

CITIES, PEOPLE & THE ECONOMY

A STUDY ON POSITIONING PENANG

Homi Kharas, Albert Zeufack & Hamdan Majeed



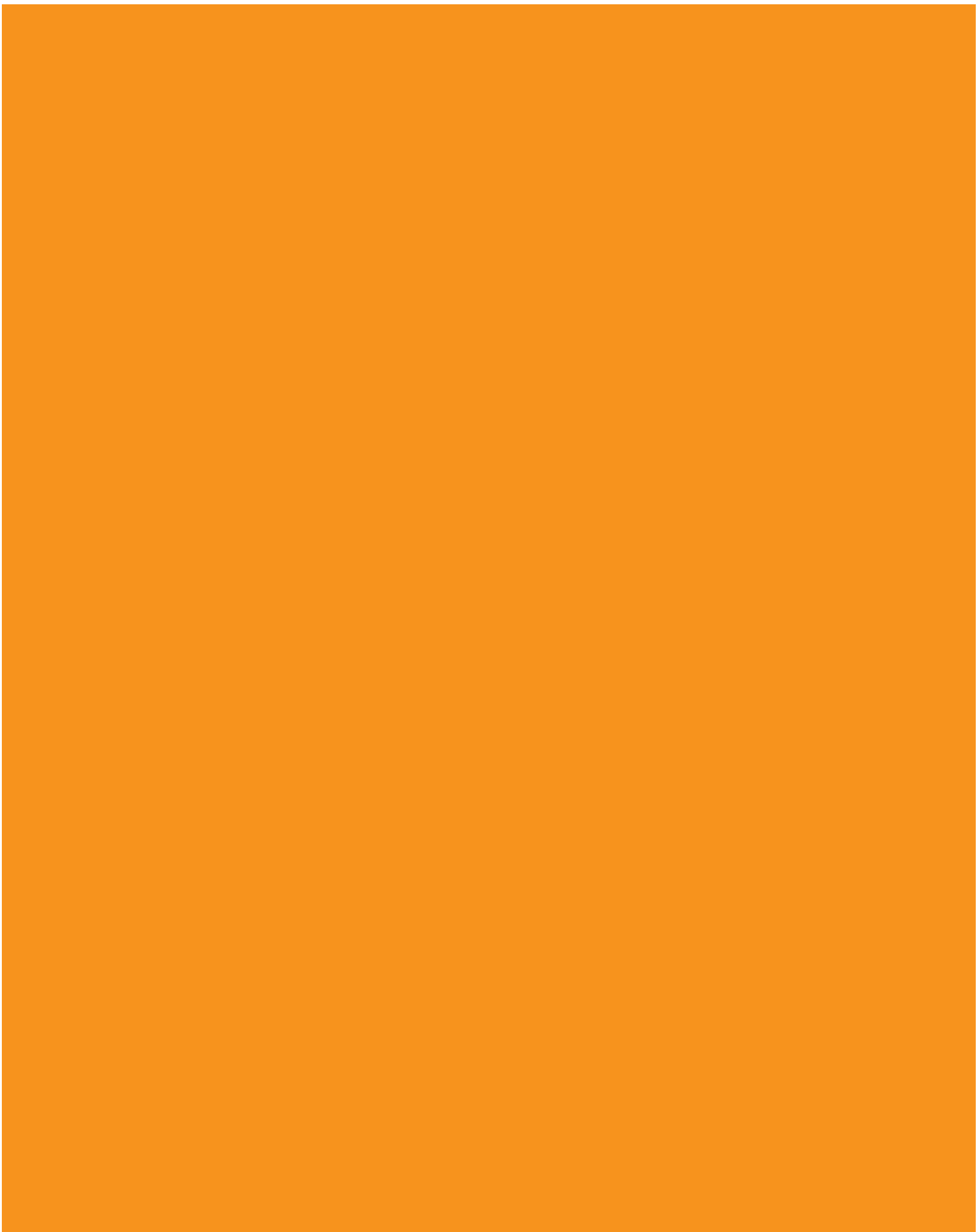
A collaborative research between



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Contents

Foreword / v

1 Rising in rhythm: Penang's cities, people and economy / page 1

- Cycles of development
- Restoring lustre to the "Pearl of the Orient"
- Growing, retaining and attracting talent
- Reinventing economic opportunity
- Looking forward

2 New opportunities and pitfalls in the global economy / page 9

- Global recession of 2009
- Emergence of East Asia, China and regional economics
- Avoiding the middle-income trap
- Doing different things and doing things differently: Strategic planning in Penang
- The Northern Corridor Economic Region

3 Penang's economy / page 21

- Macroeconomic overview
- Penang facing serious structural constraints
- Moving up the value chain
 - Agriculture
 - Manufacturing & services
- Specialisation and economies of scale: Six focus areas to drive growth

4 Penang's space / page 49

- Penang as a hub
- Penang as a secondary city in Malaysia
- Improving George Town's liveability
- George Town as a World Heritage Site

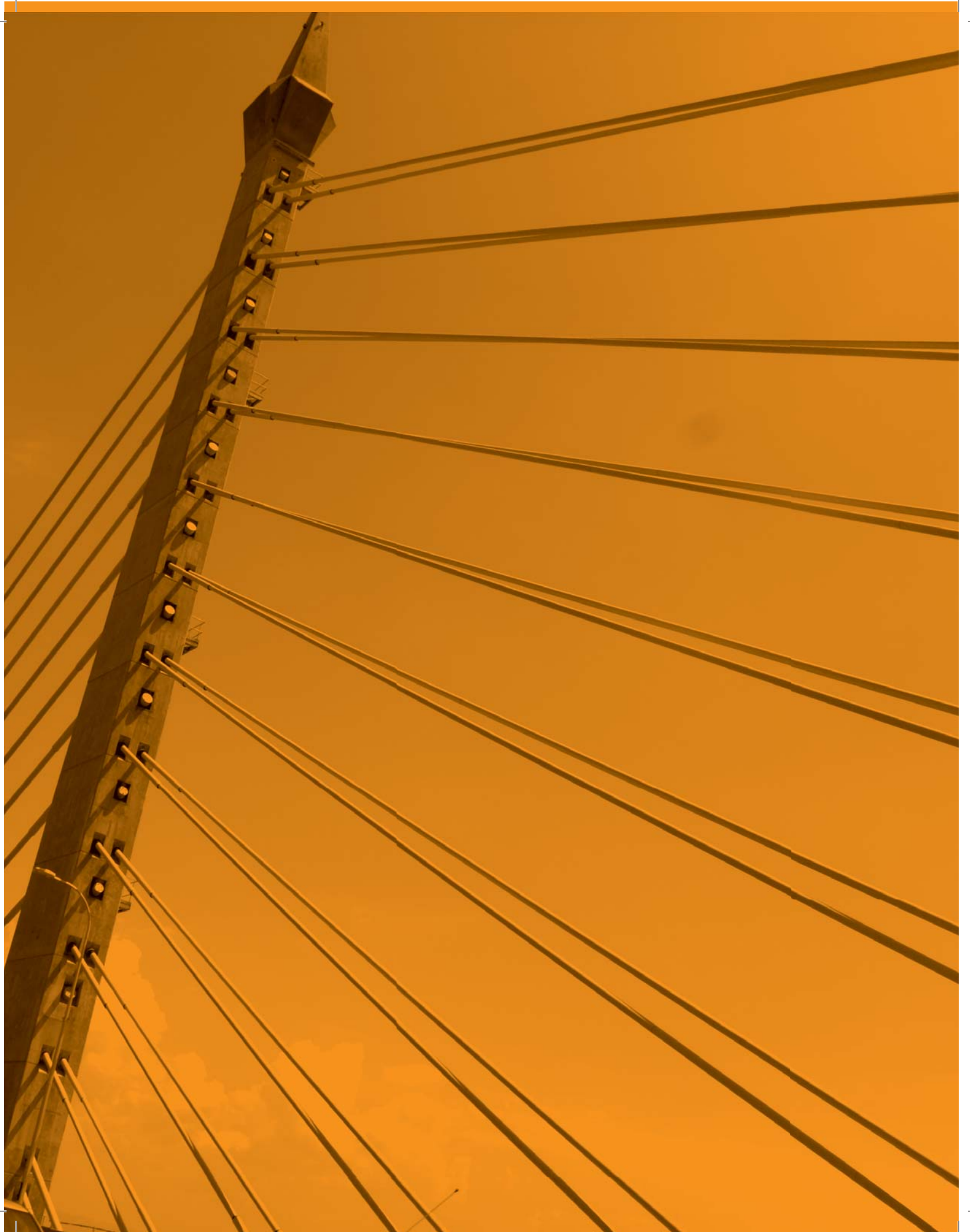
5 Penang's people / page 65

- Providing better livelihoods
- Growing, attracting and retaining talent
- A location of choice
- Continued excellence in education
- Leveraging the diaspora

6 Levers of change / page 77

- Strategic development thrusts
- Lighting the fuse: Policy and institutional reform
- Catalytic grants and investments for change
- Monitoring, data and key performance indicators
- New mindsets
- Supporting Penang to support Malaysia

References & annexes / page 91



Foreword

This book is an output of the “Positioning Penang” study, a collaborative research project between Khazanah Nasional Berhad and The World Bank, identified by the Economic Planning Unit (EPU) as one of the inputs to the 10th Malaysia Plan. This book, which primarily targets policy makers, draws on a strong body of empirical work conducted in a dozen technical background papers contributed by a team of internationally-renowned researchers and field practitioners of the Malaysian economy. These background papers will be published in a separate volume.

The premise of this book is that a regional strategy to develop the “Northern Corridor” of Malaysia is critical in encouraging the emergence of globally-competitive clusters. For the Northern Corridor to succeed, Penang, its largest conurbation, must succeed and vice versa. However, it seems to be caught in the “middle-income trap” and needs to reinvent itself. Penang cannot rely for much longer on cheap labour, subsidised infrastructure and its ability to provide suitable land for low-tech manufacturing. It must focus on developing industries which provide economies of scale, where on-the-job learning provides the base for continuous improvement in productivity. This requires a new growth strategy that positions Penang to take advantage of the new global trends. If the Northern Corridor can escape the middle-income country (MIC) trap, then, so can Malaysia.

The book proposes a multidimensional growth strategy which embraces three elements: cities, people and the economy. At present, these elements are out of phase with

each other in Penang. The urban cycle is just starting to enter a recovery phase, following the World Heritage designation of George Town. The people cycle is still in a recession, with new graduates choosing to leave the area. The economy is caught in a slump, with the boom years a thing of the past. Implementing a coherent strategy across these areas — cities, people and the economy — could lead to a sustainable, inclusive and rapid development that benefits not just Penang and its environs in the Northern Corridor, but the nation as a whole. The book suggests some levers of change and contributes inputs to the preparation of the 10th Malaysia five-year plan.

This book was prepared by Dr Homi Kharas (Brookings Institution, The World Bank Consultant), Dr Albert Zeufack (Director of Research and Investment Strategy, Khazanah Nasional) and Mr Hamdan Abdul Majeed (Senior Vice President and Head of the Khazanah Koridor Utara Office), under the overall guidance of Dr Nungsari Ahmad Radhi, Executive Director, Khazanah Research and Investment Strategy. Background reports were authored by Tan Sri Andrew Sheng, Dato’ Dr Kim Tan, Dato’ Dr Leong Yueh Kwong, Dr Rajah Rasiah, Dr Shahid Yusuf, Dr Kaoru Nabeshima, Dr Julian Velez, Dr Shahridan Faiez, Dr Hiau Kee, Mr K Gopalan, Mr Charles Landry, Mr Laurence Loh, Mr John Lamb, Mr Yoon Chon Leong and Dr Ooi Giok Ling (in memoriam). Additional input and support were received from Azlina Jaffar, Intan Nadia Jalil, Devendran Nadaraja, Yusminov Ahmad, Aziz Kevin Lee, Lim Su San, Dr Neil Khor, Christopher Choong and Nur Amalina. >>>

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Views expressed in this book do not necessarily represent The World Bank's or Khazanah's and should solely be attributed to the authors.

**Homi Kharas, Albert Zeufack
and Hamdan Majeed**



RISING IN RHYTHM: PENANG'S CITIES, PEOPLE & ECONOMY

- **CYCLES OF DEVELOPMENT**
- **RESTORING LUSTRE TO THE "PEARL OF THE ORIENT"**
- **RETAINING AND ATTRACTING TALENT**
- **REINVENTING ECONOMIC OPPORTUNITY**
- **LOOKING FORWARD**

The three key foundations of growth in Penang — its cities, people and economy — are not developing in tandem. Their cycles of development must be synchronised to turn Penang into a globally-networked economy and a secondary city leveraging on its unique endowments and niche capabilities. As a middle-income region with a strong track record of economic success, Penang must now set a new multidimensional agenda to be the most vibrant economic hub for the Northern Corridor of Peninsular Malaysia. It must accentuate the links, within and without, and coordinate the development of its cities, people and economy, so as to develop abreast of an Asia that is expected to drive global economic growth in the 21st century.



Cycles of development

Shih Chung Branch School, along Northam Road (Jalan Sultan Ahmad Shah) in George Town, Penang, was a magnificent colonial-era building in the heart of town. It is now abandoned. Its roof and some internal walls have collapsed. Vegetation is growing wildly among the ruins. Shih Chung is a grim reminder of the state's changing fortunes.

Once the "Pearl of the Orient", present-day Penang is home to many dilapidated buildings. But efforts are under way to reverse this cycle. In July 2008, the historic port cities in the Straits of Malacca — George Town and Melaka — were listed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) as World Heritage Sites for their living culture, history, architecture and multiculturalism. With this, projects to restore the cities are being actively developed.

The Penang Free School, founded in 1816, was the first English school in Southeast Asia. Convent Light Street (founded 1852), the oldest girls' school in Malaysia, and Chung Ling High School (1917), one of the first formal Chinese schools in the region, were also founded in Penang. The state's long history of formal learning has continued to this day. It is now home

to Universiti Sains Malaysia (USM), one of the largest universities in Malaysia and a multitude of research institutes.

Ironically, it has also experienced marked shortages of skilled labour. Brain drain remains a significant problem for local business. There are limited opportunities for graduates to work with cutting-edge technologies in many areas of industry, including the hard sciences (for example, with nanotechnology and grid computing), services and management. Often, multinational corporations (MNCs) rotate staff to other countries as part of their global talent-management programmes, further encouraging the drain of skilled human resources.

The Bayan Lepas industrial park, the first free trade zone (FTZ) in Malaysia, became a significant pillar of Penang's economy after the island lost its "free port" status in 1969. It also became a model for the rest of the country. Manufacturing assembly work for MNCs, especially in the electrical and electronics industries, along with tourism, provided a dynamism that allowed Penang to grow at rates exceeding the national average, and upwards of 7 per cent for the period 1970–2005.

Manufacturing's share of state gross domestic product (GDP), grew from 13 per cent in 1970 to 54 per cent by 2008. But both tra-

The grand building that later housed the Shih Chung Branch School (left) and the state it is in today (below)



Courtesy of Malcolm Wade



The cycles of development in Penang's physical infrastructure, its human resource base and its economy are not in tandem with each other today. Despite some impressive advances, Penang's economy is falling behind some of its rapidly-growing neighbours and even other regions within Malaysia.

ditional manufacturing and tourism are facing competitive threats. Lower wages and the lower cost of doing business in neighbouring countries are eroding Penang's advantages in manufacturing assembly, while tourism arrivals have fallen as alternative destinations gain popularity. Foreign tourist arrivals have declined from a peak of 2.3 million visitors in 2000 to perhaps 1.8 million in 2008. From 2001 to 2005, Penang's GDP growth averaged just 5.9 per cent, much less than its historical average. It needs to develop new sources of comparative advantage if it is to grow rapidly again.

Penang's fortunes are intimately linked to developments in these three areas: its cities, its people, and its economy. The three can complement each other.

Vibrant cities can lower the transaction costs for the flow of goods and transfer of ideas, producing what economists call "agglomeration economies" — higher productivity based on bringing people and firms closer together in dense environments. They also serve as a magnet for talented people.

People, in turn, provide the life and soul of cities. The wide presence of skilled professionals can elevate a production assembly economy to a higher value-added plain. A talented resident population is a critical requirement for a successful knowledge economy — knowledge flows best through face-to-face contact and interaction, even in an electronically-linked world.

A vibrant economy serves as a magnet for talent and provides the rhythm of city life. Economic opportunity is the means by which wages and living standards rise.

Penang can regain its dynamism only if it restores and maintains an upswing in the cycle of development in all the three areas: its cities (especially the George Town Conurbation, see

Box 1), its people and its economy. But recent history shows that they can move with their separate rhythms unless they are coordinated. In reality, the cycles of development in Penang's physical infrastructure, its human capital and its economy are not in tandem with each other today. The old city centre has become run-down. Many of the best graduates are leaving the area. That is why, despite some impressive advances, Penang's economy is falling behind some of its rapidly-growing neighbours and even other regions within Malaysia.

The prospects for Penang depend importantly on policies undertaken at the national level, and on decisions taken by the federal government in terms of projects to be undertaken in the state. The responsibility for Penang's future also rests with the state government. It is the state government that implements many federal programmes and it has the closest links with local businesses and the people. The state government, and Penang-based federal government agencies, can provide crucial inputs into articulating a vision for Penang's development. But, as former Chief Minister Tun Lim Chong Eu has said, "It is indeed the people of Penang who have made us what we are today",¹ and it will be the people of Penang who will determine the prospects for their state.

Today, in 2010, the world is still recovering from a major recession. Penang's principal economic model of export-led manufacturing based on cheap labour is under threat from lower-wage competitors in China and Vietnam. Some MNCs are relocating their production base elsewhere in the region, unemployment is on the rise, and the state government is in opposition to the federal government, making coordinated policies harder to achieve.

But this does not mean that prospects are dim. At another time, in 1969, Penang also faced a global recession, the loss of its free port status on which much of its economy depended, the exit of a major multinational (the Royal Australian Air Force from its airbase in Butterworth), rising unemployment and a state

1 SERI Penang Lecture 2005, "Building on Penang's strengths: Going forward".

BOX 1: George Town Conurbation

Envisaged in the National Physical Plan (NPP) of Malaysia, the George Town Conurbation (GTC) consists of the highly-urbanised Penang Island, Seberang Prai, Sungai Petani, Kulim and the surrounding areas (see map). With a population of 1.6 million according to the National Census in 2000, it was the second-largest metropolitan area in Malaysia after the Kuala Lumpur conurbation (Klang Valley), which had a population of 4.9 million. Johor Bahru had 1.5 million. The population of the GTC is now estimated at 2 million.

Like Johor Bahru and its surrounds, the GTC has been designated a regional growth conurbation while the areas linked to Kuala Lumpur is the national growth conurbation.

A conurbation is defined as “an urban area that encompasses several cities or towns physically agglomerated and forming a built-up area through population growth”. Under the NPP, for consistency, a conurbation is named after the most prominent town within it — and not because it is the state capital or the state in which it is situated. Its name is also not based on locality such as “northern” or “eastern”. That township will be the reference centre within its conurbation. In this case, George Town represents the most-developed area and main growth centre in the GTC.

The federal government is currently upgrading the infrastructure in the GTC. However, these developments lack a central strategy and if there is one, it is poorly articulated. Furthermore, there are risks that, due to lack of coordination, the infrastructure developed would not synergise to enable seamlessness of operations.



government in the Opposition vis-à-vis the national government. From that forbidding starting point, it enjoyed a period of prosperity and growth for over 30 years based on a strategy of export-led, labour-intensive manufacturing.

Once more, it is time to articulate a new development strategy that can guide Penang to provide better wages, jobs and prospects for the next generation. This strategy is to turn Penang into a globally-networked economy.

Restoring lustre to the “Pearl of the Orient”

Penang has been called the “Pearl of the Orient”. The image of idyllic beaches, temples and mosques, coupled with world-class schools and infrastructure, made the island an attractive destination for major MNCs from the 1970s. In those days, many skilled people lived in or around George Town, but the city today is no longer a magnet for the highly-skilled and creative. Many of its buildings are empty, with their owners awaiting redevelopment oppor-

tunities. Despite the hollowing out, traffic congestion is greater than one would expect from a city of its size. Penang has the highest per-capita car ownership in Malaysia.

The World Heritage designation for George Town provides an opportunity for a fundamental renewal. The issues, however, do not have a simple “engineering” fix — remove the congestion, improve the environment, and reduce the crime. That approach would focus efforts on the continual search for property development opportunities to optimise the use of space, and to maximise density and short-term profits. The most successful cities in the world do more than this. They develop as liveable, multicultural and sustainable environments, where quality of life, beauty and aesthetics spur innovation and creativity. In short, cities which possess the right physical, cultural, economic and social conditions would become a magnet for talent, a “sticky place” for skills.

It is time to articulate a new development strategy that can guide Penang to provide better wages, jobs and prospects for the next generation. This strategy is to turn Penang into a globally-networked economy, but it is not a simple “engineering” fix.

Penang is small and lacks the dominant position but the global experience is that “pocket-sized” places can develop niches that permit them to grow rapidly. But they must avoid the path that makes them oversized and suffer the diseconomies of poor living conditions in many major metropolises.

Successfully balancing the ambition to become a global leader, move up the value chain and be a destination of choice for the young would not be easy. Penang is small and lacks the dominant position, for example, of Kuala Lumpur. But across the world, while major global cities like London and New York

have thrived by becoming centres of creativity, there have also been highly successful secondary cities.

In Spain, Bilbao, Barcelona, Seville and Valencia have become important hubs. Bologna is the richest city in Italy in per-capita terms, and generates the greatest export revenues per capita, with a focus on education, research and advanced manufacturing. The global experience is that “pocket-sized” places can develop niches that permit them to grow rapidly. But they must avoid the path that makes them oversized and suffer the diseconomies of poor living conditions in many major metropolises (Landry, 2009).

Successfully capturing the opportunities afforded by place requires Penang to build on its diversity. It is the differences that make a difference. With these in mind, there are four aims for the future:

- Make diversity a strength, with opportunities for people from different income levels and ethnicity;
- Be creative and innovative in ways that benefit the local economy, Malaysia and the world;
- Develop as a transactional hub for products and services — a spatially-connected economy; and
- Encourage ideas, knowledge and creativity — an Internet- and people-connected economy.

Together, these changes will position Penang as a networked economy: globally, regionally and domestically.

Growing, retaining and attracting talent

The pattern of migration in Malaysia over the last two decades has favoured the Klang Valley and the south relative to Penang. For example, between 1991 and now, the population of the town of Klang has almost trebled. It has grown to 2.5 times in Ampang Jaya and more than doubled in Johor Bahru.

In the similar period as above, the population in Penang has only grown by 0.5 times (Intan Nadia, 2009). This is partly reflective of the lack of job opportunities, especially as investment has started to fall relative to other locations, and is partly the result of a perceived decline in the quality of life.

In a globalised world, where people have many options as to where to live and work, the links between quality of life and economic performance of a location have strengthened. Whereas in the past most skilled people chose a company and job, and located to where their work took them, in the modern economy, skilled people choose the place they wish to live and look for jobs there. Even if a locality is efficient and competitive, it may not attract people to live there. As an example, for many years, firms in Penang have complained about a lack of qualified skilled personnel, especially engineers. The jobs are there, but there are few qualified takers.

Instead of productive efficiency, the main source of competitiveness of a region has become the ability to attract people, especially the young. Places that attract talented youths end up being the winners in the national and global battle for development. The cohort of 25- to 35-year-olds has energy and ambition and is flexible and adventurous.

The young people in Penang surveyed for this study say that they seek a culture of openness, good career opportunities and good governance. They may migrate overseas for a time to gain experience, but they will return if family, lifestyle and cultural factors become effective pulls. The current global circulation of young people allows them to build up overseas networks, ideas and linkages. They would

add to the social capital of Penang if they can be attracted back.

It is not only engineers that Penang needs, but a broad group of creative professionals. For a city to function well, it needs a diversity of talent. So far, there has been a tendency to focus on attracting those with specific skills, like engineers or business service professionals. But arts and media practitioners, educationists, entertainers, activists and others give a city the creative edge that supports innovation.

While it is important to attract and retain talent, it is also important to develop it. Penang has a rich array of higher educational institutions, research organisations and think tanks, but these have fallen short of global standards of excellence. Restrictions on the import of skilled talent from abroad are remnants of an outmoded idea that skilled jobs must be subjected to control to provide opportunities for locally-trained professionals to flourish.

These policies have pushed the best local talent abroad to find collaborators at the cutting edge of their fields. Penangites are flourishing in Singapore, Britain and the United States because those are places where they can interact with the best in their chosen fields. Similar opportunities for them to interact with global peers and mentors are needed at home.

Reinventing economic opportunity

Economic growth in Penang has been driven by the dynamism of the manufacturing sector, especially in electronics. Manufacturing jobs account for 37 per cent of all jobs in the area and all groups are well represented in manufacturing. But the financial crisis of 2009 has shown the limits of such a strategy.

While Penang is well-integrated into the global supply chains, domestic value-added is limited and the supply chain does not extend enough to local firms or into the hinterland. Penang has grown as a sweatshop factory for the rest of the world. It must do better and become a smartshop for sustainable products.

Penang cannot rely for much longer on cheap labour, subsidised infrastructure and the ability to provide suitable land for manufacturers. It must focus on developing industries that provide economies of scale, where on-the-job learning provides the base for continuous improvement in productivity. It cannot do all things but must be selective in what it tries to develop.

Penang must position itself to take advantage of:

- The emergence of Asia as the economic driver in the world, and of Asian consumers as a dynamic new force for growth;
- Its strategic location facing the Indian Ocean and the Bay of Bengal;
- The need for new technologies to power a low-carbon global economy; and
- The continued progress of globalisation and outsourcing that is developing new markets, especially in the modern service sectors, and innovations in new products and processes.

