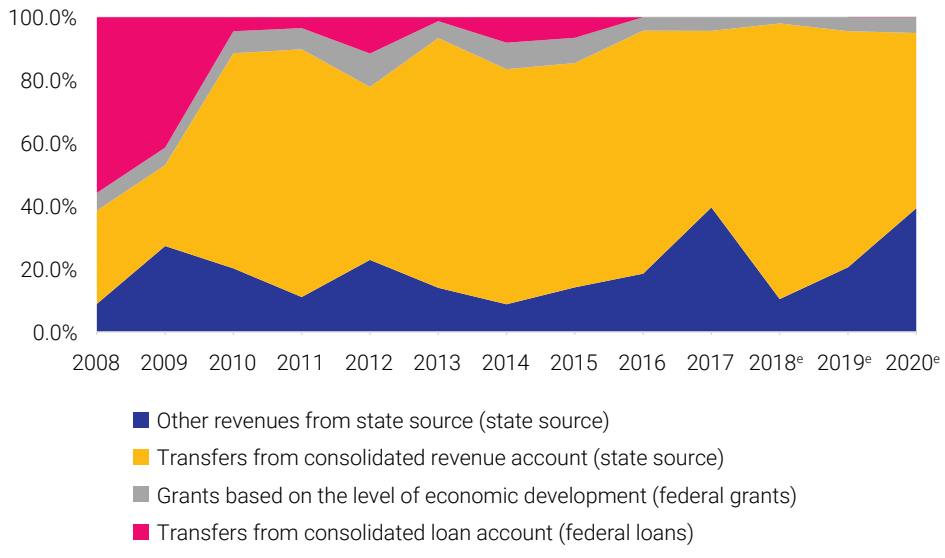
Within the state, over half of the state's development revenue will be from funds transferred from operating revenue (58.6%), followed by loan recoveries from MPSP, Penang Water Supply Corporation (PBAPP) and Penang Development Corporation (PDC) (31.4%), raw water fees (3.6%), and sale/rent-to-own low-cost houses (1.0%). In addition, about 5% of total development income is expected to be brought forward from the 2019 development budget (RM13.8 million). Penang does not plan to borrow money from the federal government in 2020.

Table 5.4 Sources of development revenue, 2018–20

	RM million			% Change			% Share		
	2018e	2019e	2020e	2018e	2019e	2020e	2018e	2019e	2020e
Federal source	**13.52**	**13.52**	**13.50**	**0.0**	**0.0**	**-0.1**	**2.0**	**4.4**	**5.0**
Federal loans	0.00	0.00	0.00	-	-	-	0.0	0.0	0.0
Federal grants based on economic development, infrastructure, and security of life stage	13.52	13.52	13.50	0.0	0.0	-0.1	2.0	4.4	5.0
State source	**671.46**	**292.86**	**255.84**	**125.0**	**-56.4**	**-12.6**	**98.0**	**95.6**	**95.0**
Transfers from consolidated revenue account/operating revenue	600.00	230.00	150.00	242.9	-61.7	-34.8	87.6	75.1	55.7
Sale/rent-to-own low-cost houses	2.50	2.50	2.50	-23.6	0.0	0.0	0.4	0.8	0.9
Loan recoveries (PBAPP, MPSP, PDC)	10.06	18.28	80.28	-89.3	81.6	339.2	1.5	6.0	29.8
Raw water fee	20.00	9.33	9.29	-22.9	-53.4	-0.4	2.9	3.0	3.4
Balance from consolidated development fund	38.90	32.75	13.77	-	-15.8	-57.9	5.7	10.7	5.1
Total development revenue	**684.97**	**306.38**	**269.34**	**119.6**	**-55.3**	**-12.1**	**100.0**	**100.0**	**100.0**

Note: e Estimated budget
Source: Penang State Budgets, 2018–2020.

Figure 5.3 Share of the sources of development revenue, 2008–2020e



Note: e Estimated budget
Source: Penang State Financial Statements, 2008–17 and Penang State Budgets, 2018–2020.