In a globalised world, where people have many options as to where to live and work, the links between quality of life and economic performance of a location have strengthened. Penang has grown as a sweatshop factory for the rest of the world. It must do better and become a smartshop for sustainable products. It cannot do all things but must be selective in what it tries to develop.

Looking forward

Penang today is a middle-income region. As such, it has various advantages like firms with enhanced capabilities and a well-developed track record of economic success. But it also faces the disadvantages of rising labour costs and greater competition from lower-cost neighbours such as China, Vietnam and Thailand. This study explores strategies suitable for middle-income regions.

Moving to a new growth strategy is not easy. A multidimensional approach is needed, and it must embrace the three elements of developing cities, people and the economy. At present, these elements are out of sync with each other. The urban cycle is just entering a

recovery phase, following the World Heritage designation. The people cycle is still in recession, with new graduates choosing to leave. The economy is caught in a slump, with the boom years a thing of the past. A coherent strategy is needed across these areas.

Moving to a new growth strategy is not easy. A multidimensional approach is needed, and it must embrace the three elements of developing cities, talent and the economy.

For the Northern Corridor to succeed, Penang must succeed and vice versa. If the Northern Corridor can escape from the middle-income trap, then so can Malaysia. Conversely, if the Northern Corridor stagnates, the likelihood of Malaysia escaping the middle-income trap declines considerably.

All over the world, cities are trying to embrace the knowledge economy and become more creative. Such pronouncements are easily made, but much harder to achieve. If a premature move takes place, with everything oriented towards a new knowledge economy, there is a high risk of failure. Along with this, the current core strengths of the economy (basic manufacturing) may be eroded at an accelerated pace — with nothing substantial to replace them. But if no move in this direction is taken, it is inevitable that Penang will decline, at least in relative terms.

Penang has excelled over the past 40 years in orienting itself externally and linking with the global economy. Its exports go to all corners of the world. It has attracted foreign direct investments (FDI) from major MNCs, especially in the electronics sector.

Penang has also started to develop closer links with its neighbours and to integrate within the region. Already, Indonesians are the major-

ity of patients in the medical tourism sector in Penang. India, China, the Middle East and Indonesia are expected to continue to have dynamic economies, and closer integration with them can bring about positive development for all. Upgrading logistics and international agreements with these neighbours can deepen regional integration ties.

Where Penang has fared poorly is in integrating domestically, in connecting the natural resources and human capital of its hinterland with the global economy. This is an area with untapped potential. Investments here can build the critical mass and density needed for the economy to benefit from scale. The premise of this book is that a regional strategy to develop the Northern Corridor of Malaysia is critical in encouraging the emergence of globally-competitive clusters.

For the Northern Corridor to succeed, Penang must succeed and vice versa. Penang is the heart of the Northern Corridor and the Northern Corridor can provide the scale required for Penang to grow. Successful development in this locality can reduce the economic distance of many Malaysian citizens to global markets, and can reduce divisions by offering opportunities for all groups to participate in economic growth.

The way forward can feature sustainable, inclusive and rapid development that benefits not just Penang and its environs in the Northern Corridor of Peninsular Malaysia, but also the nation as a whole. If the Northern Corridor can escape from the middle-income trap, then so can Malaysia. Conversely, if the Northern Corridor stagnates, the likelihood of Malaysia escaping the middle-income trap declines considerably.



NEW OPPORTUNITIES AND PITFALLS IN THE GLOBAL ECONOMY

- GLOBAL RECESSION OF 2009
- EMERGENCE OF EAST ASIA, CHINA AND REGIONAL ECONOMICS
- AVOIDING THE MIDDLE-INCOME TRAP
- DOING DIFFERENT THINGS AND DOING THINGS DIFFERENTLY:
STRATEGIC PLANNING IN PENANG
- THE NORTHERN CORRIDOR ECONOMIC REGION

The global economic recession of 2008-09 has brought into sharper focus the need to review and readjust policies to promote foreign investment. Penang is well-placed to take advantage of the shift in global consumer demand to China, India, the Middle East and Far East. However, it must avoid the “middle-income trap”. A victim of its own success, its competitiveness in traditional areas is falling as wages rise. At the same time, it has not developed an environment where innovation can flourish to yield higher profits and wages. Faced with this, the government has embarked on a new policy of developing regional economic corridors — the Northern Corridor Economic Region in Penang’s case — that can benefit from the labour, land and natural resources of the hinterland, combined with the manufacturing expertise and global connections found in exporting centres.

Global recession of 2009

There is no denying that the world has gone through a global recession of historic dimensions in 2009. The International Monetary Fund (IMF) projected that the dollar value of global output could drop by 6 per cent in 2009. This drop was largely the result of a major financial crisis that has seen the bankruptcy or merger of many of the largest and oldest financial houses in the world.

As severe as the crisis has been, it could have been substantially worse. An early, strong, forceful and coordinated policy response, starting in October 2008, has helped staunch the worst fears and prevented a panic that was spreading to non-bank credit markets. That could have triggered a collapse of markets in a range of longer-term securities.

Emerging economies, like Malaysia, were quickly affected by the crisis and recession that became global — even though they first appeared to be insulated from the problems in the subprime market that triggered the global breakdown.

The impact was transmitted through two channels. First, the major global financial institutions needed substantial liquidity when traditional funding mechanisms in their home markets became harder to tap into. They decreased their global exposure. Emerging markets, which had previously seen a surge of capital inflows, were subjected to sizeable withdrawals. Malaysia saw repayments to foreign banks in 2008 reaching US\$13 billion. This decline in liquidity had follow-on effects. Along with other countries, Malaysia saw a sharp decline in equity prices, not necessarily due to fundamental deterioration of corporate earnings, but simply because investors were nervous about whether their peers, including foreigners, still had the liquidity to remain invested in Malaysian securities.

Beyond finance, the Malaysian economy was severely affected by adverse developments in international trade. The global recession led to a softening of commodity prices. In October 2008, crude palm oil prices fell to almost half the peak levels seen in June of the same year. World trade in manufacturing

also declined. East Asian exporters, including Malaysia, were also hard hit as importers worked off excess inventories.

There is a growing consensus that the world is recovering from the recession and the decline in global output has levelled off in the second half of 2009. Much remains to be done, and the recovery is still unsustainable as it relies on massive public sector deficits which, at some point, must be curtailed. Nevertheless, history has shown that global recessions have been offset by rapid global recovery, leaving trend output at the same level. That has been the experience in the United States for over a century, and held true even in the Great Depression.

For Malaysia, the crisis presents opportunities as well as obstacles to renewed growth. One consequence of the crisis is that CEOs worldwide are reviewing their strategies so as to enable their corporations to emerge stronger. The global credit crunch has become a catalyst for a sharper focus on competitiveness. Those countries and localities that attract their attention can lock in advantages for many years to come. This requires a review of the policies to promote foreign investment. It is no longer enough to offer firms financial incentives to invest their capital in Malaysia and in Penang. Instead, they must offer a better fit with global strategies by promising and creating:

- A stable macroeconomic environment where currency and financial markets are robust enough to withstand global turmoil;
- Superb logistics and virtual connectivity to be part of a global supply chain;
- An innovative workforce that contributes to investing companies' productivity growth;
- A creative environment where new ideas and solutions can flourish; and
- Global leadership, usually through a dense cluster of firms, in niche areas.

The global credit crunch has become a catalyst for a sharper focus on competitiveness. Those countries and localities that attract global corporations' attention can lock in advantages for many years to come. This requires a review of the policies to promote foreign investment.

In this financial crisis, Malaysia has done well on the first of these. It has managed the macroeconomic turmoil without resorting to extraordinary measures. Its strong external position and sound financial sector allowed it to overcome the withdrawal of large amounts of foreign capital without fear of a market breakdown. But Malaysia must make more progress on the other four items listed above to take full advantage of this crisis. The crisis can be a catalyst for reform as it was in 1986 and 1998.

Emergence of East Asia, China and regional economics

Penang's one great asset is its location. The economic orientation of the world has changed in the last decade. Between 1965–2004, the Group of Seven (G7) accounted for 65 per cent of global output, with a range that never fluctuated outside +/- three percentage points.

Today, that share is less than 54 per cent. In the last five years, two thirds of global growth

has come from emerging economies, especially China and India. With the 2009 financial crisis slowing growth in the West still further, global demand is palpably shifting towards Asia. A global orientation no longer means exclusive focus on the markets of the rich world, like the United States, Europe and Japan, but must also include a focus on emerging economies.

The emerging economies are adding strength to the global economy and accelerating the pace of growth. It is likely that global output could grow by up to 4 per

cent, once recovery is fully under way, even as growth in the rich world slows to 2.5 per cent. That suggests that global output, notwithstanding the current major problems and

global recession, could double to about US\$110 trillion by 2025 (at market exchange rates, adjusted to exclude inflation).

Asia's contribution to this growth is likely to be at least 50 per cent, so the region's output in 2025 may be approximately the same as global output in 2004. Eight Asian economies — China, India, Japan, South Korea, Taiwan, Indonesia, Malaysia and Thailand — could have economies of over US\$1 trillion, a size that would put them in the top 10 global economies today. In other words, a large fraction of global demand will shift to Asia. An even greater fraction of consumption of consumer durables will be in Asia.

In this scenario, by 2025, most of the world's middle class would be in Asia and most of Asia's population would be middle class. Today, the global middle class is concentrated in Europe and the United States. The middle class in these regions numbers almost one billion people. Asia's middle class is much smaller, numbering only 500 million, of whom one quarter is in Japan.¹

This is why most of Malaysia's and Penang's manufactured exports, which are heavily concentrated in electronics used in consumer products, are oriented towards the rich world. But by 2025, this pattern will be reversed. The majority of the global middle class, numbering over 2.7 billion people, will live in Asia, while the number living in Europe and the United States will stay the same at about one billion. In terms of where the consumer market is growing, it will be China, India, the Middle East and surrounding East Asian countries that will show the greatest dynamism. A large fraction of consumer purchases and sale of consumer durables will be in Asia.

This long-term trend has implications for Penang's medium-term strategy and reflects Penang's history. In the past, northern Malaysia started to do poorly when close neighbours like Myanmar, southern Thailand and Sumatra

By 2025, most of the world's middle class would be in Asia and most of Asia's population would be middle class. Penang is well placed to take advantage of this shift in demand. It has a multicultural workforce of mostly Malays, Chinese and Indians with connections and links to the most dynamic economies of the world.

¹ The middle class is defined here as households with daily per-capita incomes of between US\$10 and US\$100 in purchasing power parity terms.

BOX 2: The upcoming Asian “middle billion” urbanites

Between now and 2050, according to UN estimates, the global population is expected to increase from 6.9 billion to more than 9 billion. Some 98 per cent of the growth will be in the developing and emerging world where most of the economic growth will happen. More than 6 billion people or two-thirds of the population will live in cities.

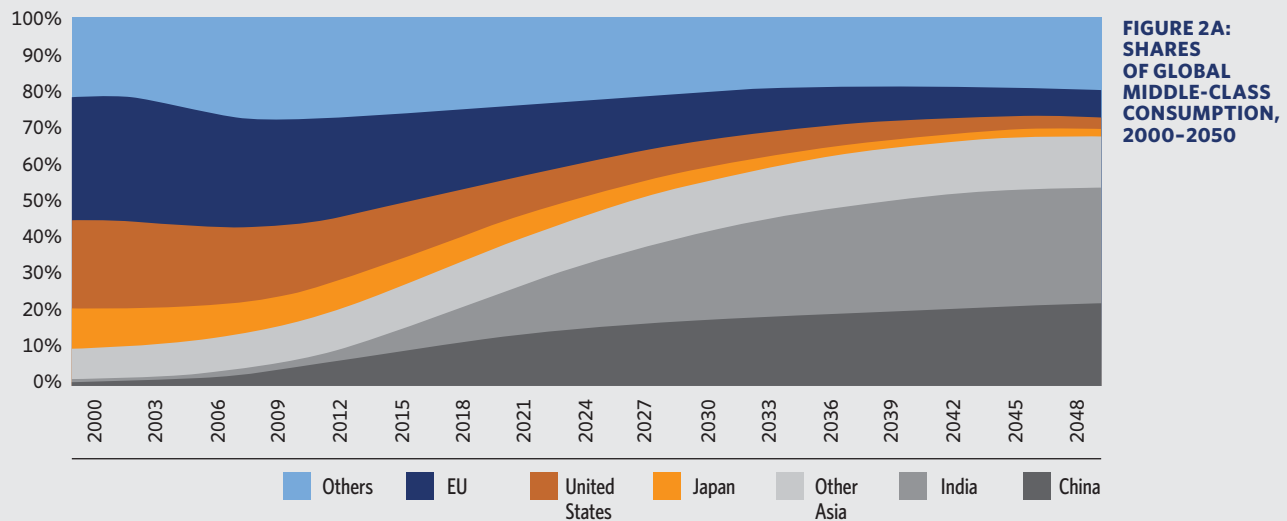
Many people will be moving up to the middle class, consuming much more resources per capita. By the year 2050, Asia will have 5.4 billion people, out of a world-total of 9 billion, and will be home to 63 per cent of the global urban population, or 3.3 billion people.

Globally, the middle class could increase from 1.8 billion people to 3.2 billion by 2020 and to 4.9 billion by 2030. Almost all of this growth (85 per cent) will come from Asia. The size of the middle class in North America is expected to remain roughly constant in absolute terms. This is because the number of middle-class people becoming rich will be roughly equal

to the number of poor people joining the ranks of the middle class. Europe would enjoy some early growth in numbers of the middle class, but then see a fall as populations decline in Russia and elsewhere.

Figure 2A below illustrates the shift. In 2000, Asia (excluding Japan) only accounted for 10 per cent of global middle-class spending. By 2040, this could reach 40 per cent, and it could continue to rise to almost 60 per cent in the long term. The two countries driving this change would be China and India and, to a lesser extent, Indonesia. Malaysia is conveniently located in the neighbourhood of these three economies and should strategically position itself to serve the many billion Asian middle-class consumers in the coming decades.

Source: Kharas H (2010), *Vision 2050: The New Agenda For Business* (2010)



did poorly.² In the future, the most successful locations will be those that fit into regional production networks serving the new regional markets. Penang must attract MNCs that have a strong regional presence and focus in Asia and ensure that it builds strong physical, hu-

man and social connections with the countries in the region.

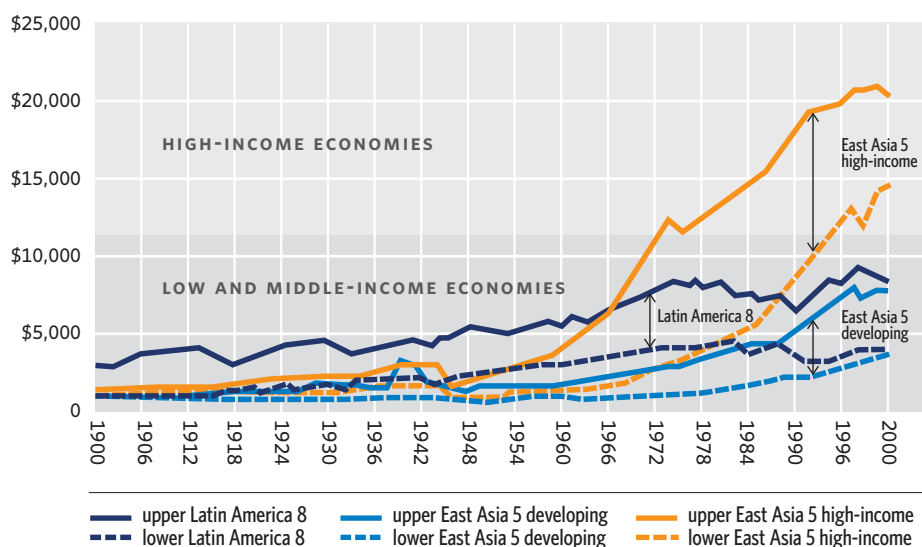
Penang is well placed to take advantage of this shift in demand. It has a multicultural workforce of mostly Malays, Chinese and Indians with connections and links to the most dynamic economies of the world. It has one of the largest centres of economic mass facing the Indian Ocean. Under the Association of Southeast Asian Nations (ASEAN) free trade agreement, Penang will enjoy free trade within the more advanced economies of the region starting in 2010.

2 Some of the loss of regional trade was politically driven. For example, trade with Aceh was lost in 1963, while Singapore, with more pragmatic policies, maintained its trade relationships. Similarly, trade with Myanmar was lost after that country's military coup in 1962.

**FIGURE 1:
GDP IN LATIN AMERICA
AND EAST ASIA DURING
THE 20TH CENTURY**

Note: The figure shows the growth in the range of per-capita incomes within three groups of economies: the high-income East Asia Five (upper limit and lower limit), middle-income East Asia Five (upper limit and lower limit), and the large, middle-income Latin America Eight (upper limit and lower limit). See the text for a more detailed description.

Source: Maddison (2003), cited in Gill I and Kharas H (2007)



ASEAN has also signed free trade agreements with China and India that will expand opportunities in those countries. But Penang’s orientation and connectivity with the new growth areas in East Asia, South Asia and the Persian Gulf can be improved further to take the best advantage of these large new markets.

Penang faces problems that many middle-income regions have faced before. It is becoming a victim of its own success. “Trapped middle-income countries” tend to make two common mistakes: either they cling on too long to past successful policies or they exit prematurely from the industries that could have served as the basis for their specialisation process.

Avoiding the middle-income trap

Penang faces problems that many middle-income regions have faced before. It is becoming a victim of its own success. Its competitiveness in traditional areas is eroding as wages rise. Yet it has not developed the creative environment in which innovation can flourish and yield higher profits and wages. Other countries have faced this situation before. Some have succeeded in escaping from it and gone on to become advanced economies. Others have failed and have had extended periods of slow growth.

Penang can learn from these experiences.

Figure 1 plots the per-capita income levels of three groups of countries between 1900–2000:

- 1 Eight largest Latin American countries that have reached middle-income levels (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay and Venezuela);
- 2 Five East Asian economies that have now reached high-income levels after growing rapidly through the middle-income stage (Hong Kong [China], Japan, South Korea, Singapore and Taiwan [China]); and
- 3 Five current middle-income countries in East Asia (China, Indonesia, Malaysia, the Philippines and Thailand).

It shows that by the early 1970s, the average per-capita income of the high-income East Asia Five economies and the Latin American Eight economies was roughly the same — about US\$5,000 (although the East Asian Five group had a larger dispersion). Over the next three decades, the East Asian economies went on to become rich while the Latin American economies stagnated.

By the early 2000s, the middle-income, fast-growing East Asia Five had caught up with the Latin America Eight and, coincidentally, the range of incomes of countries in the two regions was almost identical.

BOX 3: What's the middle-income trap?

The “middle-income country trap” is a development stage that characterises countries that are squeezed between being low-wage producers and highly-skilled, fast-moving innovators. Countries caught in this trap tend to grow slower and often fall behind. Cost advantages in labour-intensive sectors, such as the manufactured exports which once drove growth, start to decline in comparison with lower-wage poor country producers (Gill I and Kharas H, 2007). At the same time, they do not have the institutions, capital markets, track record, or critical mass of highly-skilled people to grow through major innovations like rich countries.

Caught between these two groups, many are without a viable high-growth strategy. In addition, they are faced with new challenges including distribution and social cohesion issues. Therefore, they are hard-pressed to develop new growth drivers (Nungsari and Zeufack, 2009).

The figure below provides a good illustration of the middle-income trap. Only one (South Korea) of the seven countries which were middle-income by 1975 managed to reach high-income status by 2005. Brazil and South Africa, which had double the per-capita income of South Korea in 1975, have remained at the same level since then. It faced periods of negative growth, which cancelled all earlier progress.

Evidence of the middle-income trap can also be found in the dynamics of occupations and wages across countries. The integration of the world's labour markets creates big gains for rich and poor countries alike. For example, blueprints of products flow from California to China, while manufacturing goods flow in the opposite direction. The middle-income countries benefit less from globalisation (Eeckhout and Jovanovic, 2007). They are not technologically-savvy enough to compete with rich countries and are not cheap enough to compete with China, Vietnam and other dynamic low-income countries.

Thanks to communications and transportation technologies, managers, engineers and designers — larger in number in rich countries — have access to a pool of cheap labour in poor countries. This makes

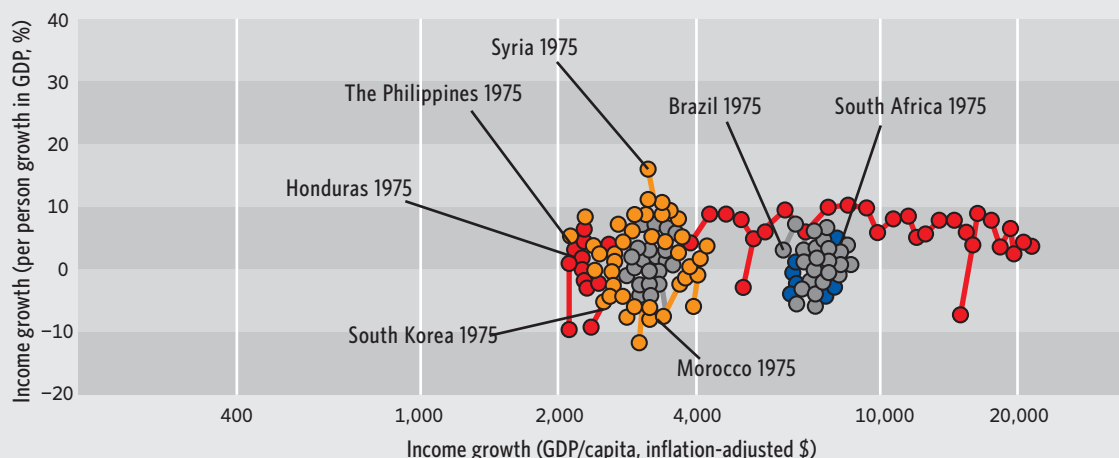
them more productive as they can produce more with the same resources. The higher wages that accrue to high-skilled individuals represent the gains to rich countries of an integrated global labour market.

Poor countries also gain. They produce better and more, thanks to the technology, design and managerial skills brought in from rich countries. The wages of their unskilled rise and this represents their gains from globalisation. However, middle-income countries (lower middle-income to upper middle-income) gain almost nothing from globalisation as they are likely to experience “the smallest change in factor-price ratio” or no significant change in the ratio of skilled to unskilled wages (Udomsaph and Zeufack, 2009).

Escaping the middle-income country trap is an uphill battle. The move from being a middle-income country (MIC) to being a high-income country (HIC) requires a break from the past in some significant way: a structural shift. Apart from policies that no longer work to elevate them to a high-income economy, many “trapped MICs” tend to make two common mistakes: either they cling on too long to past successful policies or they exit prematurely from the industries that could have served as the basis for their specialisation process (*The Growth Report*, 2008).

Timing is key. Most MICs fail to anticipate the transition and the new demands that come with it. For example, most MICs hold on to a labour-intensive strategy for too long. They artificially maintain non-competitive firms through a battery of subsidies, continuing to pile up fiscal incentives with no consideration of the take-up rate or efficiency, and continue to make FDI volumes the key performance indicator for competitiveness (Nungsari and Zeufack, 2009). The second common mistake is a premature shift away from assembly manufacturing before ensuring an adequate supply of high-quality and competitive human capital to support the transition to higher value-added sectors.

Source: Nungsari and Zeufack (2009)



Source: Kharas H (2009)

This prompts the questions:

- What did the five Asian leaders do to transit successfully through middle-income stages of development?
- What did the Latin America Eight do wrong?
- What might today's middle-income countries in East Asia and states like Penang learn from those experiences?

If Penang is to avoid becoming trapped in middle-income, like Latin America, it is these lessons which are critical.

Some features differentiating middle-income from poor country growth are clear. Growth tends to become more capital- and skill-intensive. The domestic market expands and becomes a more important engine, especially for service-sector growth. Wages start to rise, most rapidly for high-skilled workers, and shortages can emerge.

The traditional low-wage, manufacturing-for-export model does not work well for MICs. They seem to become trapped unless they change strategies and move up the value chain. Cost advantages in labour-intensive sectors, such as the manufactured exports which once drove growth, start to decline in comparison with lower-wage poor country producers. At the same time, MICs lack the institutions, capital markets, track record or critical mass of high-skilled people to grow on the back of major innovations like rich countries. Caught between these two groups, MICs can become trapped without a viable high-growth strategy.

The Growth Report emphasises that for middle-income countries to become rich, they must do different things, and do things differently. Understanding what needs to be done and how to accomplish them are the essence of the current strategic-planning exercise. The emphasis must be on geographic and sectoral specialisation, and on the ability to execute such a strategy.

Some recent work³ argues that the way out of the middle-income trap is for developing countries — especially small, open economies — to specialise. This builds on the empirical observation that while MICs have much more diversified economies than poor countries, rich countries tend not to be more diversified than middle-income economies. In other words, the growth process from middle-income to rich-country status is associated with specialising, moving up the value chain and innovating in selected products.

Within rich countries, one also observes that production of certain goods tends to be highly concentrated in specific localities. In the new economic model, it is surmised that the forces driving specialisation are closely linked to the ability to generate economies of scale in certain products. They then become the products in which rich countries specialise, like aircraft, machinery and financial services, and firms producing such goods tend to concentrate in specific localities, forming clusters. Rich countries withdraw from products with constant returns to scale in which they gradually lose competitiveness to lower-wage countries. Many manufacturing activities fall into this category, such as apparel and textiles, leather, footwear, fishing, sawmill products and agricultural crops.

In this environment, the policy maker's role must change. *The Growth Report* emphasises that for MICs to become rich, they must do different things, and do things differently. Understanding what needs to be done and how to accomplish them are the essence of the current strategic-planning exercise. The emphasis must be on geographic and sectoral specialisation, and on the ability to execute such a strategy.

3 *An East Asian Renaissance*, Gill I and Kharas H, The World Bank (2007).

BOX 4: The Growth Report by the Commission of Growth and Development



Few countries manage to achieve high levels of sustained growth for over a generation and even fewer continue their high growth rates once they reach middle-income. *The Growth Report* by the Commission of Growth and Development, chaired by Nobel Laureate in Economics, Michael Spence, identified 13 developing countries¹ that

sustained growth of more than 7 per cent for over 25 years in the postwar period. These success stories have five common characteristics:

- Openness to the global economy in knowledge and trade;
- Macroeconomic stability;
- “Future orientation”, exemplified by high rates

of saving and investment;

- Reliance on markets and market-based prices to allocate resources; and
- Leadership committed to growth and inclusion with a reasonable capacity for administration.

The success factors appear to be deep rooted in local institutions, but they are insufficient for continued growth. Some countries with these characteristics grew fast, but often could not sustain the growth. As examples, East Asian MICs suffered severe setbacks in 1997–98 and Brazil has yet to regain rapid growth after its disastrous hyperinflationary episodes of the 1980s, even though it was one of the fastest-growing developing countries in the 1960s and 1970s.

The Growth Commission went on to report that reaching income levels associated with the advanced countries is uncommon: Only six of the high-growth cases achieved this. It is more common for growth to slow markedly at the middle-income level. Many Latin American and Middle Eastern countries have suffered this fate of falling into a “slow growth, middle-income country” trap. The reasons why this is so common are, however, less understood.

1 The 13 success stories are Botswana, Brazil, China, Hong Kong (China), Indonesia, Japan, South Korea, Malaysia, Malta, Oman, Singapore, Taiwan (China) and Thailand.

Doing different things and doing things differently: Strategic planning in Penang

Penang has a long tradition of strategic planning, starting with the Munro Report in 1964. The report recommended the development of an industrial site, charting the course of Penang’s future industrialisation. The report also argued that because Penang alone is not large enough to constitute a planning region, the development of a greater region, consisting of Perlis, Kedah and the Krian district of Perak, should be considered and regional policy should be linked to the overall national development programme. However, despite the sense of urgency of the Munro Report, intensive industrialisation would not happen in Penang until the early 1970s.

In 1970, a report prepared by the US-based Nathan Associates, and sanctioned by the federal government, became the Penang Master Plan (PMP). That exercise was triggered by the loss of Penang’s free port status and the corresponding need to transition away from an entrepot trading hub to a new approach. The recommended strategy was to establish market linkages with the global economy, bypassing the lo-

cal, national and regional markets. The PMP also recommended that manufacturing for export and tourism become the lead sectors, given the assessment that natural resource endowments were poor, but that human capital and physical infrastructure were comparatively strong. The PMP was enormously effective in generating rapid growth and employment, especially during 1975–80 when GDP grew by 11.2 per cent annually. The main thrust of the Nathan Report — to put to productive use the underemployed labour force — was achieved. But the strategy also made Penang more vulnerable to global business cycles, and the slowdown in the United States in 1980 and 1982 meant that Penang’s growth for 1980–85 also slowed dramatically, to just 3 per cent per year. Other objectives, such as reducing income disparities, improving inter-industry linkages and diversifying exports, were less-effectively met.

The essential insight of the Nathan Report was that for a poor economy to advance, the critical growth driver would need to be a strategy that employed all available labour,

The essential insight of the Nathan Report was that for a poor economy to advance, the critical growth driver would need to be a strategy that employed all available labour, land and capital in productive ways in the setting of a market economy.

**TABLE 1:
HISTORY OF
PLANNING
PENANG'S
PROGRESS**

PERIOD	PLAN DOCUMENT	OUTCOME
1964-1982	Munro Report	<ul style="list-style-type: none"> • Industrial development
1970-1990	Penang Master Plan (Nathan Report)	<ul style="list-style-type: none"> • Export-led manufacturing • Global orientation
1991-2000	First Penang Strategic Development Plan	<ul style="list-style-type: none"> • Solid GDP and FDI growth • Few local linkages
2000-2010	Second Penang Strategic Development Plan	<ul style="list-style-type: none"> • Faltering growth and competitiveness • Slow transition to K-economy
2007-2025	Northern Corridor Economic Region Socio-economic Blueprint	<ul style="list-style-type: none"> • World-class economic region and a choice destination for investment, work and living

land and capital in productive ways in the setting of a market economy. Because the region lagged behind in all sectors, it needed to be organised, like an army, to advance on all fronts simultaneously. The PMP was able to utilise the region's most significant asset — its large pool of rapidly-growing and initially unemployed labour force — in an effective way.

By the time of the First Penang Strategic Development Plan (1991-2000), emphasis had shifted to the services sector as a means of diversifying the state's economic base. Finance, insurance, real estate and business services were accorded the lead. Various deficiencies in air, water and noise pollution, congestion (especially in land and housing) and stubborn poverty were to be addressed.

The growth target of the plan (6.5 per cent between 1991-2000) was substantially met, but there was less progress towards broader, structural objectives. As envisaged in the plan, Penang did continue to be a major recipient of FDI and started a shift towards higher value-added activities in manufacturing and services. But other strategic challenges that were identified in the plan met with less success. Strategies were devised to:

- Promote local entrepreneurship and small and medium-sized enterprises (SMEs);
- Enhance the participation of the Bumiputera in high-growth sectors;
- Modernise and revitalise the rural sector;
- Promote commercial and modern management in agriculture;
- Improve lifestyle conditions; and
- Link Penang better to the northern states of Peninsular Malaysia and regional Asian economies.

These challenges remain at the forefront of issues that confront Penang today.

The Second Penang Strategic Development Plan (2001-10) (PSDP2) was developed during the aftermath of the 1998 crisis, a year when Penang's GDP contracted by 8 per cent. Nevertheless, the PSDP2 was optimistic, forecasting a return to rapid growth based on a transition to an ICT-led knowledge economy. The second plan reported that Penang's underlying business competitiveness remained strong compared to its neighbours, especially with respect to office rentals and productivity-adjusted wage costs.

It envisaged growth per capita of 5.9 per cent for 2001-05, accelerating to 6.2 per cent for 2006-10. It had an upside scenario for even faster growth if Japan and the United States performed well. Actually, global growth did better than expected, but Penang's economy faltered. Today, Penang's bold vision outlined in the PSDP2 of becoming a fully-developed state by 2010 has become unattainable.

Almost 40 years after its introduction in the Nathan Report, the basic global, export-oriented strategy based on FDI that has driven Penang's economy needs to be revisited.

The Northern Corridor Economic Region

Faced with the realities of a middle-income country situated in Asia, the federal government has embarked on a new approach to development in Malaysia. It is focused on regional corridors that can benefit from the labour, land and natural resources to be found in the hinterland, combined

with the manufacturing expertise and global connections found in the exporting centres.

The Northern Corridor Economic Region (NCER) is the expression of this new strategy for four northern states of Peninsular Malaysia. The strategy was articulated in the NCER Socioeconomic Blueprint, 2007-2025, developed by Sime Darby in 2007. The NCER combines the states of Perlis, Kedah, Penang and Perak into a single economic region. It seeks to develop the area into “a world-class economic region and a choice destination for investment, work and living”.⁴

A new institution, the Northern Corridor Implementation Authority (NCIA), has been given wide-ranging powers to develop and execute a new development strategy. Encouragingly, the Northern Corridor Implementation Authority Act 2008 creating the new authority explicitly recognises the multidimensional nature of the challenge. Among the functions of the new authority, cited in the Act, are the promotion of economic and social development, infrastructure and logistics, arts, culture and heritage, and human capital development in various forms. In other words, the key issues identified as critical for Penang — developing the cities, people and economy — are already foreshadowed by the Act.

In presenting a broad framework for corridor development, the Act goes beyond most strategic plans. It also presents an opportunity for decision making on important policy issues to take place locally rather than centrally — the NCIA offices have already been established in George Town. Previously, many decisions had to be routed back to Kuala Lumpur, complicating the task of timeliness, and of local participation and accountability.

The Northern Corridor strategy rests on two pillars. First, the federal government is committed to a range of important investments in infrastructure. These include the expansion of the Penang Bridge, construction of a second bridge, the upgrading of the port and supporting infra-

structure, double tracking of the railway and establishing Butterworth as the northern transport hub, upgrading of public transportation with the introduction of Rapid Penang, housing development, sewerage treatment, broadband infrastructure, industrial estate expansion, and improved air links and sea routes with the surrounding region.

Other projects that have been led by the private sector — the Penang Outer Ring Road and the monorail project — have been temporarily postponed. Between them, these projects promise the introduction of several billion dollars worth of new investments into the region, and also serve to modernise the logistics and infrastructure facilities to sustain much higher economic growth rates.

The second pillar of the strategy is the development of new focus areas of business, along with strengthening the contribution of existing industries. The Northern Corridor plan calls for a focus on increasing the value-added in existing industries, along with the development of new industries. It was envisioned that the Northern Corridor would be a world-class economic region by 2025 in E&E products, agriculture, tourism and biotechnology.

There is a commitment in the blueprint to growth with social equity, by emphasising local community involvement in a private-sector driven, market-oriented approach. The strategy is broadbased. It mentions *padi* farming and food production, new crops and livestock, downstream agricultural processing, higher value-added E&E products,⁵ oil and gas, biotechnology, sustainable materials, automotive products, tourism and logistics. Strategies are proposed to drive economic value-added, raise the capacity for knowledge and innovation, address social economic imbalances, improve the quality

The Northern Corridor strategy rests on two pillars. First, the federal government is committed to a range of important investments in infrastructure. The second pillar of the strategy is the development of new focus areas of business, along with strengthening the contribution of existing industries.

4 Northern Corridor Implementation Authority Act 2008 (Act 687).

5 Including wafer fabrication, chip design, automation design, and research and development (R&D) into materials or packaging.

An important element of the Northern Corridor is that it represents a political commitment to spur development in the area. The politics of place is complicated in every country, and nowhere more so than in Malaysia where place, ethnicity, poverty and other political drivers coincide.

of life and strengthen institutions and implementation capacity.

A corridor approach is new for Malaysia. It is consistent with a body of new theories of economic development, including new growth

theory, new trade theory and new theory of economic geography. This study takes elements of these theories to underpin the proposed approach towards strategic development in the Northern Corridor. The approach encompasses measures to develop the economy, cities and people.

An important element of the Northern Corridor is that it represents a political commitment to spur development in the area. The politics of place is complicated in every country, and nowhere more so than in Malaysia where place, ethnicity, poverty and other political drivers coincide. For example, decisions to promote Langkawi as a tourist destination created competition with tourism in Penang. Efforts to spread development evenly across the country complicated the emergence of a denser E&E cluster in Penang that could have created higher national

value-added. By creating a better-networked economy, the Northern Corridor can serve to integrate Penang and Kulim, gain stronger advocacy in federal agencies, such as the Malaysian Institute of Microelectronic Systems (MIMOS), on the focused needs of specific industries, and push for connectivity that can catalyse new business opportunities.⁶

A corridor approach can be very useful for promoting development, if well executed. Malaysia is highly centralised, with many “siloed” ministries. One-stop shops have had limited success. Investment and sectoral priorities are centrally determined, but these may lack coherence when implemented at the state or local level. The commitment to follow up to solve local implementation problems is also limited by distance. The corridor authority can resolve these contradictions and is in a position to assess local capabilities, develop local clusters, and build up local cities as anchors for a new, geographically-oriented strategy.

⁶ One example of such change is the rapid development of tourism in Sabah once direct flights to Kota Kinabalu were approved by the federal government.



PENANG'S ECONOMY

- MACROECONOMIC OVERVIEW
- PENANG FACING SERIOUS STRUCTURAL CONSTRAINTS
- MOVING UP THE VALUE CHAIN
 - AGRICULTURE
 - MANUFACTURING & SERVICES
- SPECIALISATION AND ECONOMIES OF SCALE:
SIX FOCUS AREAS TO DRIVE GROWTH

From a trading port in the 1950s, Penang has evolved into one of the largest global electronics manufacturing hubs. Its further development is being constrained by structural impediments. It must break out of this. The course of change must see Penang retain its core export firms and develop them as clusters linked with support services. To achieve excellence and to avoid “blind diversification”, six focus areas have been identified as drivers of Penang’s growth — technology-based manufacturing, biotechnology/life sciences, business-process outsourcing (BPO), logistics, tourism (with niches in medical tourism and meetings, international conventions and exhibitions or MICE) and agribusiness. These six areas were chosen based on the potential to generate scale economy, link Penang with regional and global demand as well as to build on Penang’s existing strengths while offering opportunities for further technological upgrading.

Macroeconomic overview

Penang has exhibited strong growth for the last four decades, driven by FDI in the assembly of E&E products and tourism. Yet the state seems increasingly trapped between fast-moving low-cost giants like China, India and Vietnam at the low end, and by highly-skilled research and design centres like Singapore and Taiwan at the other end.

As a consequence, traditional sources of growth have started to lose steam. The solutions of the past, for example, the generous fiscal incentives package used to promote manufacturing in the 1970s and 1980s,¹ do not seem to be good enough this time around to attract the next generation of industries needed for Penang's renewal. In addition, Penang is facing serious structural constraints including skills shortages, infrastructure bottlenecks and a high regulatory burden.

Penang has done particularly well in the past 40 years

Over the past four decades, Penang's growth performance has been impressive. GDP grew from RM790 million in 1970 to RM46,744 million in 2008, achieving an annual growth

rate of about 7 per cent and by 2008, Penang's GDP per capita was 58 per cent higher than the national average at RM19,120. The manufacturing sector accounted for 54 per cent of Penang's GDP in 2008 compared with 13 per cent in 1970. In 2008, Penang contributed 8.8 per cent of Malaysia's GDP and 6.2 per cent of employment in the country.

From a trading port in the 1950s, Penang has evolved into one of the largest global electronics manufacturing hubs with more than 200 multinational technology manufacturing companies with all the major global players in E&E running large operations there.² While it has a population of only 1.4 million, making it the second-smallest state in Malaysia, Penang has become the country's second growth pole, after the Klang Valley. In addition, this spell of sustained growth was accompanied by significant poverty reduction.

Between 2002-07, the global economy performed much better than had been expected — global growth averaged an unprecedented 4.7 per cent annually, yet Penang (and Malay-

From a trading port in the 1950s, Penang has evolved into one of the largest global electronics manufacturing hubs with more than 200 multinational technology manufacturing companies with all the major global players in E&E running large operations there.

1 The World Bank (2006).

2 AMD, Intel, Agilent, Dell, Bosch, Sony, Siemens, Motorola, Osram, Altera and Braun, among others, have made massive investments in Penang.

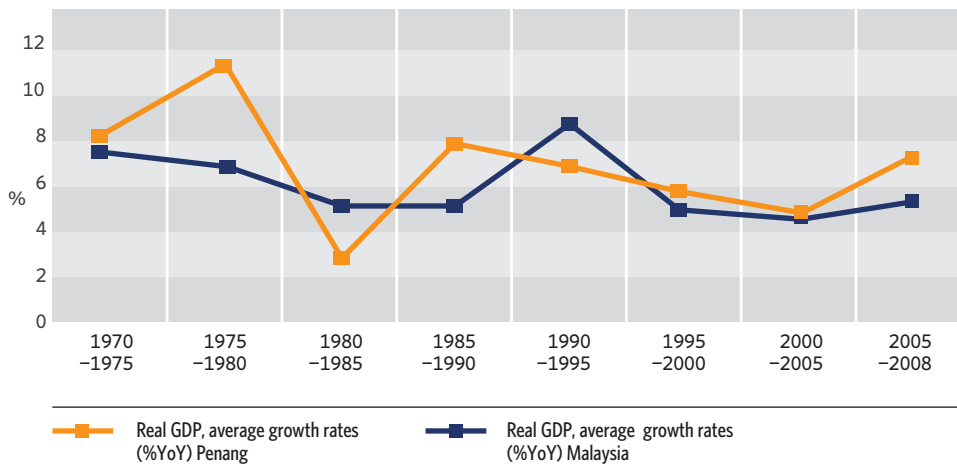


FIGURE 2: REAL GDP GROWTH (%YoY) IN PENANG 1970-2008
Source: Malaysia Plans, KRIS

sia) did not benefit as expected from this surge. In fact, Penang's growth continued to drop over successive five-year periods (Figure 2, page 23). Other competing economies like China, Vietnam and India have grown faster and have become competitive threats.

MNCs in Penang have not established strong linkages with the domestic economy and, as a result, they can move, and have moved, operations to other locations that offer lower costs without significant disruption.

Data from productivity and investment climate surveys provide preliminary evidence that Penang may face serious impediments to productivity growth and competitiveness in the shape of skills shortages, infrastructure bottlenecks and a high regulatory burden, as well as concerns about crime.

Moreover, MNCs in Penang have not established strong linkages with the domestic economy and, as a result, they can move, and have moved, operations to other locations that offer lower costs without significant disruption.

Penang's exports led Malaysia out of the 1997-98 financial crisis and recovered rapidly after the cyclical collapse of the global electronics sector in 2001. Hardcore poverty has been substantially eradicated and the employment rate is above the national average. Yet, despite these considerable success, Penang's economy is fragile. Per-capita income only grew by 1.9 per cent per year from 2000 to 2005. Investment in Penang is shrinking as a share of total investment in Malaysia (although this reversed itself in 2007).

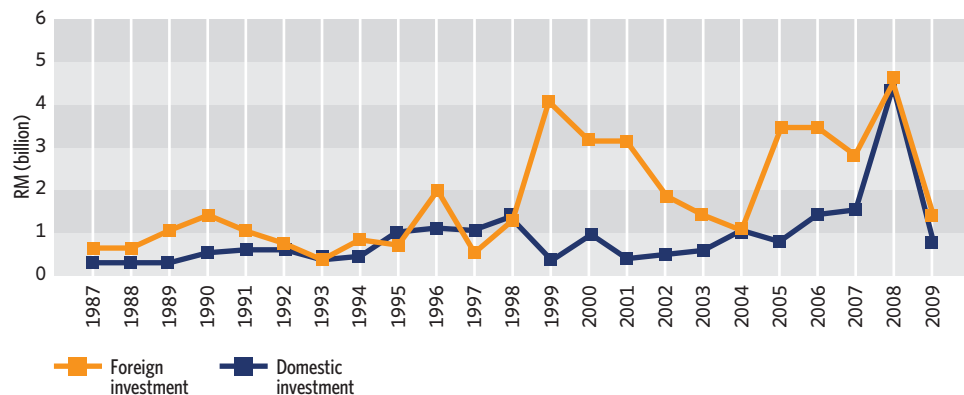
Traditional growth engines are losing steam

Agriculture in Penang has shrunk to just 1.8 per cent of state GDP. It has registered solid growth, but has not shown signs of upgrading to higher-value production. Manufacturing growth seems to have peaked by the mid-1990s. After slightly rebounding from the 1997-98 financial crisis, the E&E-dominated Penang manufacturing sector was hit in 2000-01 by the bursting of the dotcom bubble. It rebounded thereafter, but has fallen well short of the double-digit growth that was recorded in the past. Construction has also been volatile and, on average, has contributed little to Penang's recent growth. Service-sector growth, including tourism, has been steady but unspectacular.

A clear indication of the weakening dynamism of manufacturing in Penang is the slowing of FDI inflows. FDI approvals in Penang, in manufacturing especially, have been declining since 2000. However, Penang is still an important destination for FDI. In 2007, around 21 per cent of all FDI approvals flowing to Malaysia went to Penang, and around one third of all E&E FDI was directed at Penang (Figure 3).

In addition, Penang's appeal as a destination for foreign visitors has been fading. Foreign arrivals of tourists are 50 per cent down from the peak in the late 1990s. In 2004, 3.5 million foreign tourists visited Penang. That represented just 43 per cent of the total for Malaysia, compared with a share of 62 per cent in 2000.

**FIGURE 3:
APPROVED
MANUFACTURING
PROJECTS IN
PENANG**
Source: MIDA
Penang, KRIS



Penang facing serious structural constraints

Some studies suggest that the decline in growth rates in Penang is the result of serious structural constraints.³ Data from productivity and investment climate surveys provide preliminary evidence that Penang may face serious impediments to productivity growth and competitiveness in the shape of skills shortages, infrastructure bottlenecks (electricity and telecommunications) and a high regulatory burden (customs and business licensing), as well as concerns about crime. These constraints appear to be more serious in Penang than in other parts of the country, possibly because exporters in the state face a more competitive climate than domestic firms and cannot easily absorb regulatory costs.

Unfavourable business and investment climate

The constraints are highlighted by data obtained from a report "Doing Business in Penang".⁴ They reveal the regulatory burden faced by firms in Penang in terms of entry, operating and exit costs. Many other countries have simplified business startups through reforms.

Penang, and Malaysia, can ease the difficulties of starting a business by reducing the number of procedures and the time taken to implement them, cutting the minimum capital requirement, introducing a one-stop shop, standardising incorporation documents, cutting antiquated formalities and allowing online business startups.

High entry costs

Overall, the cost of starting a business is slightly higher in Penang compared with Malaysia as a whole and about the same as in South Korea. However, compared with other island

economies like Singapore and Hong Kong, or even Thailand, starting a business in Penang is much more expensive.

The issue is implementation inefficiencies. The number of procedures involved in building a warehouse is the same for both Penang and Malaysia, but the cost in Penang is much higher (Figure 4). The approval process, especially on the planning permission and building plan, takes longer.

Dealing with construction permits in Penang is worse than in Kuala Lumpur or other states because of the bureaucratic complexity in the local authority (it was commented that Dewan Bandaraya Kuala Lumpur is more efficient in its work). Too many procedures and overlapping of processes also lead to a longer time in completing warehouse construction. Cutting red tape and bureaucracy is essential.

One indication of the high cost of entry is the time taken to construct a standard warehouse. Most businesses need some facility for storage of their goods, but in Penang, the local authorities have not been service-oriented in providing necessary planning and building approvals (by the Planning Department, Town Services Department, Building Control Department and Public Works Department). As a result, it can take years to obtain the required clearances.

Among ASEAN countries, it is easier to deal with construction permits in Singapore and Thailand than in Malaysia. In Singapore, almost 99 per cent of applications are now submitted electronically through the Construction and

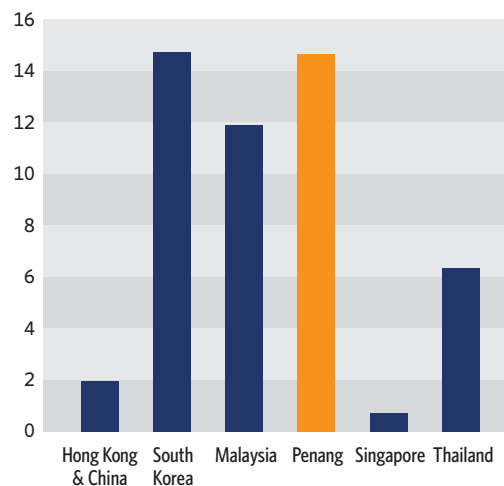


FIGURE 4:
COST TO START
A BUSINESS (%
OF INCOME PER
CAPITA)

Source: The World Bank, *Doing Business* (2009), Penang Business Survey, Khazanah Nasional Berhad (2009)

³ The World Bank (2005).

⁴ Following The World Bank's *Doing Business* methodology, leading law firms and tax preparation agents providing services to manufacturing firms in Penang were interviewed. Results were then compared to the *Doing Business* findings for Malaysia.

Real Estate Network (CORENET). In Hong Kong (China) under the “Be the Smart Regulator” programme, a broad initiative to improve business licensing, the government reduced the time to deal with construction permits by 36 days and eliminated eight procedures related to inspections and pre-approvals.

A worker with 20 years of employment in a medium-sized business receives a severance payment of 84 weeks’ salary in Penang (75 weeks in Malaysia) compared to four weeks in Singapore, 10 weeks in Hong Kong and 54 weeks in Thailand.

Penang, and Malaysia, can improve by reducing permit-processing times, setting up a one-stop shop, computerising the permit process, setting statutory time limits for issuing permits, introducing a new building code and improving inspection for construction projects.

If businesses try to get a fast start by purchasing other businesses, they still face significant obstacles. The time to purchase a property from another business, and to transfer the title to the buyer’s name, can take up to five months in Penang, compared to five days in Singapore.

High operating costs

Penang still enjoys advantages compared to the rest of Malaysia in efficient trade logistics. Export and import costs are lower due to cheap

port and terminal handling charges (RM1.40 per cubic metre in Penang) and the short distance from the pick-up area to the port. All procedures, for both export and import, can be done within a time frame of 12 days as compared with 18 days for Malaysia as a whole. But these advantages disappear compared with neighbouring competitors. For example, Singapore has the shortest time in the world to process imports.

Singapore, South Korea and Hong Kong have made great strides in improving logistics and have halved the time taken to process exports and imports compared to Penang (Figure 5).

They still charge more per container (US\$456, US\$742 and US\$625 respectively) compared to Penang (US\$373) but this rewards greater efficiency. Others have also been reforming faster than Malaysia or Penang. Thailand was the top reformer in 2009, cutting the number of necessary documents and introducing a new Internet-based customs clearance system in 2009.