5.3 Expenditure

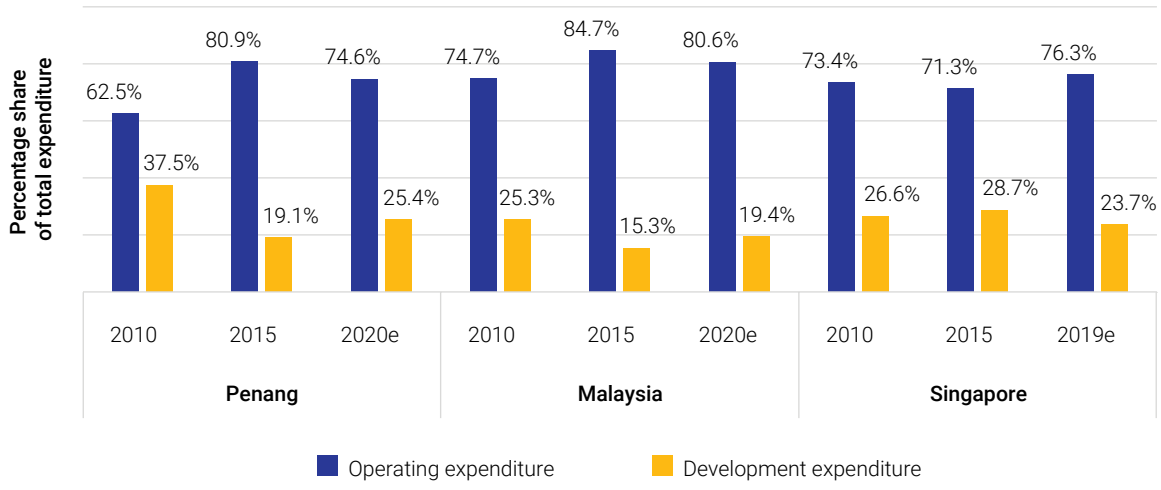
The state's expenditure can be divided into operating expenditure and development expenditure. Operating expenditure will continue to take up the largest share of the state's expenditure in 2020, accounting for about three-quarters. The remainder will be spent on development projects—maintaining the same proportions as in 2019. The state government is expecting a smaller outflow of funds in 2020, with both operating and development expenditures to decrease by 12% each (Table 5.5).

Table 5.5 Breakdown of state expenditure, 2018–20

	RM million			% Change			% Share		
	2018e	2019e	2020e	2018e	2019e	2020e	2018e	2019e	2020e
Operating expenditure (A)	1,252.30	901.19	792.66	77.4	-28.0	-12.0	64.6	74.6	74.6
Development expenditure (B)	684.97	306.38	269.34	127.3	-55.3	-12.1	35.4	25.4	25.4
Total expenditure	**1,937.28**	**1,207.57**	**1,062.00**	**92.3**	**-37.7**	**-12.1**	**100.0**	**100.0**	**100.0**
Contribution to development funds (C)	600.00	230.00	150.00	242.9	-61.7	34.8	47.9	25.5	18.9
Operating expenditure (exclude the contribution to development funds) (D) = (A)-(C)	652.30	671.19	642.66	22.9	2.9	-4.2	48.8	68.7	70.5
Total expenditure (exclude contribution to development funds) (B) + (D)	**1,337.28**	**977.57**	**912.00**	**60.7**	**-26.9**	**-6.7**	**100.0**	**100.0**	**100.0**

Note: e Estimated budget
Source: Penang State Budgets, 2018–2020.

Figure 5.4 Percentage share of operating and development expenditures in Penang, Malaysia, and Singapore



Note: e Estimated budget
Source: Penang State Financial Statements, 2010 and 2015; Penang State Budget 2020; Malaysia's Ministry of Economic Affairs and Ministry of Finance Malaysia; Singapore Budget 2019; and Singapore Department of Statistics.

As mentioned in the previous section, a fraction of the operating expenditure is essentially being transferred to the development account as income for state-development-related expenses. This amount is estimated to be smaller than in previous years, accounting for about RM150 million in 2020, down by about 35% compared with RM230 million in 2019 (Table 5.5). This has caused actual operating expenditure to reach RM642.7 million in

2020, 4.2% lower than the actual operating expenditure in 2019 (RM671.2 million). The state's contribution to the state development account will decrease after taking into account the loan repayments to be made by PDC and PBAPP to the state government in 2020 (Tan, 2019).

It is important to note that the Penang state government continues to stress socio-economic and environmental development projects. The composition of state allocation resembles the structure of government expenditure in Singapore, where at least 20% of total expenses are spent on development activities (Figure 5.4). In the federal fiscal budget, the federal government allocated 19.4% of the budget to development projects in 2020.

The Penang state government also engages in public-private partnerships for infrastructure development projects. For example, to ensure smooth traffic flow, the state government collaborated with the private sector to execute strategies recommended in the RM46 billion Penang Transport Master Plan (PTMP). This project includes building two light rail transits LRTs, a third link to the mainland, a bus rapid transit (BRT), a monorail, and three paired highways (Penang State Government, 2019). The private sector will finance some of the projects through the land reclamation of three man-made islands in the southern region of the Penang Island through the Penang South Reclamation (PSR) scheme (Mohamed, 2019). The state government is also hoping that the federal government will take the PTMP into account in its allocation for transportation projects in the 12th Malaysia Plan (12MP), to be released this year.

Operating expenditure

Operating expenditure is a composition of emoluments, supplies and services, asset acquisition, and fixed contributions (excludes contributions to the development account). In 2020, the state government is estimated to experience a 4.2% decline in the operating budget. This is owing to an expected 12.7% decrease in fixed contributions and a 12.2% decrease in asset acquisition (Table 5.6). The fixed contributions will continue to take up the largest share of operating expenditure (42%), to be followed by emoluments (28.3%), supplies and services (28.2%), asset acquisitions (0.7%), and other expenditures (0.7%).

Fixed contributions will decline in 2020, primarily because of a projected decline of 26.3% in domestic contributions disbursed by the State Finance Office. This disbursement is estimated to decrease from RM457 million in 2019 to RM337 million in 2020—the largest component in fixed contribution—before subtracting transfers to the development account (RM150 million). State grants from the Chief Minister's Office and the State Secretary's Office will make up the second-largest component in fixed contributions. These will include contributions made to the state library, state museum, state sports council, scholarships, and study aids, which will amount to about RM44.3 million—an increase of 1.4% from RM43.7 million in 2019. The third-largest component of fixed contributions will consist of fixed payments disbursed by the State Welfare Department to communities in need of social welfare. The department consistently spends RM8 million every year in this area.

Table 5.6 Operating expenditure, 2018–20

	RM million			% Change			% Share		
	2018[e]	2019[e]	2020[e]	2018[e]	2019[e]	2020[e]	2018[e]	2019[e]	2020[e]
Emoluments	176.96	179.01	181.62	8.2	1.2	1.5	27.1	26.7	28.3
Supplies and services	158.54	172.13	181.20	13.0	8.6	5.3	24.3	25.6	28.2
Asset acquisition	8.60	4.84	4.25	10.7	-43.7	-12.2	1.3	0.7	0.7
Fixed contributions and charges/payments (excludes contributions to development funds)	302.01	310.97	271.36	39.8	3.0	-12.7	46.3	46.3	42.2
Other expenditures	6.19	4.23	4.23	93.4	-31.7	0.0	0.9	0.6	0.7
Total operating expenditure	**652.30**	**671.18**	**642.66**	**22.9**	**2.9**	**-4.2**	**100.0**	**100.0**	**100.0**

Note: [e] Estimated budget
Source: Penang State Budgets, 2018–2020.

Emoluments will continue to be the second-largest component in operating expenditure in 2020. The state government recorded smaller growth in emoluments in the past two years. In 2018, the state was estimated to have a growth rate of 8.2% in emoluments, which then dropped to 1.2% in 2019. The state attempts to hold emoluments more or less constant, with not more than a 2% increase each year. The Chief Minister's Office and the State Secretary's Office will record the highest share of emoluments, registering at RM45.4 million in 2020—about a quarter of the state's total emoluments. The Public Works Department will have the second-largest share of the state's emoluments (2020: RM17.9 million; 16.6%), followed by Department of Irrigation and Drainage (2020: RM17.9 million; 9.9%).

Most state departments are expected to expand in emoluments of not more than 4% in 2020 except the State Mufti Department, where its emoluments are to be expanded by 6.2% from RM1.6 million in 2019. Meanwhile, the Public Works Department, State Islamic Affairs Department, and the State Finance Office are to experience decreases of 0.05%, 4.1%, and 0.08%, respectively, in emoluments in 2020.