High exit costs

One obstacle for many firms in Penang is the rigidity of labour laws. When the economic environment changes, as has happened periodically, especially in cyclical industries such as electronics, most firms adjust by reducing their

FIGURE 5: TIME TO EXPORT AND IMPORT (RIGHT)

Source: The World Bank, *Doing Business* (2009), Penang Business Survey, Khazanah Nasional Berhad (2009)

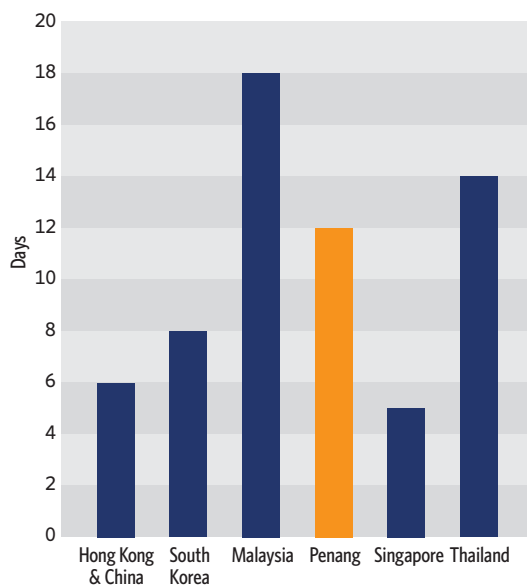
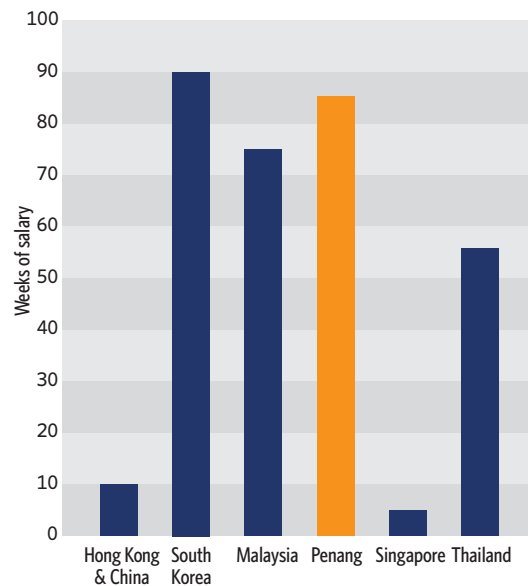
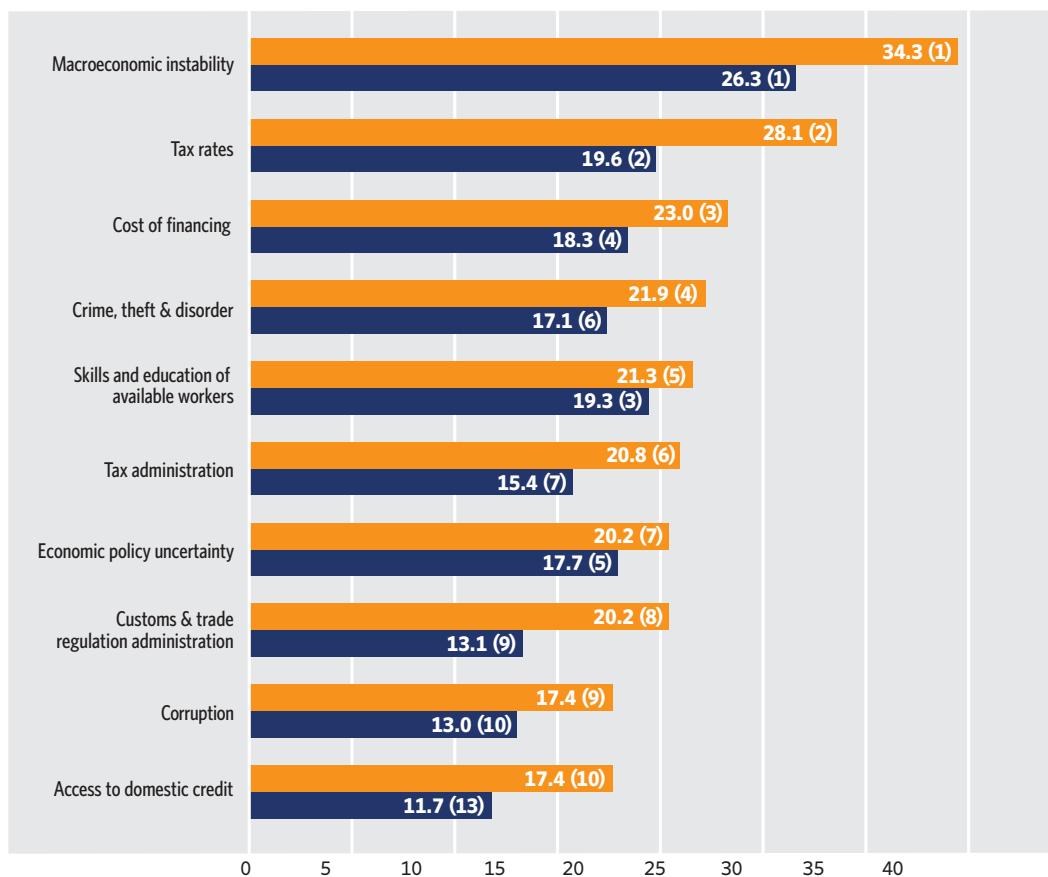


FIGURE 6: FIRING COST IN WEEKS OF SALARY (FAR RIGHT)

Source: The World Bank, *Doing Business* (2009), Penang Business Survey, Khazanah Nasional Berhad (2009)





**FIGURE 7:
GOVERNMENT
REGULATIONS
AFFECT
PENANG FIRMS
MORE (%)**
Source: Zeufack
and Gopalan
(2009)

Per cent of firms identifying indicated problem as one of top-three concerns (number in parentheses denotes rank in respective year)

Penang Malaysia

labour force. But in Penang (and more generally in Malaysia), the cost of this is much higher than in competitor countries.

For example, a worker with 20 years of employment in a medium-sized business receives a severance payment of 84 weeks' salary in Penang (75 weeks in Malaysia) compared to four weeks in Singapore, 10 weeks in Hong Kong and 54 weeks in Thailand (Figure 6). The high severance payments in Malaysia and Penang compared to other countries is partly the result of a policy that protects jobs, not people.

In more advanced economies, such as in Europe and those within the Organisation for Economic Co-operation and Development (OECD), public unemployment insurance provides protection to workers, so a firm does not

have to provide high severance benefits. Such a policy package transfers the burden of social protection from firms to the government, making firms more competitive.

Overall, the costs of doing business in Penang are higher than in Malaysia, and this puts the state at a disadvantage. More than one-fifth of the firms in Penang rank macroeconomic and policy uncertainty, high tax rates (including on labour), high financing cost, theft and security, worker skills and tax regulations as obstacles to doing business. Significantly, these obstacles are more serious for firms in Penang than for firms elsewhere in Malaysia. The regulatory and licensing reform agenda is more important for Penang than the rest of the country (Figure 7).

Moving up the value chain

Internationally, Penang has been one of the world's most successful stories of rapid industrialisation. The share of agriculture in the state GDP dropped from 12 per cent in 1970 to around 2 per cent in 2008 while manufacturing rose from 23 per cent to 54 per cent in the same period. The share of services to Penang's GDP has remained close to the national average.

AGRICULTURE

Agriculture's role in the regional economy of Penang is much smaller than in the national economy (Tengku Mohd Ariff, 2001). Nevertheless, it is an important source of livelihood for many people and a major resource of the states surrounding Penang. Like other middle-income regions, Penang and the rural areas in the Northern Corridor can benefit by integrating better with each other, developing supply chains that connect modern agriculture with global markets.

Agriculture was the only sector in Penang

that recorded negative growth in the 1990–2000 decade. Since productivity gains in agriculture during that decade were unable to offset an outflow of human resources from agriculture to the other sectors, agriculture's share of Penang's GDP decreased significantly, from 7.2 per cent in 1990 to just 1.8 per cent in 2008 (Figure 8).

There has since been some resurgence in agricultural growth for the Penang region, thanks mainly to the commodity boom of recent years (Table 2).

Favourable climatic advantage

Penang enjoys a favourable year-round equatorial climate, which is warm and sunny, along with plentiful rainfall, especially during the southwest monsoon from April to September. Temperatures are uniformly high throughout the year. They average 78°F to 82°F (25°C to 28°C) for most lowland areas. Temperatures are lower in the interior highland regions. The mean annual rainfall is approximately 100 inches (2,540mm).

These climatic conditions, good for growing crops, are influenced by the surrounding

FIGURE 8: PENANG GDP BY SECTOR

Source: Malaysia Plans, Mid-term reviews of Malaysia Plans, KRIS

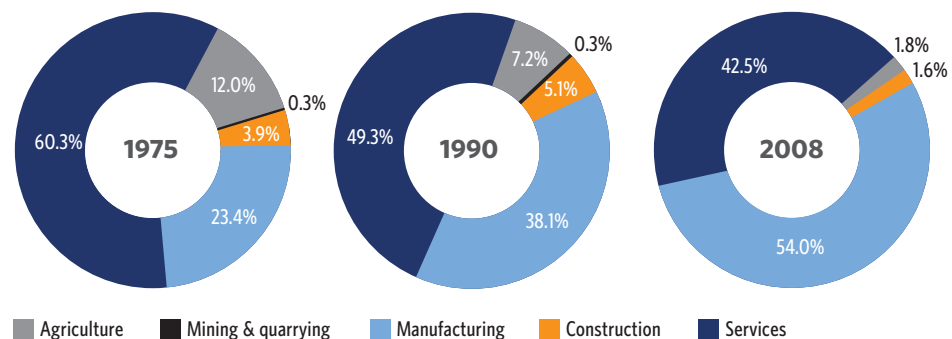


TABLE 2: PENANG: GROWTH RATE OF GROSS REGIONAL PRODUCT (IN 1987 CONSTANT PRICES)

Source: Penang State Government

	2001	2002	2003	2004	2005	2006
GRP (RM mil)	16,773	17,501	18,788	20,032	21,128	22,254
GRP growth (%)	-2.5	4.3	4.2	6.6	5.5	5.6
Agriculture	17.6	3.6	3.4	4.5	2.7	4.2
Mining	5.9	-3.1	-4.6	-7.4	-3.0	4.4
Manufacturing	-11.9	4.5	4.1	9.6	5.9	5.9
Construction	-3.1	-8.8	3.3	-11.1	-1.3	2.4
Services	5.4	5.0	4.5	5.4	5.6	5.5

sea and a wind system of eight or nine major airstreams. The advance and retreat of these airstreams are responsible for the division of the climatic year into four seasons: the north-east monsoon (from November or December to March), the first inter-monsoonal period (March to April or May), the southwest monsoon (June to September or early October), and the second inter-monsoonal period (October to November).^{5/6} However, Penang's proximity to Sumatra, Indonesia makes it susceptible to dust particles carried by wind from perennial but transient forest fires, creating a phenomenon known as haze.

Soils are strongly acidic and coarse-textured and have low amounts of organic matter. They have been exposed for a long time to intense tropical weathering and most of their plant nutrients have been leached out. Regular applications of fertilisers are therefore necessary in order to sustain crop yields. Soil erosion is always a danger on sloping ground. Building contour embankments or planting protective cover crops are therefore required.

Supporting infrastructure and services

Penang enjoys an excellent infrastructure of roads, utilities, ports and airports. There is a large irrigation system for the rice lands but it needs to be expanded. The feeder road system also needs to be upgraded to allow better access to the hinterland in order to help producers or traders bring farm products to major distribution and consumption centres such as George Town.

The Butterworth area of Penang on the mainland where the seaport is located is well connected to the main interstate road system, especially the North-South Expressway that traverses the Malaysian peninsula from Singapore to Thailand, linking Penang to the North-South Corridor to China. Overland access to China is one of the major comparative advantages Penang has to support agricultural development.

Furthermore, within Penang, there are several supporting industries such as input suppliers, equipment suppliers and packaging companies, which are essential to value-added agricultural development. Penang also has numerous trade service providers, such as freight forwarders and customs brokers, who are crucial to facilitating trade and keeping transaction costs down.

All these conditions, as well as the upgrading of the main seaport, augur well for efforts to develop Penang into a major logistical hub for agricultural products. Realising this would require:

- More and better exportable supply of goods;
- Better commercial linkages to markets;
- Investment tailored to the specific competitive requirements of major value/supply chains; and
- Better coordination between the passenger and cargo aspects of transport service. Open skies policies, cheap back-hauls, charters and cold chain logistics are typically key to achieving a takeoff in the export of high-value perishable products.

Penang also boasts a network of research institutes and R&D facilities, universities and training centres that are the cornerstone for any knowledge-based economy. While not yet agriculture-oriented, they can certainly contribute to food processing and manufacture. And one in particular — the life sciences park — could expand into agricultural biotechnology if the right applications, business models and partners can be identified.

Creating an agribusiness free trade zone

Agribusiness free trade zoning is an innovative concept implemented as a source of agricultural growth in rapidly-developing countries. These countries want to leverage on good growing conditions and strategic geographical location close to major international and/or regional markets. However, many lack the technical knowhow, the managerial skills and the availability of packaging and/or processing equipment, materials and supplies.

It is envisaged that the major drivers of the agribusiness strategy proposed for Penang would

⁵ *Encyclopaedia Britannica*.

⁶ <http://en.wikipedia.org/wiki/Penang>.

BOX 5: Penang as hub of support services for aquaculture industries



The market place for seafood is changing. There is growing awareness among consumers about the global nature of food production. Consumers today are demanding stricter food safety and traceability, and as well as greater

production compliance towards environmental sustainability. Major retailers such as Wal-Mart, and food service companies like Darden, have made commitments to buy only fully-certified and sustainable shrimps in their procurement policy. These changes will have a huge knock-on effect all along the production chain. As a result, the nature of seafood aquaculture production is undergoing a significant long-term change. These changes towards certification and traceability will inevitably require advanced support services in all aspects of the industry.

A growing shrimp market demand that now exceeds US\$19 billion and changing requirements of standards in production give Malaysia an opportunity to position itself as a country of origin for safe seafood. Malaysia is well-suited to reach this objective with natural endowments of good weather, world-class infrastructure and skilled human capital. In addition, shrimp aquaculture is a high-income venture for the farmer in comparison to other crops like paddy and palm oil. Table 5A illustrates the comparison.

To position itself as a country of origin for safe seafood, the Malaysian government has committed to a programme to increase the production of high-quality shrimp that can be supported by a credible

certification and verification system. Investments thus are planned for establishing a fully-accredited shrimp diagnostic laboratory, capacity building of food-safety auditors, an Aquaculture Skills Development Centre, and enhancing the capability in shrimp aquaculture R&D.

The geography where this global food megatrend will play out is the north west region of Peninsular Malaysia that covers the states of Perlis, Kedah, Perak and Penang. This region has a long seafood production history and is now a hub for shrimp aquaculture. Within this region alone, there are over 3,500 ponds across 2,800 hectares producing more than 45,000 metric tonnes (MT) of *Panaeus Vannamei*.¹ The region is also home to the highest concentration of seafood processing plants in the country² (see Figure 5A).

However, production as a whole has not been sustainable and farms frequently experience boom-and-bust cycles. The sustainability of the aquaculture sector is hampered by outdated aquaculture technology and management practice employed by farms. Because the vast majority of farms are small, they lack the necessary design and infrastructure to support production and ensure biosecurity. Compromises are made on food-safety standards

- 1 These figures were provided by various feed companies and averaged out. Assumptions are also made on two production cycles *Panaeus Vannamei* and at 8 metric ton harvest per cycle.
- 2 Malaysian Frozen Foods Processors Association, Ministry of Health.

**TABLE 5A:
REVENUE COMPARISON
BETWEEN SHRIMP,
PADDY AND PALM OIL**

Source: Malaysian Palm Oil Board (MPOB), NCIA & PERDA (Lembaga Kemajuan Wilayah Pulau Pinang)

DESCRIPTION	PADDY	PALM OIL	SHRIMP
Production Cycle/year	4.5MT/cycle 2	7MT/year	12MT/cycle 2
Price/MT	RM1,200	RM2,500	RM10,000
Estimated turnover annually	RM10,800	RM17,500	RM240,000

be industries involved in fresh-cut products. They process and sell fruits and vegetables produced locally and in nearby countries. Some also cultivate bananas for emerging international markets.

Fresh-cut products are the fastest-growing items on supermarket shelves in much of the developed world, reaching sales growth rates of more than 20 per cent annually. These industries have the potential to create a large impact measured in terms of annual sales, volume output, value added, job creation and tax-revenue generation. They also have high aggregation

potential and are especially suited to attract talent and to contribute to the development of a knowledge-based economy. Feasibility studies and foreign partner interests demonstrate the considerable potential of this sector.

The agribusiness development strategy for Penang will be centred on an ASEAN free trade zone (AFTZ) that will promote the creation of different types of agribusinesses capable of utilising local products, human resources and supporting soft and hard infrastructure. Most importantly, the AFTZ will greatly contribute to the

and the risk of exposure to disease is enhanced. In addition, there exist a weak aquaculture services sector that the industry needs to operate at the required higher level of standards and expertise. Due to these weaknesses, the industry hit a crisis when in 2008 a team of EU auditors concluded that the supply chain did not meet the standards for import into the lucrative EU market. Malaysia was forced to impose a unilateral export ban to the EU that had a tremendous negative impact on the industry.

Emerging from this crisis, Blue Archipelago Berhad, a subsidiary of Khazanah Nasional, developed a joint programme with the Malaysian Department of Fisheries to promote “new aquaculture” based on the principles of financial and ecological sustainability. Blue Archipelago operates the largest integrated shrimp farm in the Northern Corridor region that spans 420 hectares. The company took over an ailing Kerpan farm in 2008 and put in place a programme to transform it into a “new aquaculture” operation. This involved upgrading of infrastructure such as high-density polyethylene lining of ponds and canals, and investments in an on-site processing plant and a hatchery to turn the farm into a fully-integrated aquaculture operation. The integration ensures a more efficient system of traceability and control over food-safety protocols.

A key value proposition of Kerpan farm is that all aspects of the production chain — from fries to grow-out to processed shrimps — are guaranteed to achieve particular global standards that are backed by certification. Standard operating procedures (SOPs) governing all aspects of the production chain are designed to comply with standards set by the US Food and Drug Administration, third-party certification bodies such as the Aquaculture Certification Council (ACC) and the GLOBALGAP.

A key success of the Blue Archipelago initiative has been the enthusiastic response of the market for Kerpan farm’s products. In the past, the farm could only sell its products in the domestic market or to neighbouring Thailand. Today, the farm is producing for the premium markets of the EU, Japan and the US. It was the first farm to be awarded the Fish Health

Certificate to export its products to the EU market since the 2008 export ban.

While Penang is the largest urban centre in the Northern Corridor region, the shrimp aquaculture farms of the northwest peninsula represent its production hinterland. The concentration of 33 seafood processing plants as well as shrimp-feed operations, such as Charoen Pokphand and Gold Coin, in the region is evident of the already established hub and hinterland relationship that Penang offers to the industry. As the industry shed its old ways and move towards “new aquaculture”, strong support in the form of services and logistics from Penang will become crucial.

Penang already has an established list of natural endowments such as infrastructure of roads, utilities, ports and airports. The superior logistics of Penang and associated services such as freight forwarding, insurance and finance, will facilitate farmers to gain access to global markets. Finally, Penang is poised to contribute significantly to shrimp aquaculture R&D due to the concentration of research facilities located here. This includes global bodies such as the Worldfish Centre, the Fisheries Research Institute, and the marine biology research programme of Universiti Sains Malaysia.

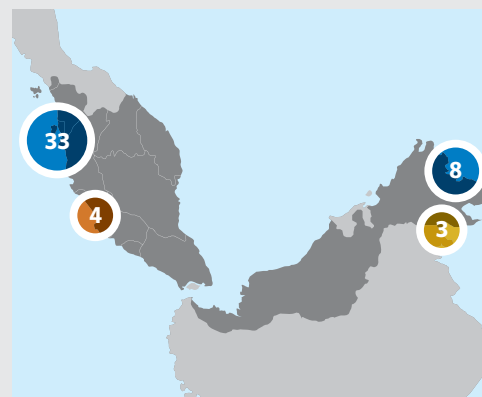


FIGURE 5A:
CONCENTRATION OF SEAFOOD PROCESSING PLANTS IN MALAYSIA
Source: Shahridan Faiez, Blue Archipelago (2010)

development of a knowledge-centred economy by bringing in much-needed knowhow, expertise and state-of-the-art technology to foster Malaysia’s own agricultural development.

Promotion of local and regional fruits

The Northern Corridor region produces a wide variety of fruits and vegetables. Among the most important economically are mangoes in northern Kedah, pomelos in northern Perak and durian in the whole region. Other products with high market potential but very little pro-

duction are pomegranates, pineapples, papayas and other citrus fruits.

These local and regional fruits have the potential to (1) compete as fresh products to be distributed locally and exported as whole fruits to nearby markets and (2) enrich the fresh-cut mix of products as raw materials. They could also be supplied to plants that process juices, pulps and concentrates. In the case of papayas and pineapples, the Malaysian Agrifood Corporation (MAFC) and the Malaysian Agricultural Research and Development Institute (MARDI)

have developed new varieties that are very promising indeed.

Recently, the Japanese and Malaysian governments finalised a protocol that allows the export of mangoes to Japan, but similar work must be done to get a different protocol (hot air treatment) approved by China. If that happens, the same facility can be used for a wider range of tropical fruits, including carambola. The Chinese market for tropical fruits is vast.

Yield enhancement in rice for food security and import substitution

The Malaysian government has a policy to achieve 91 per cent national self-sufficiency in rice. Since subsidies are involved for producers, and sometimes millers, this creates a market opportunity for industry players in the Northern Corridor, long known as Malaysia's "rice bowl".

Significant opportunities to raise yields for rice through block farming and more intensive management are already known and proven elsewhere. In addition, serious discussions have begun with the Consultative Group on International Agricultural Research (CGIAR), the International Rice Research Institute in the Philippines, MARDI and other rice industry stakeholders on the revitalisation of the national rice improvement programme. They are to work, among others, on "cool rice" adapted to climate change, as well as better-performing hybrids.

Instead of the traditional "high-volume, low-mix" production of electronic products, Penang's industry must graduate to a "low-volume, high-mix" of technology-intensive products.

MANUFACTURING & SERVICES

Penang is one of the most successful export-processing zones in the world. Its E&E cluster, in particular, is the most vibrant of all 10 clusters studied by the UNIDO's 2009 *Industrial Development Report*. Over the period of 1971–2005, most of the biggest foreign electronics MNCs invested in Penang. They were the prime pillar of investment, employment and exports in the state. Penang's proactive strategy included the provision of financial incentives and quality ba-

sic infrastructure at export processing zones.

Aggressive promotion and direct approaches to meet with CEOs from flagship firms by the Penang Chief Minister and other senior state government officials, the management of the Malaysian Industrial Development Authority (MIDA) and the Penang Development Corporation (PDC) were also instrumental in bringing waves of electronics MNCs from the United States, Europe and Japan to Penang. Electronics manufacturing had, by the 1990s, become a major springboard of Penang's economy and a major contributor to economic growth for the Malaysian economy. In 2008, manufacturing accounted for 54 per cent of Penang's state GDP, compared to 13 per cent in 1970.

However, existing policy frameworks have failed to sustain upgrading into higher value-added activities as have happened in South Korea, Singapore and Taiwan. Efforts to move up the value chain through new institutions like MIMOS and Silterra were not as successful in transforming the industry and establishing a thick E&E cluster as had been hoped. There was a lack of a strong institutional commitment in moving up the value chain, and hence, efforts were diffused and lacked a demand-driven focus to address cluster development needs. The future of the electronics and electrical engineering industry and of other industries rests upon a more focused transition to profitable and higher value-adding activities.

Instead of the traditional "high-volume, low-mix" production of electronic products, Penang's industry must graduate to a "low-volume, high-mix" of technology-intensive products. Moreover, the future growth of Penang's economy also calls for further diversification of tradeable activities so as to complement the core electronics industry and nurture new leading sectors.

Most recently, there is some evidence that a nucleus of Penang-based firms in the E&E industry, mostly MNCs, are upgrading and moving up the value-added ladder and leading the way in innovation. Between 2001–06, Penang had overtaken the Klang Valley as the leading region for patents granted to Malaysians. Penang generated 37 per cent of all patents against only 29 per cent from the Klang Valley. However, the transition is not happening fast enough and in

BOX 6: Intel in Malaysia



itself been in operations for less than five years.

Since then, it has expanded its operations in Penang and into Kulim and Kuala Lumpur, with a total employment of more than 10,000 workers involved in advanced manufacturing, research and development work as well as software development, product design marketing and other local and global shared services. One of the biggest milestones for Intel Malaysia was being part of the Centrino Platform Development and based on this achievement, it continues to support mobile products.

The Intel Penang Design Centre is one of the largest silicon design centres in the region which han-

Intel Corporation established its manufacturing operations in Penang in 1972, with an initial investment of US\$1.5 million and with approximately 100 employees. It was Intel's first offshore operation for a company, which had

dles advanced and integrated design and development work. The operations in Penang also handle shared services for IT, HR as well as finance and payroll support for other Intel operations globally. In addition to this, its Embedded and Communications Group, one of the two offshore sites for Intel Corporation, offers the full spectrum of developmental capabilities for SoC (system on chip), covering architectural design, pre- and post-silicon validation to market-enabling activities for the embedded markets.

Throughout the last 38 years, Intel Penang has been a significant part of Intel Corporation and what began as a low-cost, high-volume manufacturing centre has evolved into a business centre for the organisation in the region. Its involvement, over and above its core activities, in driving educational development, human capital development and in supporting the development of new vendors and business partners in the region has made Intel a part of the Penang community.

the scale that can trigger large externalities (see Annex 4 of the *New Economic Model Report*).

The core challenge for Penang is to raise the rate of productivity growth. Based on an analysis of firm-level performance for 1,600 firm-years, it appears that productivity has grown by only 1 per cent per year between 1999–2006. The highest productivity came from large firms, MNCs and export-oriented firms. Older firms also show higher productivity. However, firms in Penang are today less productive than those in the Klang Valley (Zeu-fack and Gopalan, 2009).