Supplies and services are estimated to stand at RM171.1 million in 2019[61] (Table 5.6). This segment is forecast to experience slower growth in 2020—5.3% compared with 8.6% and 13% in previous years. Out of RM181.2 million, the expected figure for 2020, the Chief Minister's Office and State Secretary's Office will take up the largest share of supplies and services (47.2%), with the Management Services Division to hold the biggest stake (RM46.7 million), followed by the State Information and Communication Technology Division (RM14.2 million) and the State Economic Planning Division (RM3.9 million). Professional services and hospitality, rentals, minor maintenance and repairs, and communications and utilities are estimated to be the biggest expenses in the State Chief Minister's Office and State Secretary's Office. Meanwhile, the State Finance Department and the Department of Irrigation and Drainage are expected to take up the second and third-largest shares of total supplies and services in 2020 at 18.9% and 13.1%, respectively.

While other expenditure is projected to be unchanged, expenditure on asset acquisition is expected to decrease by 12.2% in 2020. Each constitutes about 0.7% of the state's total operating expenditure.

Development expenditure

The development budget is allocated based on the projects approved by the respective department in the state.

In 2018, the Chief Minister's Office and the State Secretary's Office had the largest expenditure, totalling RM300.4 million or about 63% of the overall development expenditure (Table 5.7). This allocation is expected to decrease by 77.8% in 2019 and then by a further 20.5% in 2020. Most of this expenditure is allocated to development activities for Penang Hill, special economic projects, low-cost housing projects, land acquisitions, and state quarters.

While land acquisition, low-cost housing plans, purchase of office equipment for KOMTAR offices, and heritage development will see smaller budgets in 2020, the drastic drop is because the state government loaned RM225 million to PDC and will also allocate RM20.7 million to water supply projects. As a result, the share of development expenditure held by the Chief Minister's Office and the State Secretary's Office has declined to 21.8% and 19.7% in 2019 and 2020, respectively.

Meanwhile, RM306.4 million and RM269.3 million were budgeted for development expenditure in 2019 and 2020, respectively. The State Finance Office is estimated to be responsible for the largest proportion of the expenditure in 2019 and 2020, representing more than 55% of the overall development expenditure. The expenditure of this department is to increase by 48.5% to RM180 million in 2019, but will decline by 15.4% to RM152.4 million in 2020 (Table 5.7). Development projects or special projects undertaken by state authorities are expected to be the major contributors to development expenditure in this department, with a decrease of 17.4% forecast for 2020 (Table 5.8).

[61] This includes payments made to professional services, travelling and lodging, communication and utility, rentals, and others (Penang Institute, 2019).

Table 5.7 Development expenditure by state department, 2018–20

State department	RM million			% Change			% Share		
	2018	2019e	2020e	2018	2019e	2020e	2018	2019e	2020e
Chief Minister's Office and State Secretary's Office	300.42	66.82	53.11	77.1	-77.8	-20.5	63.4	21.8	19.7
Irrigation and Drainage	12.11	15.27	17.53	-14.5	26.1	14.8	2.6	5.0	6.5
Forestry	1.92	2.02	2.06	6.4	5.2	2.0	0.4	0.7	0.8
Penang Botanical Gardens	0.78	0.74	1.15	154.6	-5.7	54.9	0.2	0.2	0.4
Public Works	19.37	24.00	24.13	2.9	23.9	0.5	4.1	7.8	9.0
Religious Affairs	12.08	11.20	11.09	42.0	-7.3	-1.0	2.5	3.7	4.1
Finance	121.24	180.00	152.35	48.0	48.5	-15.4	25.6	58.8	56.6
Veterinary Services	2.96	2.96	2.98	2.3	0.2	0.7	0.6	1.0	1.1
Agriculture	3.33	3.37	4.94	-1.3	1.3	46.6	0.7	1.1	1.8
Total development expenditure	**474.20**	**306.38**	**269.34**	**57.3**	**-35.4**	**-12.1**	**100**	**100**	**100**

Note: e Estimated budget
Source: Penang State Budgets, 2020.