Nevertheless, Penang still accounts for 24 per cent of Malaysia's exports and 46 per cent of Malaysia's electronics exports, suggesting it remains a pre-eminent location for firms. In both cases, Penang's export shares have

increased steadily since 1995, and especially sharply in electronics since 2000 (Figure 9).

The electronics sector is the most important in terms of employment and value-added. It accounts for 60 per cent of manufacturing in Penang and is the largest employment generator with 53 per cent of total manufacturing employment. The sector has a large multinational presence as well as a significant small- and medium-industry segment.

Rapid industrialisation in Penang — A brief history

The first wave of export-oriented electronics firms emerged in 1971–74 (Rasiah, 1988). Export-oriented industrialisation became the prime driver of manufacturing growth from 1971. Japanese-owned Clarion was the first for-

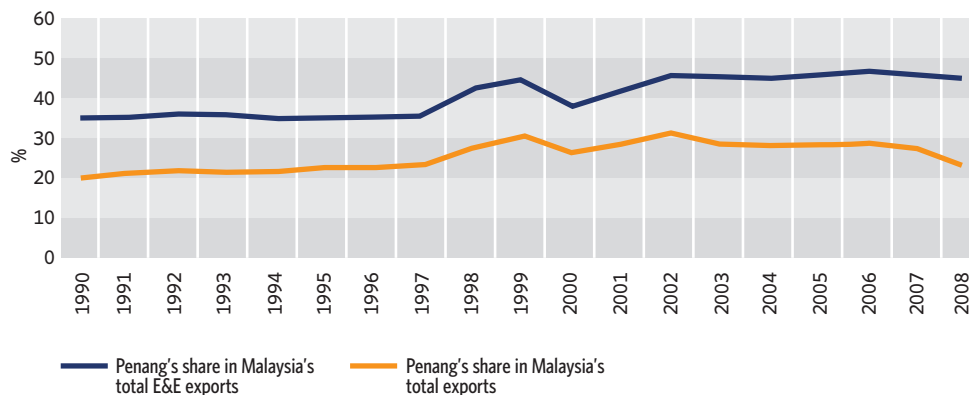


FIGURE 9: PENANG'S SHARE IN MALAYSIA (E&E EXPORT AND TOTAL EXPORT)

Source: Department of Statistics, Bank Negara, KRIS

eign electronics firm to build its manufacturing facility in 1971 in Penang, followed by National Semiconductor from the United States.

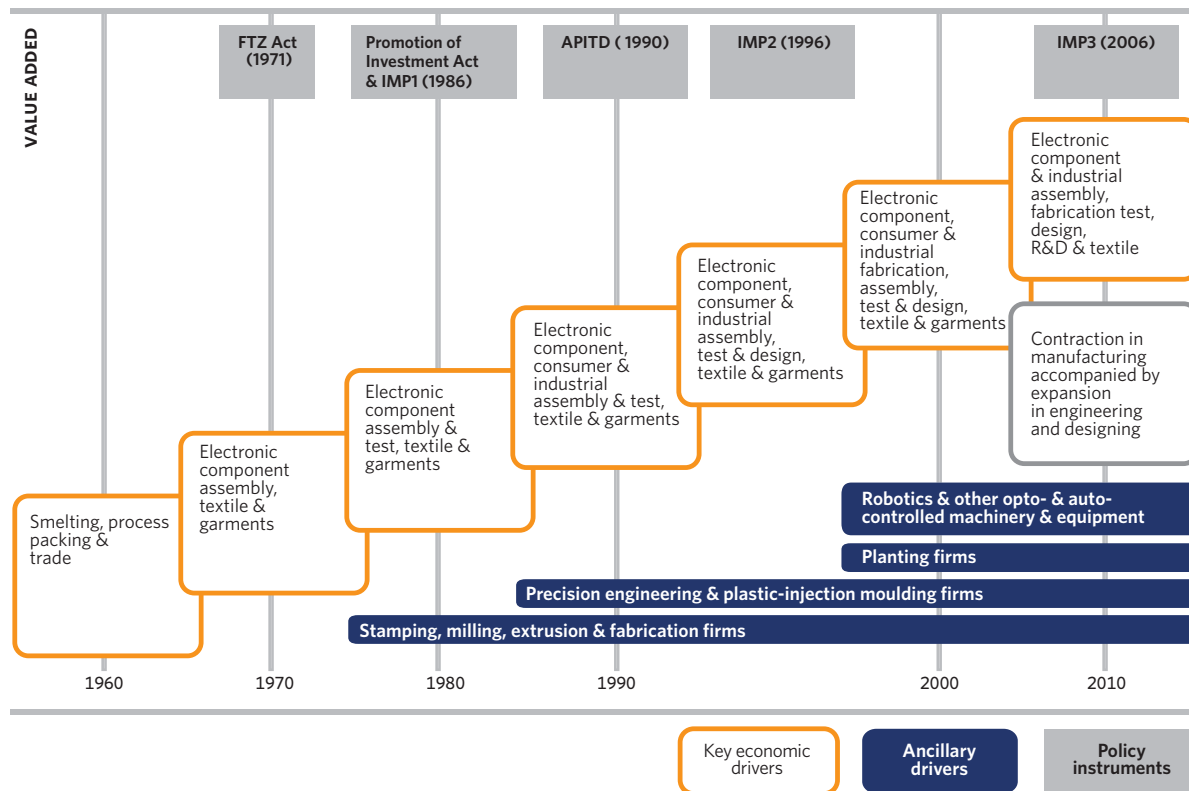
Earlier export-oriented initiatives following the Investment Incentives Act (IIA) of 1968 and the launching of Malaysia's New Economic Policy in 1971 did not prove successful until the free trade zones were opened. They then rapidly expanded between 1972 and 1979. The initial wave of export-oriented E&E firms from the developed countries was driven by a search for low wages. More significantly, they came to Penang because of a strategic government move. The then Chief Minister (now Tun) Lim Chong Eu and his officials proactively visited flagship firms abroad to invite them to move to Penang. It coincided with a time when American and Japanese firms were relocating labour-intensive operations to host sites endowed with large supplies of trainable labour and good infrastructure.

In the 1980s, there was a distinct slowdown in electronics production. Prices of microchips crashed in 1984-86. It resulted in several corporate moves among MNCs to streamline their business activities. For example, Mostek was acquired by Thomson CSF in 1986, which eventually sold the plants to Intergrated Device Technology (IDT) in 1987. In a defensive takeover, Advanced Micro Devices (AMD) acquired Monolithic Memories in 1988. AMD launched the construction of a plant in Bangkok while Intel resumed assembly activities in Manila in the mid-1980s. The realignment led to labour cutbacks. Penang was severely hit and angry workers took to the streets to demonstrate over their retrenchment.

Nevertheless, the mid-1980s crisis did not lead to any closure of the semiconductor firms. Both incumbent and acquired firms invested extensively to automate and reorganise plant layouts, organisational structures and to

FIGURE 10: INDUSTRIALISATION IN PENANG, 1960-2010

Source: Rasiyah, Hamdan and Gopalan (2009)



absorb state-of-the-art process techniques such as just-in-time and materials resource planning (MRPI) and integrated materials resource planning (MRPII) that uses the cellular manufacturing framework. Firms also introduced small group activities and kaizen, a Japanese practice based on continuous improvement of work processes.

Another wave of foreign investors into Penang was triggered by the appreciation of the currencies of East Asian manufacturers after 1985, the withdrawal of GSP (Generalised System of Preferences) benefits from more advanced Asian economies, and the introduction of new incentives via the Promotion of Investments Act 1986 and the Industrial Master Plan in 1986. So rapid was the expansion that it was constrained by labour shortages. The Penang Skills Development Centre (PSDC) was launched in 1989 to overcome growing demand-supply deficits in skilled workers. Local firms established stronger collaboration during this period to avert job hopping by workers.

The 1990s was a period of rapid development of local supplier activities. National Semiconductor started its own machine tool firm called Micro Machining and set up Dynacraft to manufacture lead frames. Intel began an elaborate programme to develop prototypes of machinery and equipment inhouse and to outsource them to fostered local suppliers from 1984. Plastic-injection moulding firms were also developed this way, with Intel fostering several firms and its own suppliers that were later sold to local buyers.⁷

The move to develop independent and preferred suppliers, such as Atlan and Cirrus, led to the emergence of 45 firms in 1989 that expanded to 155 in 1993 and 455 in 2001. These machine tool and plastics injection firms co-evolved with the electronics firms. But the number of suppliers in Penang fell to 189 in 2008, with many engaged only in exporting activities.⁸

Serious labour shortages in Penang and the emergence of more attractive manufacturing sites for labour-intensive operations in Chi-

na, Vietnam and the Philippines started to take their toll in the late 1990s. Disk-drive firms, such as Conner Peripherals and Readrite, relocated out of Penang.

Although Quantum, Seagate and Komag remained in Penang, their labour-intensive operations were relocated out to Thailand and China. Labour-intensive firms also began to relocate more to Johor, Senawang, Melaka and Sama Jaya. The financial crisis of 1997-98 provided temporary relief as domestic costs fell sharply following the crash in the ringgit. But further government efforts could not halt a sharp contraction in productivity and employment growth.⁹

Other middle-income countries, like South Korea and Taiwan, also saw a drop in electronics production and a declining share of global exports as production shifted to China (Table 3). However, these

The lessons for Penang are clear. Government policy must focus on the retention of core export firms, cluster development and industrial upgrading, and promoting linkages within clusters.

9 The Action Plan for Industrial Technology Development (APITD) of 1990 led to the enactment of the Human Resource Development Fund in 1992, the launching of the Malaysian Technology Development Corporation (MTDC) and the Malaysia Industry Government High Technology (MIGHT) in 1993, and the Second Industrial Master Plan (IMP2) in 1996.

COUNTRY (%)	1990	2000	2006
China	1.0	4.5	19.8
European Union (25)	-	29.2	28.8
Hong Kong, China	4.3	5.2	8.6
Indonesia	0.0	0.8	0.4
Japan	22.5	11.2	6.9
South Korea	4.8	6.1	5.8
Malaysia	2.7	5.4	4.7
Mexico	1.5	3.5	3.2
Philippines	0.6	2.6	1.8
Singapore	6.4	7.6	8.1
Taiwan	4.7	6.0	4.4
Thailand	1.2	1.9	2.0
United States	17.3	15.9	9.4
Vietnam	-	0.1	0.1

TABLE 3: GLOBAL SHARE OF IMPORTANT ELECTRONICS EXPORTERS, 1990-2006
Source: WTO (2008: Tables 11.37 and 11.64).

7 For example, Samatech, Shinca, Shintel, Globetronics and Unico.

8 Extracted from interviews with supplier firms in 2008.

countries were able to move up the value chain, and retain higher value-added activities in their home countries. South Korean and Taiwanese firms are at the technology frontier in electronics manufacturing. World-class national firms in South Korea include Samsung, Hynix and LG-Electronics, and in Taiwan they include Taiwan Semiconductor Manufacturing Corporation (TSMC), Acer, ASE Electronics and Winbond. The global leader in 2008 in dynamic random access memory (DRAMs) was Samsung and in logic chips, TSMC.

This brief history shows several recurring features of the electronics industry. It is driven by cost and technology, is intensely competitive across countries, responsive to major global events and export-oriented. Proactive government policies can help, as in the 1970s, but cannot substitute for strong fundamentals. Continued upgrading of skills and technologies is required to remain competitive.

An ecosystem of firms co-evolves, with each providing an impetus to the other in clusters of activity. These clusters are more resilient than any individual firm, although they must be

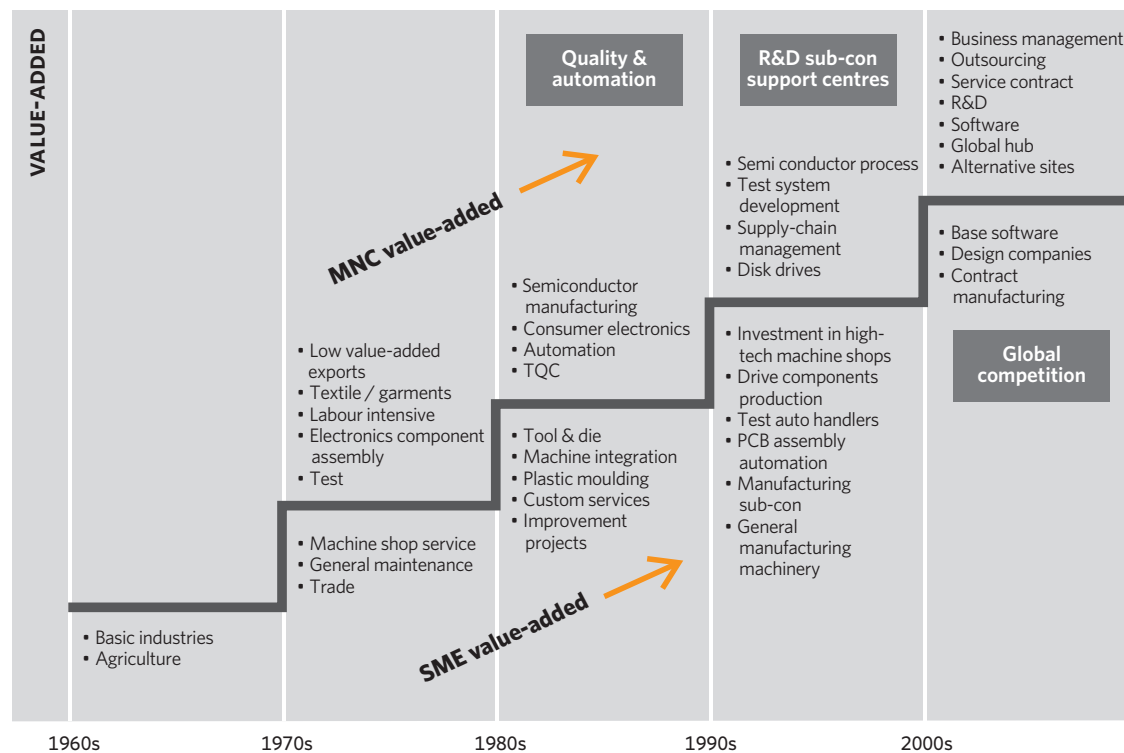
anchored by core firms. The lessons for Penang are clear. Government policy must focus on the retention of core export firms, cluster development and industrial upgrading, and promoting linkages within clusters.

Industrial upgrading

Penang boasts an ecosystem of electronics firms co-evolving with a machine tools and plastics industry. Firms in Penang are engaged in wafer fabrication as well as in chip, process, product and system design. Forward linkages to consumer, industrial and military electronics users have been developed along with backward linkages with moulds, plating, packaging, bonding, lead frames, precision materials, testing and R&D. Figure 11 below shows how both MNCs and SMEs in Penang have upgraded their operations over time.

Much of the upgrading occurred after the dotcom crash in 2000. Although there are some firms that have upgraded to the most sophisticated areas, the number remains few. The challenge is to broaden the degree of industrial upgrading to a sufficiently large number of firms.

FIGURE 11: VALUE ROADMAP – THE PENANG STORY
Source: Technology roadmap for the E&E industry of Penang, PSDC (2007)



One measure of upgrading is the sophistication of exports from Penang-based firms. This can be measured by comparing Penang's export mix with that of other countries. The calculation follows the methodology proposed by Hausmann, Hwang and Rodrik (2007). Each exported commodity is assigned a score given by the weighted average of the per-capita income levels of the exporting country, with weights equal to each country's global export market share. Commodities that are predominantly exported by rich countries are accordingly assigned high scores while those exported by low-income countries get lower scores. The idea is that rich countries export more sophisticated products. These product scores are then combined to a score for a country or region by weighting them by the share of each product in total exports. This is called the region's EXPY score.

Applied to Penang, the results show a stagnation of upgrading during the late 1990s, when Penang was struggling to hold on to labour-intensive assembly operations, even while these were relocating to lower-wage countries.

YEAR	EXPY
1995	11,073.01
2000	11,004.57
2006	13,768.47

But there was considerable upgrading between 2000 and 2006. On average, Penang's exports in 2006 were equivalent to those of a country with a per-capita income level of US\$13,768. In other words, Penang is increasingly competing with rich countries rather than with poor ones, and is steadily upgrading the sophistication of its export mix.

Another approach to measure industrial upgrading is to assess the revealed comparative advantage (RCA) of the products being exported. Penang's RCA is an indicator of the degree to which it specialises in a particular product. For each product, the RCA is given by Penang's global export share in that product, divided by the island's share of global exports in all commodities. When this ratio is greater than one, Penang is said to have a comparative advantage in that product.

TABLE 4:
CHANGES
IN AVERAGE
SOPHISTICATION
OF PENANG'S
EXPORTS

Source: Yusuf and Nabeshima (2009)

SITC 4	RCA	SHORT DESCRIPTION	LALL CLASS*
6642	30.75	Optical glass and elements of optical glass (unworked)	RB2
7631	26.55	Gramophones and record players, electric	MT3
4313	24.25	Fatty acids, acid oils, and residues; degrass	RB1
7522	21.51	Complete digital data processing machines	HT1
6871	20.13	Tin and tin alloys, unwrought	PP
8482	18.72	Articles of apparel, clothing accessories of plastic or rubber	LT1
7528	18.17	Offline data processing equipment, nes	HT1
7628	16.48	Other radio receivers	MT3
7768	12.88	Crystals, and parts, nes of electronic components of heading 776	HT1
8748	10.69	Electrical measuring, controlling, etc, instruments, apparatus, nes	HT2
2320	9.66	Natural rubber latex; natural rubber and gums	PP
7621	9.36	Radio receivers for motor vehicles	MT3
7764	8.02	Electronic microcircuits	HT1
7622	7.28	Portable radio receivers	MT3
8973	6.91	Precious jewelry, goldsmiths' or silversmiths' wares	LT2
7267	6.85	Other printing machinery; machines for uses ancillary to printing	MT3
7599	6.69	Parts, nes of and accessories for machines of headings 7512 and 752	HT1
6852	6.58	Lead and lead alloys, worked	PP
7763	5.50	Diodes, transistors, photocells, etc.	HT1
4242	4.89	Palm oil	RB1

* The Lall Class refers to the classification developed by Sanjaya Lall

TABLE 5:
PENANG'S
TOP 20
COMMODITIES
BASED ON
REVEALED
COMPARATIVE
ADVANTAGE,
2007

Note: PP: primary products, RB1: agro-based, RB2: other resource-based, LT1: textile, garment & footwear, LT2: other, low-technology, MT1: automotive, MT2: process, MT3: engineering, HT1: electronic & electrical, and HT2: other, high-technology
Source: Yusuf and Nabeshima (2009)

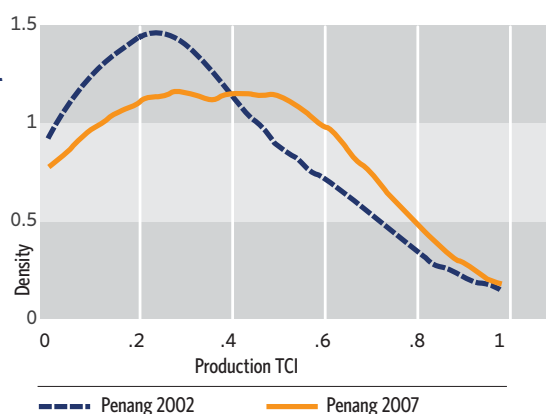
**TABLE 6:
NUMBER OF
PRODUCTS EXPORTED
AND RCA IN
EXPORTS,
CHINA,
MALAYSIA AND
PENANG**

Source: Yusuf and Nabeshima (2009)

NUMBER OF PRODUCTS	1995	2000	2006/7
China	766	763	763
Malaysia	740	740	746
Penang	582	608	601
PRODUCTS WITH RCA > 1			
China	274	279	278
Malaysia	103	101	122
Penang	65	71	72
SHARE OF PRODUCTS WITH RCA > 1 (%)			
China	35.8	36.6	36.4
Malaysia	13.9	13.6	16.4
Penang	11.2	11.7	12.0

**FIGURE 12:
UPGRADING
THE TECHNICAL
CAPABILITIES
FOR PENANG**

Source: Zeufack and Gopalan (2009)



Each product where there is an RCA can be categorised according to whether it is a primary product, resource-based, or has high, medium or low technological content. In 2007, Penang had a comparative advantage across a wide spectrum of products, ranging from primary products like latex and rubber, to palm-oil-based natural resource products, medium-technology products like radio receivers, and a number of high-tech products like data processing equipment. In 2007, seven of the top 20 products ranked by RCA were high-tech compared with only four in 1995.

Despite the apparent upgrading, Penang faces challenges in sustaining its export mix in the face of stiff competition from abroad. Every year, there are about 780 products exported

by at least one country. Major exporters, like China, have a well-developed manufacturing base that allows them to compete across the whole range of products, and China exported 763 products in 2007.

Malaysia as a whole does almost as well, exporting 746 products. Penang's export base is a bit narrower, but still significant, at 601 products. But what is of greater concern is that the share of its exports in products in which it has a comparative advantage is much lower than that of either China or Malaysia as a whole. China has RCA in over one-third of its products while Penang has comparative advantage in less than one-eighth (Table 6).

The strategy for Penang is to raise the share of exports with RCA greater than one and to develop new sources of comparative advantage based on greater technological sophistication.

Upgrading initiatives — Policies and incentives

The Third Industrial Master Plan (IMP3), *inter alia*, targeted the electronics industry for upgrading. This plan included the provision of upfront grants to stimulate participation by firms in high value-added activities such as designing, R&D, logistics and marketing. The government approved Penang's Multimedia Super Corridor (MSC) status in 2006, allowing firms in the state to import human capital for their operations. The government also set up the Northern Corridor Economic Region (NCER) to drive upgrading in the region. There are plenty of incentives for firms in Penang and these are comparable with, or better than, incentives available in other countries, including China and Thailand.

Firms in Penang have responded fast in appropriating the grants and human capital privileges to make the transition to higher value-added activities. Intel announced plans to transfer its assembly operations to Kulim in 2008 to specialise in designing in Penang. Osram was approved capital grants upfront when it sought to introduce wafer fabrication in 2007. Motorola, Intel, AMD, Fairchild, Alterra and Agilent have managed to import more engineers since 2007.

While a handful of largely foreign firms have managed to upgrade, the engineering intensity of the lion's share of firms has not im-

While a handful of largely foreign firms have managed to upgrade, the engineering intensity of the lion's share of firms has not improved substantially.

WHAT PERCENTAGE OF YOUR PRODUCTION MACHINE IS COMPUTER CONTROLLED? (%)	2002	2007
• 1 to 30	23.9	15.5
• More than 30	40.2	48.6

PERCENTAGE OF FIRMS IN PENANG THAT RESPONDED "YES" (%)		
• Employ staff exclusively for design/doing innovation/R&D?	14.3	18.8
• Subcontract R&D project to other companies or organisations?	0.9	9.9
• Paid royalties?	46.2	11.4
• Planning to introduce new designs or products in the next two years?	43.9	52.5
• Upgraded machinery and equipment?	56.1	66.3
• Entered new markets due to process or product improvements in cost or quality?	44.7	50.8
• Filed any patent/utility models or copyright-protected materials?	13.9	16.6
• Developed a new product line?	30.1	33.7
• Upgraded an existing product line?	52.0	53.6
• Introduced new technology that has substantially changed the way the main product is produced?	26.8	34.3
• Adapted or conducted R&D on technology transferred from parent establishment to suit local conditions?	42.5	30.4
• Received any government incentives to conduct technological innovation and R&D?	11.6	5.8
• Received any ISO (e.g. 9000, 9002 or 14000) certification?	34.7	58.0

**TABLE 7:
PRODUCTION
OF TCI
COMPONENTS
FOR PENANG**
Source: Zeufack
and Gopalan
(2009)

proved substantially. This is because of a lack of improvements in the embedding institutions. A survey of 73 electronics firms in Penang in 2008 showed that around 80 per cent regard the embedding support for R&D and designing as weak. This is the result of weak industry-university linkages and a lack of centres to train tool and die makers, engineers and lab technologists.¹⁰ In addition, 81.3 per cent of the electronics firms reported little participation in university curriculum development. In fact, five flagship firms reported that such relationships were much stronger in the early 1990s.

To see the way in which technology upgrading has occurred in response to new incentives, The World Bank's Productivity and Investment Climate Surveys (PICS), covering more than 400 firms in Penang, are used (The World Bank 2005, 2009b) to measure their technological sophistication. The responses to the survey showed that firms have upgraded their equipment, introduced new technolo-

gies and received more international certifications. On the other hand, the amount of royalty payments and the adoption of foreign technologies to suit local conditions have declined. Also of concern is the decline of firms availing themselves of government incentives, from 11.6 per cent in 2002 to just 5.8 per cent in 2007 (Table 7).

Each firm is given a score corresponding to its technological capabilities, based on its response to the survey questionnaire. The degree of upgrading that has occurred is clearly visible in the shifting curve shown in Figure 12 on page 38. The proportion of firms with high technological capabilities is getting steadily larger. It is also the case that firms in Penang are systematically more advanced in their technology than firms elsewhere in Malaysia.

Better technological capabilities translate directly into better firm performance. An analysis of Penang's firms (Rasiah, Hamdan and Gopalan, 2009) shows that productivity in firms goes up with more training expenditure, more process technology expenditure, more R&D expenditure and more R&D personnel. All these variables also add to the propensity of the firm to export. In ad-

10 International Development Research Centre (IDRC) survey (2008).

ASSESSMENT	NUMBER OF FIRMS	%
Very poor	0	0.0
Poor	5	7.3
Fairly good	50	72.5
Very good	14	20.3

TABLE 8:
ASSESSMENT OF
QUALITY OF STUDENTS
GRADUATING FROM LOCAL
PUBLIC UNIVERSITIES IN
PENANG

Source: Yusuf and Nabeshima (2009)

TABLE 9:
LINKAGES TCI
COMPONENTS
FOR PENANG

Source: Zeufack and Gopalan (2009)

PERCENTAGE OF FIRMS IN PENANG THAT REPONDED "YES" (%)	2002	2007
• Technology innovation developed in collaboration with other firms?	40.2	37.7
• Technology innovation developed in collaboration with universities?	11.0	15.9
• Technology innovation developed in collaboration with research institutions?	18.3	21.7
• Technology innovation developed in collaboration with other institutions?	11.0	13.0
• If a supplier to an MNC, did you learn any new technology from the MNC?	19.5	24.6
• Use e-mail in interaction with clients and suppliers?	39.3	37.7
• Use websites in interaction with clients and suppliers?	59.3	44.2

TABLE 10:
COLLABORATION
PARTNERS WHEN
DEVELOPING
TECHNOLOGIES
LOCALLY

Source: Yusuf and Nabeshima (2009)

	YES	NO
With other firms	52 (37.7%)	86 (62.3%)
With universities	22 (15.9%)	116 (84.1%)
With research institution	30 (21.7%)	108 (78.3%)

dition, the skill intensity of production is an important determinant of exports, again suggesting that Penang is increasingly entering higher-skill export markets. The evidence clearly shows that it is possible to substantially raise the technological capabilities of Penang firms even more rapidly if attention is paid to these factors, especially the availability of R&D engineers.

Research universities and university-industry linkages

Research intermediaries can help drive the upgrading of technology and industrial diversification in Penang. There are three types of intermediaries that could contribute in this regard: research universities that undertake fundamental research; research institutes which focus on developmental work, based on platform and hybrid technology and training institutions, such as PSDC which apart from human capital development, also provide testing and design services.

Growing importance should be attached to universities for two reasons:

- One is that the quality and skills of the workforce are major determinants of technological and innovative capacity. They also influence the supply of entrepreneurship and, in particular, entry into high-tech activities.
- A second reason is the comparative advantage universities can generate (subject to commercialisation) as a result of their basic and applied research. For example, Universiti Sains Malaysia (USM) recently decoded the genome for rubber and this can become a source of patents and technology for the Penang economy.

International experience suggests that successful industrial clusters benefit from proximity to high-quality universities. Firms interviewed in Penang indicated that their R&D or product/process development efforts were being impeded by shortages of specialised skills. MNCs hire some technical personnel to work on design, testing and product development¹¹ but as Rasiah, Hamdan

11 While 80 per cent of AMD's chips are produced in Penang, its R&D employees are more involved with process innovation, than with chips "design". Motorola assigns 1,000 engineers for product design. Agilent employs 500 R&D engineers in Penang, mainly on development work. Many of the MNCs identified the low number of engineering and science PhDs and MAs produced by universities as a significant bottleneck. Shortages also contribute to the high turnover among experienced engineers (currently 16 per cent annually) working for MNCs.

	NUMBER OF FIRMS (%)		
	Most important	Second most important	Third most important
Haven't heard of them	33 (26.8%)	08 (7.7%)	08 (8.6%)
Their services are not relevant to your firm's needs	51 (41.5%)	26 (25.0%)	07 (7.5%)
Don't know anyone there to make a first point of contact	20 (16.3%)	23 (22.1%)	22 (23.7%)
Application process too cumbersome	07 (5.7%)	12 (11.5%)	18 (19.4%)
Lack of technical capability inhouse to interact with institutions	01 (0.8%)	22 (21.2%)	15 (16.1%)
Afraid of in-firm technical knowledge leaking out by collaborating	03 (2.4%)	06 (5.8%)	12 (12.9%)
Tried it before and it was not a fruitful experience	03 (2.4%)	05 (4.8%)	09 (9.7%)
Others	05 (4.1%)	02 (1.9%)	02 (2.2%)

TABLE 11: REASONS FOR NOT COLLABORATING WITH UNIVERSITIES AND RESEARCH INSTITUTES
Source: Yusuf and Nabeshima (2009)

and Gopalan pointed out, "In Penang, the supply of R&D engineers and technicians is too small for the [MNCs] to upgrade further into R&D activities" (Rajah, Hamdan and Gopalan, 2009).

While firms find the quality of students graduating from local public universities to be adequate (Table 8), they would welcome improvement in the level of skills.

Few Malaysian firms — whether in Penang or elsewhere — have sought to cement university-industry linkages for the purposes of product upgrading and innovation. The interaction is limited to consulting arrangements and troubleshooting contracts.

This is not unusual for three reasons. First, firms, especially small and medium-sized ones, conduct a minimal amount of R&D and when they outsource, they seldom seek assistance from universities. Second, for larger firms also, universities are ranked low as sources of technology. Third, most firms are specialised in electronics and electrical engineering, which are research-intensive fields. They are not noted for university-industry collaboration.

Few universities anywhere in the world do much downstream applied research in electronics, and USM is no exception, although it has expertise in other selected areas.

The preference of firms in Penang — much like firms in Britain and the United States — to seek technology from sources other than uni-

versities is underscored by the results from the latest round of the investment climate survey,¹² and interviews with firms. Firms in Penang acquire technology mainly through purchase of new machinery, especially imported ones. Only a handful regard universities as a source of technology (Table 9).

Even when the technologies were developed locally, firms did not regard universities and research institutes as their main collaborators. Instead, they identified other firms as preferred collaborators (Table 10).

On a more positive note, the few firms that collaborate with universities in Penang or elsewhere in Malaysia generally regard their services to be satisfactory, especially in identifying new technologies, in modifying existing technologies, and conducting R&D in technologies closer to the frontier. The problem lies in the small number of firms in Penang that regularly collaborate with universities and research institutes in general.

The main reason given by firms that have not collaborated with universities and research institutes in recent years is that they do not feel that such institutions can render services that

¹² The second round of the investment climate survey was conducted in Malaysia in 2007-08. For the results on the first round, please see The World Bank (2005).

**TABLE 12:
RANKING OF
SELECTED
UNIVERSITIES
IN EAST ASIA**

Source: Yusuf and Nabeshima (2009)

GLOBAL RANK		REGIONAL RANK	SCHOOL NAME	ECONOMY
2008	2007	2008		
19	17	01	University of Tokyo	Japan
25	25	02	Kyoto University	Japan
26	18	03	University of Hong Kong	Hong Kong (China)
30	33	04	National University of Singapore (NUS)	Singapore
39	53	05	Hong Kong University of Science & Technology	Hong Kong (China)
42	38	06	The Chinese University of Hong Kong	Hong Kong (China)
44	46	07	Osaka University	Japan
50	36	08	Peking University	China
50	51	09	Seoul National University	South Korea
56	40	10	Tsinghua University	China
166	223	23	Chulalongkorn Universit	Thailand
230	246	33	Universiti Malaya (UM)	Malaysia
250	309	35	Universiti Kebangsaan Malaysia (UKM)	Malaysia
313	307	43	Universiti Sains Malaysia (USM)	Malaysia
320	364	46	Universiti Putra Malaysia (UPM)	Malaysia
356	401–500	51	Universiti Teknologi Malaysia (UTM)	Malaysia

are relevant to their operations. This is compounded by a lack of knowledge of these institutions, the services they offer, and the people to contact (Table 11 on page 41).

Lack of knowledge on services and appropriate contacts can be mitigated by establishing an intermediary organisation which facilitates matchmaking between the university and the firm. There are several different options, depending on the scope of the intermediary organisation. For example, universities can set up technology licensing offices and other affiliated organisations.

One well-known example is UCSD Connect, which has facilitated linkages between University of California San Diego and the local business community. In other countries, a municipality (or a group of municipalities) sometimes act together to promote university-industry linkages with diverse memberships to stimulate the local economy (Yusuf and Nabeshima, 2009). However, such efforts are unlikely to lead to a major shift in the demand for university-based research. From a longer-term standpoint, the most effective approach to building university-industry linkages would be one that gradually improves the quality of teaching and research capacity and carves out a reputation for scientific excellence. With regard to international reputation, Malaysian universi-

ties have improved their ranking, but this is still low (Table 12). They are among the top 200 to 300 universities in the world and among the top 30 to 50 universities in the East Asian region.

To summarise, under these circumstances, USM can assist over the medium term by:

- Improving the quality of education, particularly in the science and engineering disciplines, by enhancing soft skills and enlarging the supply of technical workers. Communication, team working and analytic skills are the ones that many employers feel students lack;¹³
- Initiating post-doctoral programmes in key areas so as to deepen the culture of research and to position the university to generate knowledge in new areas, some of which could have commercial potential;
- Encouraging entrepreneurship with the help of training and specialised services provided through incubators and a science park;¹⁴ and

13 Over 60 per cent of the 167 E&E firms surveyed in Penang and Johor in 2005 reported that university curricula in Malaysia lack interface with their firms' activities, thereby forcing them to invest in longer training periods for new recruits (Rasiah, Hamdan and Gopalan, 2009).

14 The National University of Singapore has initiated some programmes that offer useful pointers (Poh Kam Wong, 2008).

- Engaging in exploratory research and internship programmes with local companies with government funding serving as a catalyst.

The university's ability to attract more students into its science and technology (S&T) graduate programmes and to raise quality will be strongly influenced by the demand for high-level skills reflected in better entry-level salaries and career prospects for graduates and PhD holders. Although employers complain of shortages and of staff turnover, it is not apparent that the salaries of the most highly-skilled workers, and particularly of researchers, have risen sufficiently to be attractive to them.

Diversifying into linked services

Services are important for Penang's economy, contributing more than 54 per cent of total employment of Penang in 2005. However, the sector faces several serious challenges. Labour productivity of services in Penang are lagging behind the rest of the country, with the exception of shipping services, financial services and the hotel industry.

Evidence from business support services sector firms surveyed consecutively, in 2002 and 2007 as part of the Productivity and Investment Climate Survey (PICS), suggest that firm performance over the past decade has been rather disappointing. Annual growth rate of sales of firms located in Penang declined drastically from 30 per cent for the period 1999-2001 to 3 per cent for 2004-06.

Penang needs to remove the barriers that are holding back the services sector's performance for it to drive future growth. As the economy moves up the value ladder and becomes more knowledge intensive, the line between manufacturing and services blurs and the latter would have to play an increasing role in Penang's economy. However, the Malaysian services sector is skilled-constrained and is one of the most restricted in the world. Restrictions on foreign ownership in particular appear to negatively affect the performance of firms that are not constrained by foreign equity considerations are found to be more efficient, better in networking, providing spillover effects to local firms (Kee, 2009). Addressing these concerns would pave the way to a diversification of the sector into linked services.

Improving the quality of instruction provided by USM and expanding graduate and doctoral programmes would start the process of enhancing USM's reputation in Malaysia and abroad. This would begin to draw more foreign students to Penang and contribute to the heterogeneity of the student body. It could also be a welcome source of earnings for the university, as well as for local providers of services to the school. Elite universities are important exporters of services and can be significant revenue generators for the local economy (Yusuf and Nabeshima, 2009). University teaching and research in the life sciences have the potential to generate synergies with Penang's hospital sector, itself a growing exporter of medical services, mainly to visitors from Indonesia although there is ample scope for diversification.

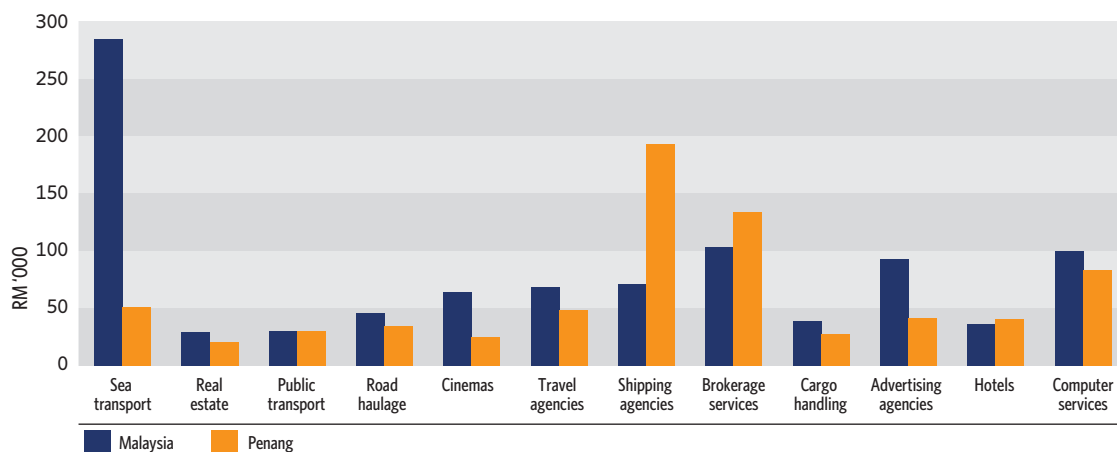


FIGURE 13:
LABOUR PRODUCTIVITY OF SELECTED SERVICES INDUSTRY, 2004
Source: Kee (2009)

Medical services providers, like universities, can be significant revenue earners for the local economy but too often, universities and hospitals remain island sectors in the urban economy with few linkages and low employment capacity. It is when these sectors connect with the real sector, as in the case of Boston and San Francisco, that the multiplier effects start to grow.

The backward linkages from medical services can be to bio-informatics, to IT-based firms, to producers of diagnostic and imaging

equipment and medical implants. They can also link to the pharmaceutical industry supplying hospitals with medications and using their services to conduct drug trials. Universities can be the source of ideas and entrepreneurship, which contribute to firms supporting the medical services sector. The electronics and biopharma industries in Penang could evolve to serve the hospital sector, with USM and local entrepreneurs providing some of the impetus. This electronics-IT-biopharma nexus between USM and

the hospital sector is one possible pathway to growth via technological upgrading that harnesses the resources of several key drivers.

There has been some discussion about whether Penang should graduate from a manufacturing-based economy to a knowledge economy or a services-based economy. The reality is that such changes have to be made incrementally and that the boundaries between defined economic sectors have become increasingly blurred in modern economies. Firms are not narrowly confined to one sector, but perform a range of activities, covering both manufacturing and services. The range of what is produced will automatically shift as firms upgrade their technology and as they link with other firms.

These linkages must remain the basis for Penang's future growth. It implies that services like logistics, business support services, medical tourism, and electronics testing and design work,

which are closely connected to the presence of manufacturing capabilities in Penang, offer the best way forward.

Specialisation and economies of scale: Six focus areas to drive growth

The way out of the middle-income trap is to exploit economies of scale through specialisation, focusing on a few products where it is possible to achieve global excellence. This is often achieved through exploiting agglomeration economies by concentrating production in a given locality. Participation in regional supply chains offers one avenue for specialisation that is especially relevant for Penang's future strategy of enhancing its network to strengthen its industrial base.

In developing a strategy to specialise, policy makers must understand that countries or regions cannot artificially create a comparative advantage in a product simply by decreeing that that product should be a focus area. Instead, they must focus on business areas where there is already a demonstrated ability to compete in a related area. That related area need not be in the same sector, but it should use the same skills.

The idea that products can be related in terms of the core comparative advantage that goes into their production has been formalised by Harvard economist Ricardo Hausmann and others.¹⁵ They argue that many countries try to diversify their production base, but do so with no reference to core competencies. The result of "blind diversification" is often an expensive mistake. As the authors say, "By trying to be good at everything, you'll turn up being excellent at nothing."

To illustrate the point, consider the case of German and Japanese automobile producers that have successfully outcompeted US car firms. How can this information be used to predict other sectors where German and Japanese

Harvard economist Ricardo Hausmann and others argue that many countries try to diversify their production base, but do so with no reference to core competencies. The result of "blind diversification" is often an expensive mistake. As the authors say, "By trying to be good at everything, you'll turn up being excellent at nothing."

15 Hidalgo, Klinger, Barabasi and Hausmann (2007).

BOX 7: Promoting life sciences as a new source of growth in Penang



The definition of life sciences (LS) is as broad as “a branch of science that deals with living organisms and life processes” and covers a wide spectrum of fields like biology, chemistry, biochemistry, mechanical engineering and bioengineering.

This innovation-led industry has been identified by a number of countries as the engine to achieve the goal of sustainable knowledge economies. Malaysia should also embrace LS to avoid inter-generational poverty — historically, nations that continually embraced technological development, from the Industrial Revolution onwards, have prospered. The Asian Tigers embraced the ICT revolution and prospered whereas Mexico and the African countries did not, even though these countries had similar GDP numbers some 30 years ago. With the ageing demographics pushing up healthcare costs, new technologies for early detection, treatment and prevention of diseases will be critical to help manage health budgets.

Due to new LS technologies, our economy, which has been petroleum-based, is changing. Polymers, plastics and other industrial hydrocarbons can now be produced from corn; and biofuels from corn, soya, palm, jatropha and sugar cane. Food ingredients can be cultured in laboratories and genetically-modified (GM) crops are growing in acreage. Failure to fully embrace the LS industry risks impoverishing the next generation.

Penang has been identified as one of the potential states in Malaysia to further develop the existing nascent LS industry due to some comparative advantages that the state possesses:

- It has a strong electronics-industry base developed over the past 30 years that has a crossover with LS;
- It has a growing network of more than 30 LS companies and supporting industries in Penang, the majority of which are in the medical devices field

(e.g. B Braun and Ambu);

- It has a strong academic and research base for LS at USM which is offering a wide variety of courses that cover research, development and innovation centres;
- It has a 250-acre Science Park anchored by three companies utilising 75 acres of land. The Research & Innovation Park in Bukit Jambul (sains@usm) has also been established to provide a platform and infrastructure support for a seamless interaction among universities, research intuitions and industries, as well as to form the value chain of research, development, commercialisation and entrepreneurship; and
- It is an attractive place to live and work in (especially for expatriates) with its modern commercial infrastructure.

As an overall strategy, Penang should adopt a low-risk approach to build its LS industry. It should build on its existing competencies in ICT and precision engineering to further develop its medical devices sector. The state already has several MNCs manufacturing and exporting medical devices. Penang accounted for 70 per cent of the total medical devices produced in Malaysia in 2006, which translated to a value in excess of RM400 million (as depicted in Figure 7A).

There is a growing trend for the global pharma and biotech companies to outsource services to lower-cost countries. These include toxicology, clinical, manufacturing and analytical services. Penang can capitalise on this as it has one of the largest toxicology and biomanufacturing facilities in Asia. As the hospitals have experiences in performing clinical trials, they can be scaled up to take on international multicentred trials with some incremental investments. Western institutions and companies have a surplus of intellectual property (IP) and technologies in LS and are constantly looking for development partners. This represents a lower-risk approach for Penang to develop new products in LS in a shorter time frame.

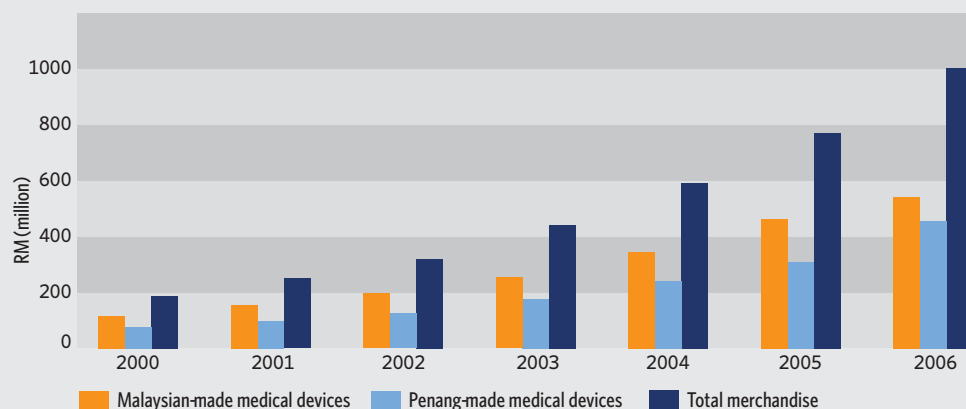


FIGURE 7A:
CONTRIBUTION OF
PENANG'S MEDICAL
DEVICES TO TOTAL
MALAYSIAN
PRODUCTION

Source: Socio-Economic
& Environmental
Research Institute

firms might be competitive? The answer does not lie in automatically thinking about related activities, like auto parts, but on understanding the key source of German and Japanese comparative advantage in automobile production. Studies suggest this rests with teamwork and effective communication among workers, something which is essential for quality when long chains of production are involved, as in automobiles. The implication is that manufacturers in Germany and Japan of other products involving long production chains are also likely to be able to compete with the United States, given the observed success of automobile producers.

In applying this principle to Penang, Khazanah Nasional has identified six focus areas that can become drivers of Penang's growth:

- Technology-based manufacturing including more sophisticated electrical and electronics manufacturing, medical devices and automation;
- Biotechnology/life sciences;
- Business process outsourcing (BPO);
- Logistics;
- Tourism (with niches in medical tourism and meetings, international conventions and exhibitions — MICE), and
- Agribusiness.

These six sectors share three characteristics that together increase the likelihood that they can be successfully developed in Penang. They are in areas where scale economies are important. They link with regional demand as well as global demand to accommodate the

role of China and neighbouring countries. They build new niches based on Penang's existing strengths while simultaneously offering potential for further technological upgrading.

Looking first at the characteristic of scale economies, the three manufacturing sectors of focus have been studied in detail in academic research (Figure 14). Electrical and electronics manufacturing has estimated scale economies of 1.2, meaning that doubling the quantity of inputs of capital and labour leads to an increase in output of 2.4 times. Instruments (including medical devices) have scale economies of 1.12. Pharmaceuticals (as a proxy for biotechnology) have an estimated coefficient of 1.31. If these industries can be expanded, more and more resources will be made available to be distributed as profits, wages and for investing in innovation. These sectors can accordingly support sustained growth, even in high-wage, middle-income areas.

It is less clear that the scale economies are present in the other areas. Some agribusinesses exhibit such characteristics, and that should be the focus of efforts in the NCER. Data on service industries is harder to obtain, but industry sources suggest that scale economies also exist in BPO, logistics and tourism.

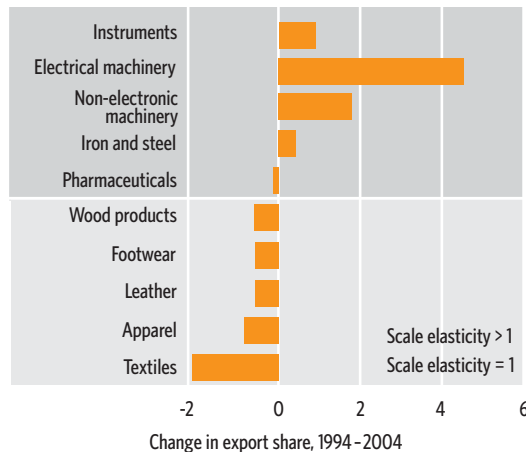
The second characteristic relates to regional demand and linkages. Electronics has perhaps the best-developed regional supply chain in East Asia. Medical tourism in Penang is largely focused on Indonesian clients. The logistics approach is to create a regional hub in Penang, serving the Bay of Bengal and the Indonesia-Malaysia-Thailand Growth Triangle. By harnessing Penang's regional centrality and its position between important economies in East Asia and India, additional value can be created, building on the concentration of skills and infrastructure that is already present in Penang.

The last characteristic relates to building on Penang's existing strengths. Hausmann and others argue that successful new products are developed in areas that are "close" to existing production structures. He constructs maps to depict this concept of "closeness" in a visual way.

Hausmann's product space rests on the intuition that the ability to produce any new product in a country can be assessed by looking at the actual ability of other countries with

FIGURE 14:
SCALE ECONOMIES IN SELECTED SECTORS

Source: Antweiler and Trefler 2002; Calculations of the authors



BOX 8: A choice location for sun, surf and scalpels



Penang, primarily known for its electronics sector and UNESCO World Heritage Site listing, as well as being Malaysia's food haven, now stands at the forefront of medical tourism, accounting for more than 70 per cent of the receipts for this sector in the country. While a major portion of the market in Penang is derived from Indonesia, especially from Sumatra, the number of medical tourists from Australia, Europe and the United States has been on the rise.¹

In anticipation of a compound annual growth rate of 10 per cent over the next five years, hospitals in Penang have begun to undertake expansion of their facilities. Based on a survey conducted recently, the number of private-sector hospital beds is expected to increase by more than 60 per cent over the next three years. In addition to this development, hospitals are also investing in higher-end equipment and setting up centres to deal with more complex medical conditions, from life-threatening illnesses to injuries and chronic medical disorders. There are also moves towards improving standards through accreditation. While most hospitals have Malaysian Society for Quality in Health (MSQH) accreditation, Penang Adventist Hospital is the first in the country to be ac-

credited by the Joint Commission International (JCI).

The collaborative efforts of the private hospitals in the state have also yielded two key institutions, namely the Penang Health Association and the Allied Healthcare Centre of Excellence. While the former focuses on promotion of medical tourism for the state of Penang, the latter is a training centre dedicated to the upgrading and development of allied healthcare professionals in the state.

Another plus factor would be Penang's four decades of experience in electronics and manufacturing. This track record, coupled with a strong base of local suppliers skilled in precision engineering, plastic and tools, provides the foundations for a thriving medical devices sector. A synergy between the medical devices and medical tourism industries will position Penang as the cornerstone to develop the country's healthcare industry into a high-income growth sector and spearhead Malaysia's aspirations to become a fully developed nation by 2020.