Table 5.8 Development expenditure by top four state development and selected development projects, 2018–20

	RM million			% Change		% Share		
	2018	2019e	2020e	2019e	2020e	2018	2019e	2020e
State Finance	**121.24**	**180.00**	**152.35**	**48.5**	**-15.4**	**25.6**	**58.8**	**56.6**
Development projects/special projects by state authorities	104.11	161.50	133.35	55.1	-17.4	22.0	52.7	49.5
Special projects and training	9.45	9.50	10.00	0.5	5.3	2.0	3.1	3.7
Community development	7.67	9.00	9.00	17.3	0.0	1.6	2.9	3.3
Chief Minister's Office and State Secretariat Office	**300.42**	**66.82**	**53.11**	**-77.8**	**-20.5**	**63.4**	**21.8**	**19.7**
Penang Hill development	12.08	20.48	15.39	69.6	-24.9	2.5	6.7	5.7
Special economic projects	7.08	12.00	9.85	69.4	-17.9	1.5	3.9	3.7
Low-cost houses	11.81	8.38	8.59	-29.0	2.5	2.5	2.7	3.2
Land acquisition	15.16	10.00	5.00	-34.1	-50.0	3.2	3.3	1.9
State quarters	1.88	3.38	3.78	79.9	11.8	0.4	1.1	1.4
Sports development	0.73	0.92	2.05	26.8	122.5	0.2	0.3	0.8
K-ICT and e-government development	1.14	2.18	2.07	91.5	-4.6	0.2	0.7	0.8
Public Works	**19.37**	**24.00**	**24.13**	**23.9**	**0.5**	**4.1**	**7.8**	**9.0**
Repair of bridges and state roads	8.87	7.30	9.91	-17.7	35.7	1.9	2.4	3.7
State roads	4.76	7.34	7.21	54.1	-1.7	1.0	2.4	2.7
Repair and redesign state buildings	3.75	6.96	6.13	85.7	-11.9	0.8	2.3	2.3

Note: e Estimated budget
Source: Penang State Budget, 2020.

The Penang Botanical Gardens and the Department of Agriculture are expected to incur larger expenses in 2020, with an increase of about 55% and 47%, respectively. Both will take up only 2.2% of the entire development expenditure (Table 5.7). A larger budget has been channelled towards the Penang Botanical Gardens for upgrading and repairing buildings/complexes/quarters. This is an increase of approximately 44%, from RM160,000 in 2019 to RM230,000 in 2020. For the Department of Agriculture, while most of its projects have the same allocation as in 2019, construction of an agriculture office in Seberang Perai Tengah is expected to cause a substantial increase in costs, from RM50,000 in 2019 to RM1.8 million in 2020.

5.4 Prospects for 2020

The budget deficit is expected to decrease by 31% to RM273.5 million in 2020 because total expenditure—operating and development expenditure—will decline at a faster rate than total revenue. However, based on past history, the state has been able to safeguard a surplus at the end of each financial year without affecting its development efforts.

As stated by The Right Honourable Chief Minister (YAB) Mr Chow Kon Yeow in his Budget speech, a lower projected development budget will not affect the development projects planned for 2020, and he encouraged more funding from the federal government and more corporate social responsibility (CSR) programmes from the private sector (Tan, 2019).

To achieve Penang2030, the state government will strengthen existing development policies and initiatives that are in line with the state's vision. According to the State Budget 2020 released on 1 November 2019, the state will allocate RM250,000 each year for a period of five years to promote the Cigarette Smoke-Free Penang (Penbar) programme, with no-smoking zones to be widened to include all districts in 2020. In addition, under the Mammo Penang programme, some RM886,000 has been allocated for free mammogram screenings in collaboration with the National Population and Family Development Board (LPPKN).

Furthermore, the government is apportioning RM50 million for welfare programmes under iSejahtera. Chow also announced that cash aid for senior citizens will be increased to RM150 annually and will benefit 178,000 senior citizens in the state. Similarly, all registered disabled persons will also receive a cash aid of additional RM50 to RM150 annually in 2020. Three stimulus packages have been made available for the COVID-19 pandemic, which are detailed in Box 5.2.

Human capital development remains the key focus of the state government. The German Dual Vocational Training (GDVT) programme will continue to be supported through subsidies. The state government is also working closely with the federal government through the Northern Corridor Implementation Authority (NCIA), Malaysian Investment Development Authority (MIDA), and Career Assistance and Talent (CAT) Centre to provide education enhancement programmes to the B40 group. The state government has set aside RM1.2 million to invest in training courses for civil servants.

Although education is under the jurisdiction of the federal government, the state government is committed to maintaining education facilities in Penang through financial support. Roughly RM12 million is to be disbursed to private, Chinese, Tamil, missionary, and religious schools in 2020. RM5 million is to aid government schools, while about RM4 million, in the form of financial aid, will be given to Penang-born students enrolled in public and private institutions of higher learning, as well as those in polytechnics.

Strengthening the state's digital infrastructure by 2030 has become the key action agenda for the state government. With a budget of RM2.1 million, the Digital Penang Corporation was established to facilitate the implementation of digital projects. It is to act as an advisory body on the direction of the state's digital development and to develop the Digital Transformation Plan for Penang. Establishing 5G network architecture and Smart Trade Facilitation Platform—an avenue made for SMEs to market their products globally—are among the action plans currently being undertaken.

Box 5.2 COVID-19: Penang's economic stimulus packages

By Yap Jo-yee

Since the COVID-19 pandemic emerged in March 2020, the Penang state government rolled out two economic stimulus packages totalling RM148.5 million; this is approximately 0.16% of the state's GDP. The first Penang Aid Package (Pakej Bantuan Rakyat Pulau Pinang or PEKA) 1.0 was announced on 17 March 2020 amounted to RM73 million (Penang Lawan COVID-19, 2020). Following the Movement Control Order (MCO), the state government unveiled a second stimulus package, PEKA Penang 2.0, on 6 May at RM76 million.

To combat the adverse economic effects of COVID-19, temporary and immediate aids need to be channelled towards low-income groups, those in precarious employment, and SMEs. Therefore, the economic stimulus packages are to provide relief to vulnerable groups, maintain worker productivity, and enable business continuity.

Penang's fiscal stimulus plan is a combination of the following:

a) Direct injections such as one-off cash handouts and funding
b) Cost-saving initiatives like rent waivers and moratoriums
c) Loan funding

As seen in Table 5.9, direct cash injections made up 38% (RM56.6 million) of the RM148.5 million stimulus packages. Waivers, rebates, and loans constituted the remaining 62% (RM91.9 million).

Table 5.9 Penang's economic stimulus package disaggregated into direct injections and waivers/rebates/loans

	Direct injections		Waivers/rebate/loans		Total
	RM million	% share	RM million	% share	
PEKA Penang 1.0	40.23	55.3%	32.54	44.7%	72.77
PEKA Penang 2.0	16.41	21.7%	59.36	78.3%	75.77
Subtotal	**56.63**	**38.1%**	**91.91**	**61.9%**	**148.54**

Source: Penang Institute estimates based on Penang Lawan COVID-19 data.

The state government was able to build up savings by running fiscal surpluses between 2011 and 2017. Should the trend continue in 2018 and 2019 (the latest financial statements only reflect budgets), it is likely that the state will be able to fund the fiscal stimulus packages entirely with its savings. This would lessen the need to implement austerity measures in the coming years.

Fortunately, dependence on federal funding is low. While the state's future revenues are expected to fall, reduced funding from the federal government due to worsening national finances poses a minor risk.

PEKA Penang 1.0

The effects of the MCO on businesses and individuals emerged in stages. The most immediate impact was seen in tourism-related businesses such as hotels, food and beverage, retail trade, and travel agencies, as well as SMEs in the services and manufacturing sectors.

As movement all but ceased, revenues in the tourism industry nosedived towards zero; so did revenues of hawkers and stall owners. SMEs that were not allowed to operate during the MCO found themselves

without clients, but still burdened with high overhead and payroll costs. Those in informal or precarious employment were also the first to experience job losses, disproportionately affecting households in the B40 income bracket. This led state policymakers to prioritise SME owners, workers from the B40 income group, and those in the tourism industry.

One-off cash handouts of RM500 were given to hawkers and stall owners, travel bus operators, taxi drivers, trishaw riders, e-hailing app drivers, and those on welfare support. The initiative benefitted a total of 46,602 individuals. Those living in state housing units further benefitted from rent waivers for April and May. The state government also provided the state legislative assembly with emergency funding to cover groups or individuals in need of urgent support. The state provided support to SMEs in the form of interest-free loans, to be repaid within 30 months through Penang Development Corporation (PDC)'s SME (Pinjaman Kelangsungan Perniagaan) PEKA scheme. RM30 million was allocated for this purpose.