-
- 1 Nearly 200,000 foreign visitors used Penang's hospital facilities in 2006 for everything from routine physical exams to heart-related procedures to hip and knee replacement. Each visitor spent approximately 2.5 days in a hospital (not including any additional time spent in Penang or other resorts to convalesce) and was accompanied by at least one additional person who generated revenues for local merchants and hotels.

similar production structures to produce the product in question. He has constructed a global product space map for manufactures that reflects this information.¹⁶

An analysis of the product space map for Penang and Malaysia shows ample opportunity to raise technological sophistication especially in electronics, engineering, process industries, other high-technology industries and some resource-based industries. These subsectors have productivity levels higher than the norm. They also employ capabilities similar to existing industries. Agro-based industries and primary products offer less potential. They are either less technologically sophisticated, implying limited scope for productivity gains or they lie far from the origin, indicating that development of the

sector would need to be "green field", lowering the probability of successful implementation.

When Malaysia's product space is compared with Singapore's, there seems to be more potential for upgrading in Malaysia. But compared to Thailand, Malaysia appears to be at a disadvantage. Thailand has scope to move into more new industries and these appear to be more closely linked with existing firm operations. Thailand seems to possess many more opportunities than Malaysia in agro-processing, building on their existing success.

Aggregate measures such as these are only indicative. It does appear, nevertheless, that:

- Malaysia (and Penang) are right to be selective because only a few sectors are close to existing capabilities and thereby offer good chances for successful implementation of productivity enhancements;
- The subsectors chosen in Khazanah Nasional's strategic approach towards Penang coincide with the subsectors that appear to offer good prospects for moving

16 One drawback of the methodology is that services sectors are not covered despite their importance in economic growth and development. This is because international statistics on services are less available.

BOX 9: Navigating the product space

The concept of product space mapping is rooted in the hypothesis that a country's capability to produce one good is somehow tied with the installed capability in the production of other similar goods (Hausmann and Klinger, 2007). The concept of proximity is used to capture this intuitive idea that the ability of a country to produce a product depends on its ability to produce other ones.

For example, a country with the ability to export apples will probably have most of the conditions suitable to export pears. They would certainly have the soil and the climate, together with the appropriate packing technologies, frigorific trucks and containers. They would also have the human capital, particularly the agronomists that could easily learn the pear business. However, when we consider a different business such as mining, textiles or appliance manufacture, all or most of the capabilities developed for the apple business are rendered useless.

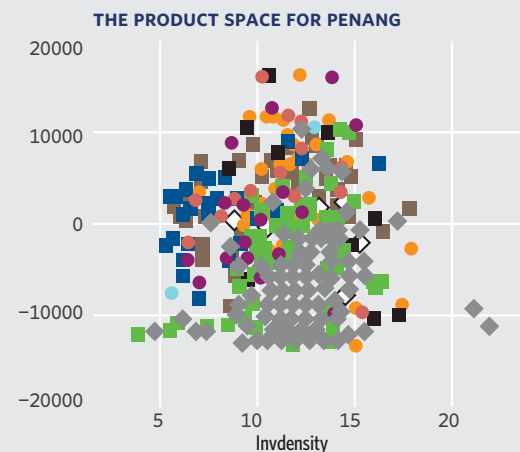
The vertical axis in the product space is basically a measure of a particular product's sophistication from the average sophistication of a country's export basket. The horizontal axis, on the other hand, captures the amount of related products that a country exports, used here to proxy "capabilities" developed for particular products. Products that are located closer to the origin indicate higher capabilities (see "Navigating the product space: A technical appendix" on page 95, and "The product space for Penang, Malaysia, Singapore and Thailand" on page 96).

The product space chart for Penang shows that the distribution of products that are exported and have revealed comparative advantage (RCA) has moved closer to the origin between 1995 and 2007, demonstrating the fact that capabilities have developed for those products. Some of the medium- to high-tech product groups in Penang that have seen evidence of industrial capabilities developing include electronic products, engineering products, and other high-tech products.

However, the opportunity to develop capabilities has not been fully exploited. The distribution of products with no revealed comparative advantage has tightened from 1995 to 2007, signifying increased capabilities. Among these, the products with the highest capabilities

comprise five high-tech products in 1995, nine in 2000 and eight in 2007. The product-space analysis therefore shows evidence of capabilities developing for high-tech products in Penang. Furthermore, it establishes prospects for further upgrading given its untapped opportunities in products that have yet to attain comparative advantage, although capabilities are increasing.

Nonetheless, from a more dynamic standpoint, the prospects of technological upgrading are fast diminishing if current opportunities are not seized. While there is evidence of capabilities developing between 1995 and 2007, the distribution of products has actually remained relatively unchanged between 2000 and 2007. This suggests that the development of capabilities has become stagnant since 2000. Moreover, products that have highest density including some cutting-edge high-tech products are moving gradually away from the origin — a sign of weakening capabilities. Meanwhile, products that are growing in density are not products that can compete at the technological frontier.



For legend and details, please refer to Annex 5 at page 96

- up the technological ladder while not moving too far from existing capabilities; and
- The challenges faced in developing successful agro-processing in Malaysia are likely to be greater than for electronics, because there is little existing internationally successful commercial experience to draw on. An exception to this may be in the palm oil and rubber-based industries, which have long histories in the northern Malaysian states and which lend themselves to scale economies in commercialised plantations.



PENANG'S SPACE

- **PENANG AS A HUB**
- **PENANG AS A SECONDARY CITY IN MALAYSIA**
- **IMPROVING GEORGE TOWN'S LIVEABILITY**
- **GEORGE TOWN AS A WORLD HERITAGE SITE**

Traditionally, Penang has been a successful trading hub for northern Peninsular Malaysia and the Indonesia–Malaysia–Thailand Growth Triangle, leveraging on its position, protection of property rights, low transaction costs and openness. Coupled with its present agglomeration of manufacturing and services expertise, it is well positioned to become a highly-successful secondary city of Malaysia. For this to occur, it must enhance its economic density (as part of a larger integrated Northern Corridor), reduce distance to markets and specialise vis-à-vis the world markets. Physical connectivity via infrastructure development will be important for this. Just as important is the need to make Penang more attractive in terms of “liveability” by international standards. Towards this end, the key is in making George Town, its heart, a global example of liveability. It has to be a catalyst for sustainable multidimensional growth where history, heritage and culture play an integral part.

Penang as a hub

Penang does not seek to compete directly with Kuala Lumpur, Singapore or Bangkok, let alone Mumbai, Shanghai or Tokyo, but it can still be a place of centrality and act in complementary ways to larger regions. Smaller places have become significant global hubs for niches.

Helsinki is a hub for new technology, East-West relations and security matters. Dublin, as a hub, connects many American companies to Europe. Reggio Emilia in northern Italy is famous for innovative social experiments from citizens budgeting to new approaches to social care and intercultural understanding. Even tiny places like Davos can have global resonance.

The National Physical Plan has identified three major urban conurbations in Malaysia, of which George Town is one. This plan now has to be translated into effective action.

Penang has a long history as a trading hub, emerging as one of the first free trade ports in East Asia in the late 18th century. It was centrally located with access to major markets in Burma (now Myanmar), southern Thailand, Sumatra and northern Malaya. It thrived on trade in rubber, tin, rice and other commodities in this important economic area. Like all other trading hubs, it based its success on the protection of property rights, low transaction costs and openness. These characteristics remain the basis for Penang's new opportunities as a hub, and are the reason why MNCs like Agilent and NGOs like the Third World Network and the World Alliance for Breastfeeding Action can organise themselves globally from Penang.

In general, Malaysia and Penang do well in terms of trade facilitation, in comparison with neighbours and with high-income countries, both in terms of costs and number of days. How-

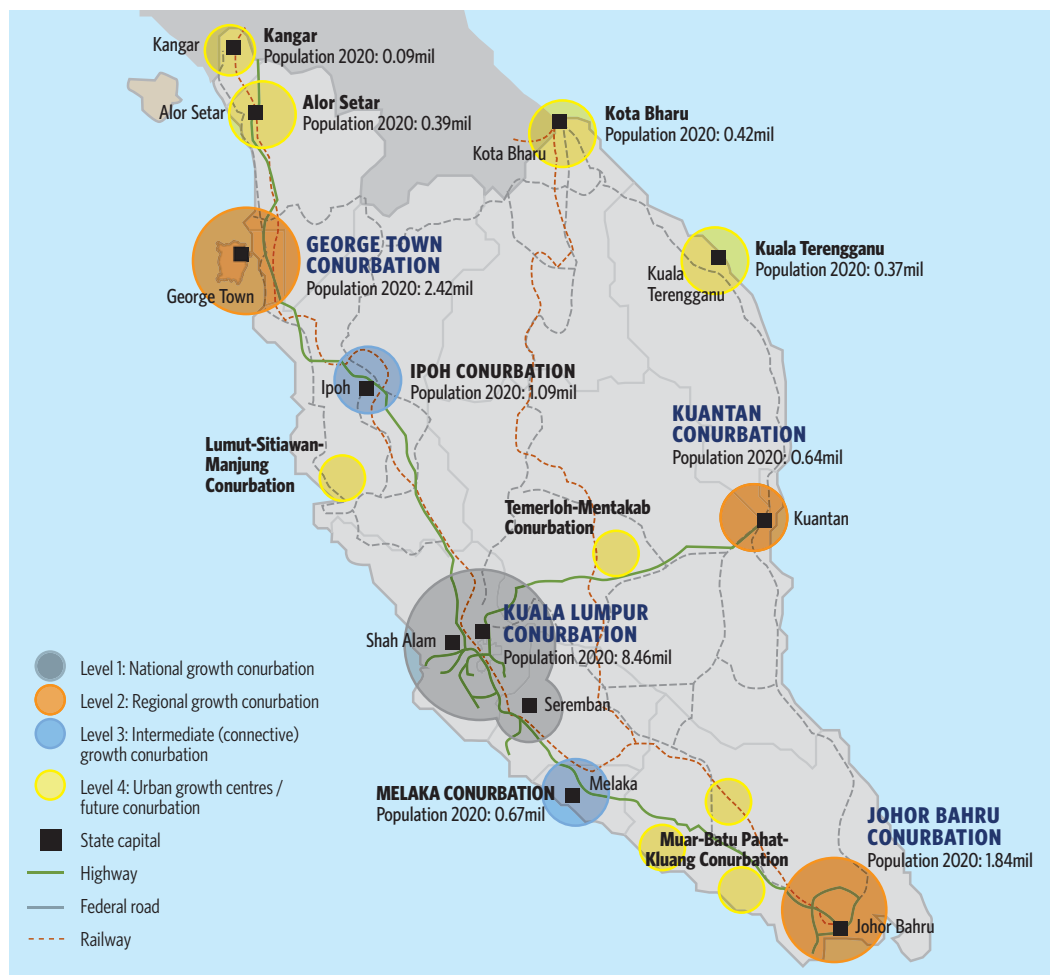
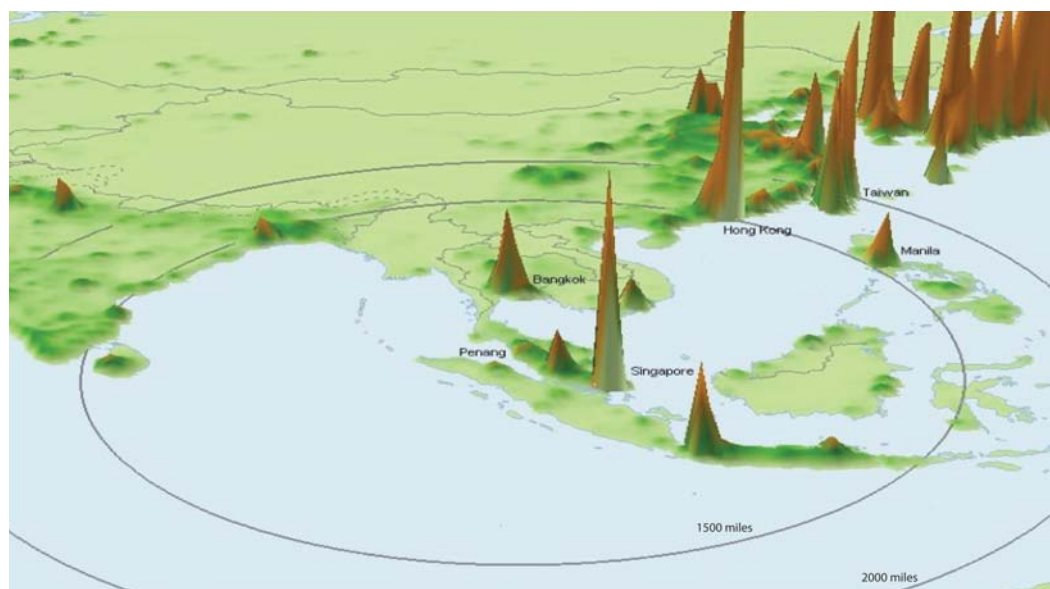


FIGURE 15: HIERARCHY OF CONURBATION
 Source: National Physical Plan, Jabatan Perancangan Bandar dan Desa

**FIGURE 16:
ECONOMIC
DENSITY AND
DISTANCE TO
MARKETS IN
EAST ASIA**



ever, Malaysia is not as streamlined as Singapore, which leads the region, nor even as the Philippines in terms of days taken to export or import.

The World Bank has emphasised that poor trade facilitation is one of the major impediments to developing trade, potentially more important than even tariff barriers (Shepherd and Wilson, 2008). Customs, administrative procedures, regulations, and maritime and airport infrastructure are among the areas for major improvements. Malaysia stands to gain by improving its own trade facilitation as well as through the benefits of expanding markets when neighbouring countries improve their trade facilities. Overall, improved trade facilitation could increase welfare in ASEAN by up to 10 per cent in the long run.

Trade facilitation is important as it mostly affects smaller enterprises. Large, productive enterprises can offset the higher cost of trade through economies of scale, but SMEs cannot do the same. Reducing the cost of exporting and importing intermediates can have a major impact on these firms.

Two strategies that are needed for Penang to develop further as a hub are:

- Improve performance in terms of its existing pattern of freight; and
- Develop specialised facilities to reduce freight costs for new products and services.

Access to attractive regional markets

Figure 16¹ shows a map of the East Asian region, with economic density, estimated as GDP per square kilometre, plotted on the vertical axis. The higher the spike on the map, the greater is the economic density of that area. For convenience, concentric circles of 1,500 and 2,000 miles from Penang are also shown to give a sense of distance.

Several features of Figure 16 are worth highlighting:

- The map of East Asia clearly shows that economic activity is not at all evenly dispersed across countries. A few areas tend to dominate, largely those on the coast that enjoy advantages in low-cost trade.
- East Asian economic activity is heavily centred on northern East Asia and most of this is over 2,000 miles (about five to six hours by air) from Penang. The density of economic activity in Japan, South Korea and, increasingly, the coastal areas of China and Taiwan, is far higher than the density of localities in ASEAN. Even Singapore, despite its high per-capita income, does not boast the same economic density as is found in northern East Asian

¹ This map and the underlying data are courtesy of The World Bank's *World Development Report 2009* team.

centres. From this perspective, Penang is at a disadvantage, as it is not as close as economies like Vietnam and the Philippines to the major markets of East Asia.

- Penang is situated between two large economic masses represented by Bangkok to the north, and Kuala Lumpur (and Singapore) to the southeast. The higher density of these cities makes them more likely to attract new firms in many sectors and so limits the nature of products in which Penang can expect to compete.
- Although Penang is ideally suited as a gateway to India, that country's economic mass remains modest. Delhi, Kolkata and Mumbai (not shown) have significant economic density, but Chennai and Bangalore remain small by international standards. These localities may well be fast growing, but at present, they represent future potential markets and not large markets that can be exploited immediately. Furthermore, Penang will face stiff competition from Bangkok, Kuala Lumpur and Singapore for business that is oriented towards India.

On a more positive note, Penang is well placed to become a hub for the Northern Corridor, the Indonesia-Malaysia-Thailand Growth Triangle and the Bay of Bengal, although both Kuala Lumpur and Kolkata will be significant competitors for the last. A hub permits a concentration of activity within which it is easier to resolve coordination and market failure issues. It can generate agglomeration economies. The whole Northern Corridor is well situated as the dominant economic mass in the Indonesia-Malaysia-Thailand Growth Triangle and has close historical trading links with these areas.

Penang has the highest economic density and lowest distance to market for a large local area in this triangle. It is closer than Kuala Lumpur to Medan, Indonesia, the only other locality with significant economic density in the triangle area. Critically, the distance between Penang and most regional markets, including the east coast of India, is within three hours by air. Penang also has the closest major seaport to Chennai.

However, several key issues exist. Shortage of capacity on key routes results in leakage of trade flow from Penang, with customers

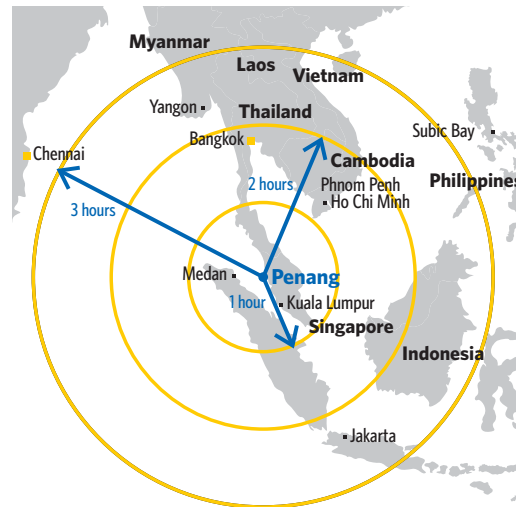


FIGURE 17: OVERVIEW OF PENANG'S CATCHMENT AREA AS DEFINED BY AIR TRANSPORT TIME
Source: Khazanah Nasional Berhad (2007)

choosing higher-cost options like trucking to and from the Kuala Lumpur International Airport (KLIA) or Changi Airport in Singapore for outbound and inbound transportation.

Limited capacity also exerts excessive pressure on cargo capacity during peak periods. Limited direct connectivity to end destinations also increases transportation lead times. With more than two stop-overs and multiple flight changes for most outbound transactions, customers end up incurring higher inventory costs.

Adding additional capacity presents a challenge as large trade imbalances with key trading partners result in significant asymmetry in air cargo volumes. Penang's total outbound cargo volume (in tonnage) is 36 per cent higher than its inbound cargo volume. This difference is large compared to Singapore, which recorded a 6 per cent difference between outbound and inbound cargo volumes. For Penang, the cargo volume mismatch is highest with destinations in the United States, Hong Kong, Australia and the Netherlands. Outbound cargo by tonnage to the United States and Hong Kong is approximately two to three times more than the inbound cargo tonnage from the same location.

Inadequate warehouse space at the Penang International Airport also decreases its overall

Penang has the highest economic density and lowest distance to market for a large local area in the Indonesia-Malaysia-Thailand Growth Triangle. It is closer than Kuala Lumpur to Medan, Indonesia, the only other locality with significant economic density in the triangle area.

cargo handling capacities. Cargo warehouses are located on either sides of the runway, resulting in longer lead times and higher handling costs. In addition, the current runway is unable to support fully-loaded wide-bodied aircraft.

Penang's seaport is currently challenged by limited depth and improper design. Its current draught of 11m is insufficient to support larger vessels that require a minimum draught of 13m. In addition, its wharf length is limited to 900m, which reduces the number of vessels that can dock at a time.

Several constraints exist, which must be immediately addressed:

- Infrastructure constraints at airports and seaports must be fixed through infrastructure upgrades and operational improvements;
- Cumbersome regulatory processes need to be simplified and streamlined; and

- Air and sea connectivity to markets and raw materials must be improved.

The current layout of the cargo handling area at the Penang airport is suboptimal and leads to inefficiencies. Cargo terminals on different sides of the runway result in higher cost, additional lead times and extra documentation for movement of goods across terminals. By consolidating cargo terminals on one side of the runway, customers will have access to higher warehouse capacity. In addition, the current practice of using tractors to tug cargo from one side of the terminal to the other would no longer be required. With all the cargo consolidated on one side, security management would also be much simpler.

Current design constraints of Penang's port have resulted in lower efficiencies compared with top ports in the Asia-Pacific region. On average, the Penang port is only capable of moving 18 containers per hour, compared with 40 containers per hour in Hong Kong, 35 in Singapore and approximately 30 in Johor's Port of Tanjung Pelepas (PTP), Shanghai and Jebel Ali.

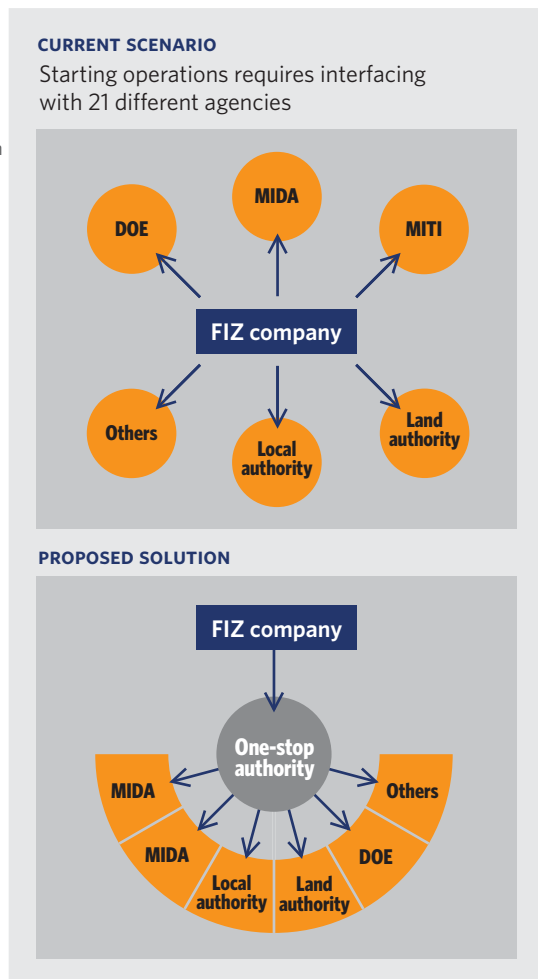
Three essential steps need to be taken to address these issues. First, cranes and other equipment need to be refurbished to improve crane movements, thus reducing turnaround time. Second, there is a need to expand the wharf, stocking area and barging centre to enable more ships to dock simultaneously. Increased docking space would also mean faster loading times for vessels. Finally, dredging to increase the draught to 14m will enable larger vessels to directly call at the port without the need for barges.

Complicated customs procedures, manual processes and inflexible regulations that do not allow manufacturing and commercial activities to be performed in one free zone are some of the key regulatory issues that exist currently. Going forward, key changes in policies are required. Import approvals should be processed electronically. Commercial activities should also be allowed in industrial zones as logistics players are typically involved in both activities (assembly, packaging, sorting and so on).

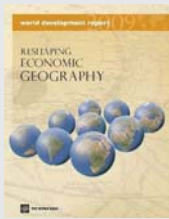
To address current issues and the multiplicity of authorities, Penang should establish a one-stop industry and regulatory authority to handle all free industrial zone (FIZ)-related issues and liaise with the necessary government departments (Figure 18).

FIGURE 18:
OVERVIEW OF
THE PROPOSED
"ONE-STOP
AUTHORITY"
SOLUTION

Source: Khazanah Nasional Berhad (2007)



BOX 10: Lessons for Malaysia from The World Bank's World Development Report 2009



The messages of the very influential *World Development Report (WDR) 2009* published by The World Bank entitled *Reshaping Economic Geography* do not seem to be in “perfect sync” with Malaysia’s corridor development strategy. The stated objective of Malaysia’s corridors policy is reducing “regional imbalance and bringing about equitable growth, investment, and employment opportunities to all regions of Malaysia”. The *WDR*, using its 3Ds (density, distance and division) framework concludes that growth is “naturally” spatially unbalanced because it stems from agglomeration economies.

The report further concludes that instead of “fighting” density and attempting to ensure that economic growth is uniform across regions by relocating production, governments would do better to integrate “lagging” with “leading” areas. This “unbalanced growth” can lead to “balanced development” if governments could create connective and spatially-blind infrastructure and institutions and grant some “spatially-focused” incentives.

The findings of the *WDR 2009* highlight the importance of agglomeration economies in determining the success of any cluster-based development strategy, such as the one for Malaysia’s economic development corridors.

Agglomeration economies are said to exist whenever concentrations of people lead to improvements in an individual’s productivity, therefore leading to more concentration. The last stylised fact is perhaps the most pertinent when considering Malaysia’s regional development corridor, which exemplifies the way in which policy makers have tried to create agglomeration economies by “manipulating” the physical space through spatially-targeted incentives.

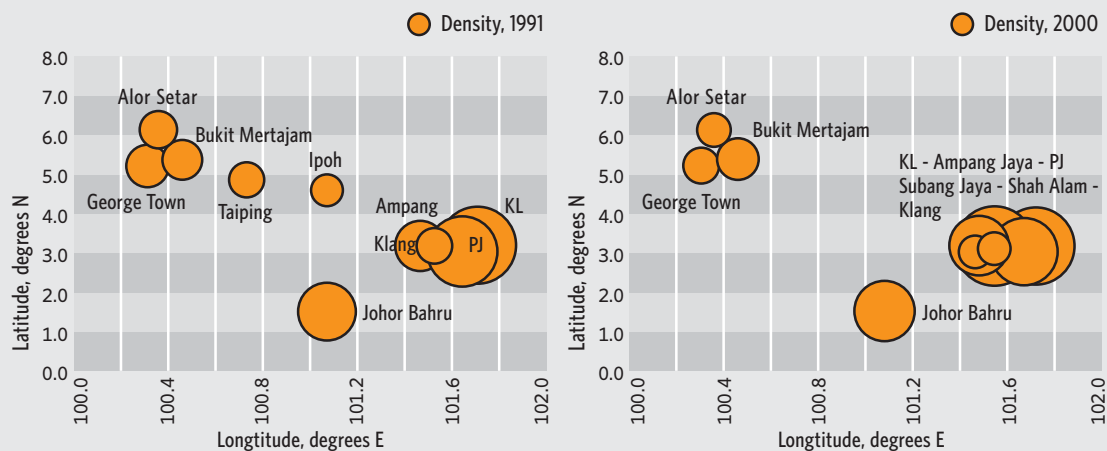
At the basic level, agglomeration can be observed in population densities: the more densely-populated an area, the more it can be assumed that people choose to move there to take advantage of agglomeration economies. This then provides the rationale behind urban concentration. An examination of the pattern of urbanisation also indicates that the central region is the focus of agglomeration for Peninsular Malaysia. The figures below illustrate the population density in the top 10 metropolitan areas in 1991 (Figure 10A) and 2000 (Figure 10B).