As shown in Table 5.10, the initial fiscal stimulus plan heavily emphasised SME loans and cash handouts as immediate relief measures. Almost 83% of the package was devoted to these initiatives.

Table 5.10 Summary of fiscal stimulus packages

	PEKA 1.0		PEKA 2.0	
	Value (RM mil)	Share (%)	Value (RM mil)	Share (%)
Direct injections	**40.23**	**55.3%**	**16.41**	**21.7%**
Handouts	30.23	41.5%	16.06	21.2%
PPE supplies	10.00	13.7%	-	-
Donations in-kind	-	-	0.05	0.1%
Funding	-	-	0.30	0.4%
Waivers/rebates/loans	**32.54**	**44.7%**	**59.36**	**78.3%**
Rent waivers	2.54	3.5%	2.06	2.7%
Rebate	-	-	47.30	62.4%
Loans	30.00	41.2%	10.00	13.2%
Total	72.77	100%	75.77	100%

Source: Penang Institute estimates based on Penang Lawan COVID-19 data.

PEKA Penang 2.0

As Malaysia entered the fourth phase of the MCO on 29 April 2020, the initial measures needed to be expanded and prolonged to address the emerging wider socioeconomic effects. The large, sustained drop in overall demand, caused by an extended lockdown and reductions in disposable income, was beginning to show repercussions in all sectors. The declining private sector economic conditions also led to protests against an assessment rate hike scheduled for this year. At the same time, reports of domestic abuse were rising.

Compared with the first stimulus package which focused solely on providing immediate relief, the second included rehabilitation and development initiatives. The tourism sector remained at the top of the agenda. The bulk of the stimulus package still comprised relief efforts. These continued through one-off cash handouts and extended rent waivers to a broader segment of workers and employers in need, as well as a reversal in the assessment rate hike decision. Additional loan funding of RM10,000 was provided to the tourism sector.

In terms of socioeconomic rehabilitation and development, the state increased fishermen's productivity by providing them with fishing equipment and allocated RM100,000 towards tackling domestic violence. Moreover, given the importance of sustaining the tourism sector, and recognizing the need for increased technology adoption, the state government also budgeted RM200,000 to develop Penang's arts and culture scene on digital platforms.

PEKA Penang 2.0 was formed to support the economy through savings rather than direct injections. Cash handouts took up a much smaller proportion compared with PEKA Penang 1.0 at 21% versus 42%. Cost-savings from the assessment tax rebate, valued at RM47.3 million, made up the lion's share of the package (62%) (Table 5.10).

After the pandemic

The fiscal stimulus packages were timely and necessary to safeguard the welfare of Penangites and to prevent a worse economic downturn. Apart from delivering immediate relief, the initiatives have the benefit of shaping future policies for the better.

The public-private partnership to create a digital platform for the arts and culture sector is one example. Long after the initiative has played its role to boost tourism in Penang, it will continue to be a catalyst for greater technology uptake among businesses and within the state government, and will help the tourism industry develop resilience against future crises.

In a similar vein, funding from PEKA Penang 2.0 to tackle domestic violence will build institutions and heighten awareness of the issue. In the long run, these pave the way for better processes to aid victims and lower societal tolerance for domestic abuse.

However, the increase in loans will have implications for economic stability and growth in the coming years.

Weighed down by debt, businesses will find themselves with less room to mitigate adverse impacts in the future. Moreover, constrained consumer spending and a shrunken export sector mean that demand will be sluggish for the second half of 2020 and possibly the first half of 2021 as well. In the face of a prolonged economic downturn, businesses may struggle to repay or service loans with constraining repayment terms, leading to a rise in default rates.

Even if businesses avoid defaulting, repaying these loans will be a drag on innovation and productivity. With a large portion of profits put into loan repayments, businesses will be constrained in their ability to reinvest to increase productive capacity or efficiency.

On a whole, the COVID-19 pandemic has created a harsh landscape for economic growth in the coming quarters because of both the immediate recession and its indirect effects on debt levels. Worker and business agility will counter some of these headwinds, however. Thus, once relief measures are over, socioeconomic recovery will depend on measures that aim to rehabilitate and develop, and these must come from both the public and private sectors.

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