The *WDR 2009* proposes interventions via “3Is” for the 3Ds it highlights. These are:

- *Institutions* for developing and managing density;
- Building *infrastructure* for reducing distances; and
- Providing *incentives* to lower divisions.

At the national regional level, the policy implication from the *WDR 2009* is that while economic growth will be spatially divergent, this imbalance should be mitigated by “balanced (connective and spatially-blind respectively) development” in terms of infrastructure and institutions. In other words, “lagging” and “leading” areas could be integrated via interventions such as building highways and other transportation networks in order to improve labour and other forms of mobility.

Source: *World Development Report 2009*, Intan Nadia (2009) and Khazanah Nasional Berhad (2009)



FIGURES 10A & 10B: TOP 10 METROPOLITAN AREAS IN PENINSULAR MALAYSIA BY POPULATION DENSITY IN 1991 AND 2000.
Source: *WDR (2009)*, Intan Nadia (2009)

FIGURE 19: MAJOR FLOWS OF OUTBOUND CARGO FROM PENANG TO AIR HUBS (2006)

Note: Includes the estimates of cargo leakage from Penang to the KLIA and Changi by road
Source: Khazanah Nasional Berhad (2007)

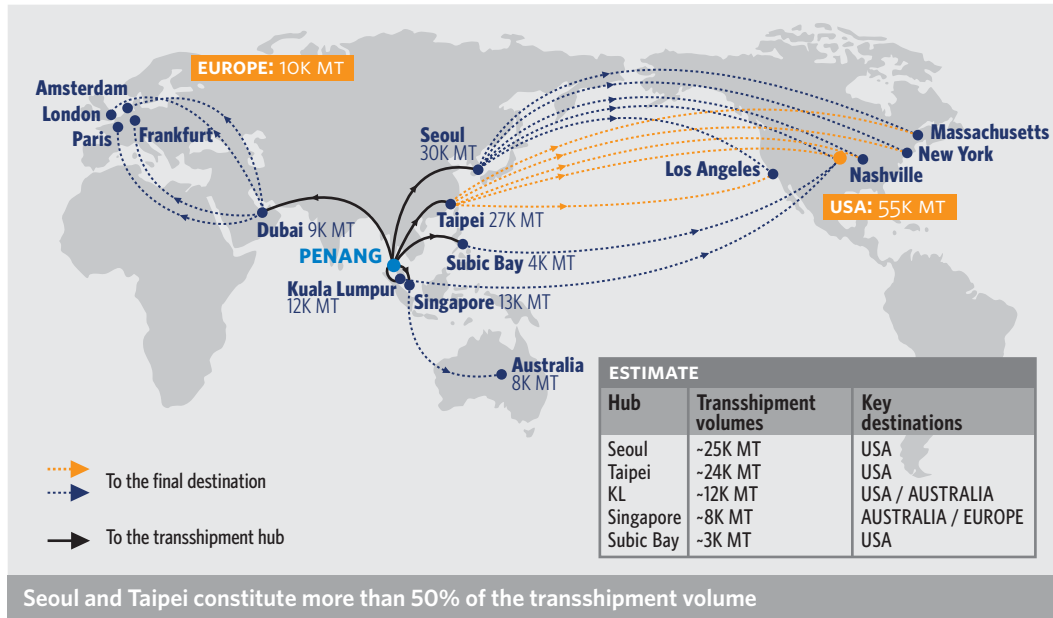
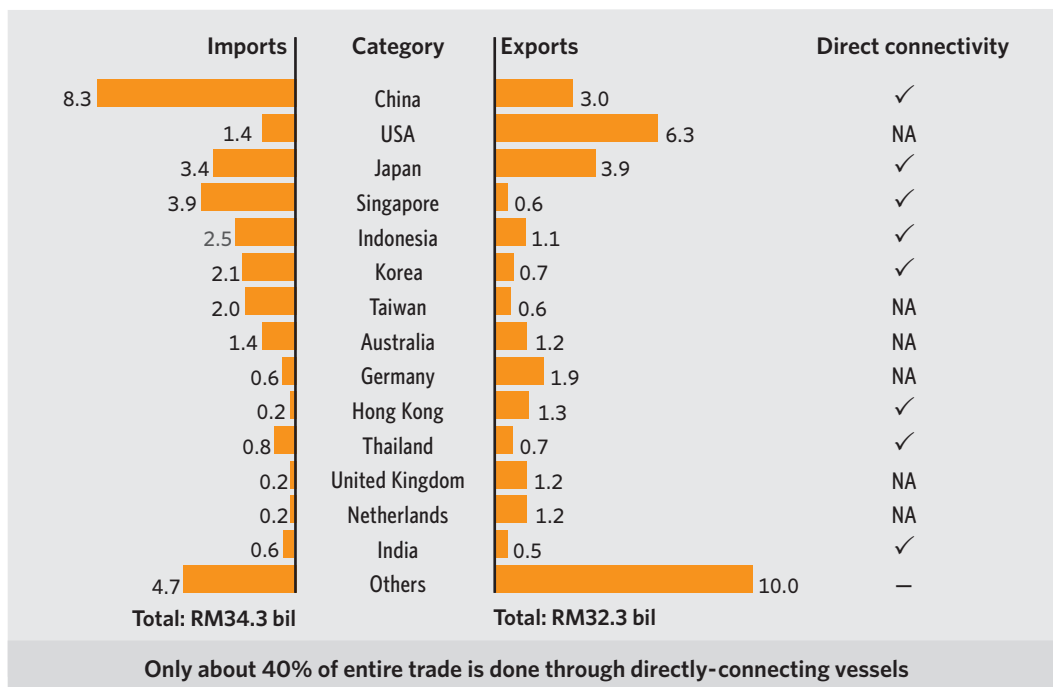


FIGURE 20: IMPORTS AND EXPORTS BY COUNTRY FOR PENANG SEAPORT (RM BIL, 2006)

Note: Product categories ranked based on the total value of trade (exports + imports)
Source: Khazanah Nasional Berhad (2007)



Currently, Penang leverages on five transshipment hubs — Seoul, Taipei, Singapore, Kuala Lumpur and Dubai — for movement of air cargo (Figure 19). Seoul and Taipei currently constitute more than half of Penang’s cargo volume with an average outbound capacity utilisation of 85 to 88 per cent a week. Average outbound utilisation for Europe is also very high, at over 95 per cent a week. This adds

extreme pressure on capacity, especially during quarter-ending peak periods.

To address this capacity issue, there is a need to incentivise airlines to develop more outbound cargo space on these key routes. Better connectivity should also be provided to nearby hubs such as KLIA and Changi in Singapore.

Penang also needs to look at improving its direct sea connectivity to major destinations.

Only 40 per cent of total trade is conducted using vessels with direct connectivity (Figure 20). There is a need, for example, to develop direct sea routes to the United States, which accounts for US\$16 billion worth of rubber products export. Penang should also strengthen connectivity to various Chinese and Taiwanese ports for the sourcing of electronics equipment and machine parts.

For new industries, like shrimp farming and rubber processing, specialised connectivity may be required, such as cold chain warehousing, break bulking and packaging facilities.

Penang as a secondary city in Malaysia

Penang is competing with other major agglomerations in Malaysia, notably the Klang Valley and Johor, host to another corridor development programme, Iskandar Malaysia. To be successful, Penang must understand how its local economy relates to the broader national economy and competing localities.

The economic density map (Figure 16, Page 52) shows clearly that Penang is a secondary city in Malaysia, not the dominant or primary. This does not imply, of course, that Penang is doomed to second-class status or second-rate growth. Quite the contrary. Internationally, secondary cities have grown at the same rate as primary cities and sometimes even faster. Secondary cities, however, have different sources of growth. They base their dynamism on specialised production in specific areas, often mature industries, whereas primary cities base their dynamism on new products, and innovations generated by cross-sectoral interactions.

Understanding the unique nature of secondary cities is critical to a successful strategy which would differ markedly from that of primary cities. Secondary cities typically specialise early on in the production of a few goods in which they can generate scale economies. Sometimes, secondary cities develop because manufacturing becomes too expensive in the primary city, when land and labour costs start to rise. At other times, secondary cities develop their own niche markets and advantages. They

typically do not suffer from pollution, crime and overcrowding in the same way as many primary cities. Low costs of dealing with “grime, crime and time” can be major competitive factors in favour of secondary cities.

In the framework of The World Bank’s *World Development Report 2009*, which identifies strategies for secondary cities across the world, the key challenges for Penang are to build density and reduce distance to markets. The bank suggests that institutional changes and infrastructure investments are key instruments for these localities. It recommends expanding administrative jurisdictions to permit more inclusive planning and connective infrastructure to increase density and reduce congestion.

One example of how this approach can be implemented is South Korea’s adoption of a rural-urban integrated city programme in 1994.² In that programme, rural counties were integrated with cities in an effort to improve local public services and local administration and to reduce rural-urban disparities. Better land-use planning in urban areas was another positive outcome.

The South Korean approach helped Daegu, a major secondary city, to expand rapidly. The broader administrative area permitted Daegu to integrate with its hinterland. It developed five industrial centres around the metropolitan hub. These centres specialised in manufacturing specific products, namely, electronics, phones, LCDs, machinery and automobiles. By locating the facilities in the hinterland, land and labour costs were kept low. By integrating the industrial centres with the hub, Daegu became

Penang is a secondary city in Malaysia and secondary cities have different sources of growth.

In the framework of The World Bank’s *World Development Report 2009*, which identifies strategies for secondary cities across the world, the key challenges for Penang are to build density and reduce distance to markets.

2 Shanghai had earlier pioneered integrated rural-urban planning in 1987. One outcome was the transformation of Pudong from an agricultural area to one of the most distinctive skylines in the world.

a vibrant city. By linking to Seoul and the port of Busan with high-speed rail and a highway system, distance to export markets was reduced. As Daegu grew, so did its economic density and it achieved significant scale economies.

Lessons can also be learned from policy failures. In Mumbai, city leaders tried to reduce density by tightening regulations limiting the building space for every square metre of land. The predictable result was a shortage of accommodation and high prices. Households spend up to 20 per cent of their incomes on rent. More than half of all households live in slums. Businesses find that land costs eat into their profits. Mumbai has slipped from 25th to 40th spot in an index of the best places to do business largely because of its overcrowding. The effort to contain density has backfired.

The lessons from these experiences for Penang are clear. The new Northern Corridor Implementation Authority (NCIA) provides Penang with an opportunity to build density on the basis of an integrated land-use plan. The example of Daegu suggests that localities thrive when there are several centres of industrial activity surrounding a city but closely connected to that city. Connectivity with the primary, capital city is also critical. Expanding public

services to rural areas is the basis for long-term supply of adequately trained workers.

A number of critical physical investments in infrastructure are needed to realise the potential to add economic density and reduce distance in Penang:

- Enhancing connectivity between the island and mainland — expansion of Penang Bridge, construction of a second bridge, upgrading of ferry service;
- Upgrading of the airport, port and supporting infrastructure;

- Double tracking of the railway and establishing Butterworth as the northern transport hub;
- Upgrading of public transportation with the introduction of the Rapid Penang bus service;
- Provision of adequate, affordable, liveable homes;
- Compact liveable city development;
- Industrial estate expansion and upgrading; and
- Improved air links and sea routes with the surrounding region.

With these in place, connectivity within the Northern Corridor will be greatly expanded, industrial parks can link more easily with each other and ensure that land prices remain affordable, and the distance between major research centres, such as the USM School of Engineering, and business headquarters will be reduced.

Large-scale physical investments are only one aspect of proper development of secondary cities. Global experience suggests that other factors are important.³ The best-run cities have strong own-revenue flows, good financial management, improved municipal information systems, and local management of procurement. In Penang, substantial progress must be made in each of these areas. Municipal revenue flows remain low and tax collections on land are limited, therefore reducing the incentive to link property development and provision of municipal services in a sustainable way. Information systems are poor, and benchmarking of service provision against other localities is not used as a way of setting priorities for municipal improvements.

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Improving George Town's liveability

Penang offers a lifestyle that is relaxed, cosmopolitan and balanced. This can appeal to leading professors, doctors, lawyers, managers, teachers, nurses, artists and craftsmen

³ *Improving Municipal Management for Cities to Succeed*, Independent Evaluation Group, The World Bank (2009).

BOX 11: The new economics of geography



The new economics of geography offers some clues to where growth is most likely to occur within a country — it is concerned with the choices firms make about location.¹ In geography models, firms tend to concentrate production in one location so as to enjoy plant-level economies of scale. They also like to be near their customers and suppliers in order to reduce transport costs, thereby giving rise to “agglomeration economies” or advantages of coalescing geographically. Once established, perhaps due to history or simply luck, cities tend to grow.

The tendency of firms to invest in a particular location depends on the agglomeration economies offered by that locality, as well as on a host of traditional business factors. For a start, firms like to share input suppliers. When the market for inputs is broad, suppliers can reap internal, plant-level scale economies and reduce prices because of large-volume production runs. Suppliers can also afford to customise products to meet the exact specifications of the firm. At the same time, when many firms producing similar goods are in one location, the labour market deepens. Firms can more easily find specialised skills and training programmes can be organised. Workers and employers would reduce the risks of not being able to match skills. Lastly, common locations enable the rapid diffusion of cutting-edge ideas in an industry. For businesses that compete in global markets, the ability to operate on the frontier of new products is critical. Learning and innovating are key strategies for survival.

The new economic geography suggests that prospects for any locality depend on three factors:

- Economic density;
- Economic distance to market; and
- Economic division from global markets.²

Economic density, defined as the concentration of economic activity in a given locality or GDP per square kilometre, has long been associated with scale economies. Several studies have confirmed that productivity tends to rise when firms and consumers are located close to each other. Empirically, doubling economic density or doubling the density of employment can increase productivity of a firm by 4.5 to 8 per cent.

Economic distance measures how far the market is from producers. Physical distance is clearly an important component of distance, but by no means the only variable of importance. Timeliness, logistics infrastructure, transport costs and other elements also enter into the concept of distance to markets. The empirical findings on distance suggest that a doubling of distance to a regional market centre lowers firm profits by 6 per cent. A doubling of travel time to a city centre reduces productivity by 15 per cent.

Economic division reflects the idea that country borders provide significant barriers to trade, even when borders are seemingly open. In one famous study³, Canadian firms were found to trade 22 times more with other Canadian provinces compared to their trade with states in the United States. This is despite the 1988 free trade agreement between the United States and Canada that should have implied borderless transactions. Other studies find smaller effects, but most economists agree on the trade-reducing character of national borders.

1 See Fujita, Krugman and Venables (2009).

2 *World Development Report 2009*, The World Bank, November 2008.

3 See McCallum (1995).

around the world. The “Malaysia My Second Home” (MM2H) programme is designed to make it easier for skilled people from around the world to relocate to Penang and help build the connections, networks and knowledge that a vibrant city needs to flourish.

Interviews with Penangites suggest a strong attachment to the area, but it is not a place that figures in the long-term plans of many young or ex-Penangites. The most attractive attributes, that are summarised by the term “liveability”, have depreciated along with economic growth of the past 20 years.

Air and water quality indicators have deteriorated, with limited infrastructure improvements, and an effective legal framework to

manage environmental effects is not in place. Traffic congestion has soared in the absence of a plan or strategies to manage the growth in the number of private cars — Penang has the greatest per capita car ownership in Malaysia (Figure 21, page 60) — and the absence of public transport alternatives.

Urban amenities like libraries have largely taken the form of mobile units rather than permanent structures in the city and its suburbs. The university campus is too far away to integrate the student population — with its attendant restaurants, cafés and entertainment — into city life. Governance, in the form of lively civic participation, suffers because many key decisions over city

improvements are taken by federal authorities in Kuala Lumpur rather than by locally-elected officials.

A commitment to improve the liveability of Penang must start with a discussion and measurement of its key attributes that citizens are concerned about. A baseline is available for some indicators in the *Penang People's Report* of 1999. That study foresaw the deteriorating trends in traffic accidents, environmental indicators and air pollution but actions to reverse these trends have not been taken, and sustainability has yet to be firmly built into economic development strategies. The study has not been repeated in a decade.

Liveability can be measured, monitored and benchmarked against other localities. Cities today compete against each other for a niche in global markets. But a global city has multidimensional connectivity, not only as a market. One recent comparison of global cities looks at five dimensions:⁴

- Business activity, measuring the extent of economic opportunity;
- Human capital, measuring how well a city acts as a magnet for diverse groups of people and talent;
- Information exchange, measuring how well news and information about and to

the world is disseminated;

- The cultural experience for international residents and travellers; and
- Global engagement in shaping and participating in global policymaking and dialogue.

Penang does poorly on the human capital side — its best graduates look for job opportunities elsewhere — and on the connectivity side, where high-speed broadband has lagged other regions in Asia.

Lower stress, open spaces, convenient and fast access to shopping, heritage sites, medical care, bookstores and libraries, sports and social facilities, and cultural events are features of liveability that young professionals have cited as most important. Incorporating these attributes into the design of Penang's development strategy is essential if the strategy is to attract and retain the core group of young, skilled professionals that provide dynamism to the area.

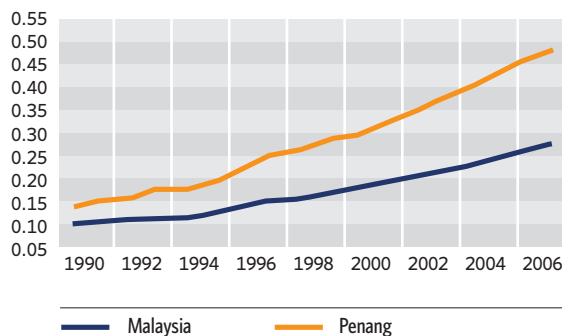
The provision of quality public services — education, health, transport, safety and security and waste disposal — is a prerequisite for liveability in a city. These services are mostly provided by a local government, but large projects are funded and executed by the federal government. For example, the new sewerage treatment plant was a federal project,⁵ as is the local bus-service improvement project.

In most countries, such projects are undertaken by the local government, which has accountability for service provision enforced through democratic elections. In Malaysia, this has not been the case since 1965, and is constitutionally excluded by the Local Government Act 1976. In the absence of a major reform of this Act, other forms of accountability and democratisation of local government must be

Cities today compete against each other for a niche in global markets.

4 AT Kearney and Foreign Policy "The 2008 global cities index". Other popular indices are the Economist Intelligence Unit's "Livable cities ranking" and Mercer Human Resource Consulting's "Worldwide quality of living survey"

FIGURE 21:
PRIVATE MOTOR CARS REGISTERED PER CAPITA
Source: Department of Statistics



5 Sewerage piping and treatment are critical in avoiding the haphazard disposal of waste water, mostly into the sea. Long delays in providing adequate sewerage caused significant pollution of Penang's beaches and a loss of competitiveness to Langkawi. Sewerage in Penang is the responsibility of Indah Water Konsortium Sdn Bhd, a company wholly owned by the Ministry of Finance.

BOX 12: Environmental concerns in Penang



Rapid economic growth in the last four decades through industrialisation and tourism development has resulted in a host of environmental problems in Penang. The increased prosperity, overdevelopment, lack of planning and

growing population have also aggravated some of the problems. These concerns have been expressed via a constant stream of reports on an almost weekly basis in the press. In more recent years, blogs in Penang have also carried stories on the issue. A survey of these blogs indicates that the environment is the second-most common topic after politics.

The first well-publicised case of the human impact of industrial pollution in Penang was that of the Perai Industrial Estate, one of the first to be established. Untreated effluents from many of its factories resulted in the poisoning and contamination of fish and other marine life in Sungai Juru and the coastal waters. The plight of coastal fishermen who lost their livelihood as a result of pollution attracted international press coverage. That was in the 1970s. To date, Sungai Juru still ranks among the worst polluted in the country alongside Sungai Pinang and Sungai Prai, both in Penang. They have been classified by the Department of Environment as "grossly polluted" since the 1980s.

Coastal water pollution in Batu Feringghi has existed since 1980s and even now, the water quality is below WHO standards for recreational use. There is now much more hill cutting in the north coast for hotel and condominium development. Besides increasing the sediment load of the coastal waters, hill cutting and soil erosion also pose dangers in the form of landslides and land slips. These have happened along the north coast and inland areas like Air Itam and Paya Terubong, where large boulders have come crashing down. The issue remains unresolved as building permits are still being approved.

Penang has also been suffering from traffic congestion and poor air quality as a result of an in-

creasing number of motor vehicles. Road infrastructure development has not kept up with vehicular growth. Traffic management remains poor and public transport in the form of buses is improving but still inadequate. Among the other long-standing environmental issues in Penang are road widening and tree cutting, coastal land reclamation and the destruction of mangroves as well as lack of public recreational space, public open space, parks and gardens.

Penang never had a comprehensive environmental plan. Environmental problems that emerged were usually handled on an ad-hoc basis. The first attempt to identify all the environmental issues and collect the data was in the studies for the first Penang Island Structure Plan. However, this was not an environmental management plan and there were only broad policy statements on how the environment should be managed.

The next major effort on a state-wide basis was the studies for the Environmental Conservation Strategy for the state, commissioned in 1996 and completed two years later. This is the comprehensive strategy and action plan for dealing with the major environmental issues of Penang. It identified 100 major issues and after discussions with the stakeholders and the government departments, the issues were put into three categories depending on their urgency and importance. The Penang State Economic Planning Unit (UPEN) was identified as the secretariat and driver for the implementation of the strategy and action plan. However, after some transfers in UPEN, there was no more interest and the plan was never implemented.

The Penang state government has undertaken two strategic development plans that would guide long-term planning in the state. Both these documents were based on studies in the different sectors. The First Penang State Development Plan (PSDP1) advocated the need to incorporate environmental considerations in economic development. The Second Penang State Development Plan (PSDP2) put sustainable development and environment as one of the five major thrusts of the plan. However, these seem to have very little influence on the decision-making processes in the state.

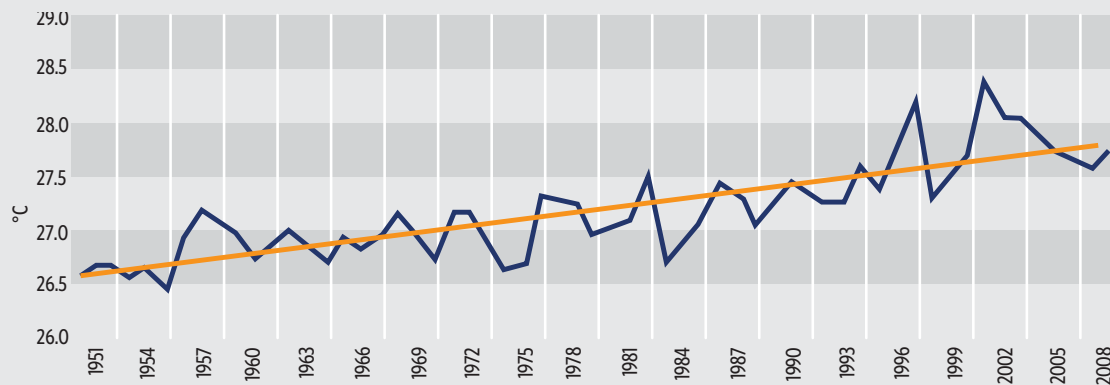


FIGURE 12A: MEAN TEMPERATURE IN BAYAN LEPAS, PENANG (1951-2009)
Source: Meteorology Department, Malaysia

George Town's transformation into a liveable space and a global example of sustainable development will have a catalytic effect. Without sensitively and appropriately revitalising Penang's heart, it is extremely difficult to make other economic strategies work. This is because history, heritage and a depth of culture are significant factors in the assessment of liveability.

found. Transparency, accountability and competence must become the norm.

Turning these concepts into processes will not be easy. Transparency implies that goals be discussed and prioritised, that expenditures for activities be made publicly available and that benchmarking standards

with other localities be provided regularly on a comparable basis. Accountability implies that overlapping jurisdictions are clarified and simplified, and authority and resources for implementation are strengthened.

Competence can be judged only if feedback mechanisms from citizens are activated. At present, the immediate priorities for action are to solve traffic problems, reduce pollution, and create an inviting city where there is a balance between natural and built environments, and a social inclusiveness that promotes civic participation in the key decisions that shape the nature of the city.

"Bringing world ideas home" is a concept that recognises that Penang has contributed to many global innovations, but has done so largely through the emigration of its talent. It is losing ideas and energy as the best and brightest move abroad. They can meet their aspirations at home if Penang becomes a city of comfort, safety, innovation, sophistication and leadership.

George Town as a World Heritage Site

In July 2008, UNESCO awarded World Heritage status to both George Town and Melaka. In the case of George Town, cultural diversity was the key component that secured the award. To maintain that status, the city needs to meet the requirements of the Heritage Management

Guidelines. This is a significant opportunity for various stakeholders to work together and devise new ways of how to improve liveability in the area. George Town is considered historically significant because of its original urban morphology — colonial origins and multitextured, two-storey shophouse buildings with terracotta roofs — architectural variety and a multiethnic, multicultural social community.

This broad concept of heritage poses problems of tradeoffs which have still to be resolved. Conservation and restoration of individual buildings are feasible and practical, but may not preserve the feel and traditions of a neighbourhood. The lifting of rent control offers an opportunity for land markets to function more efficiently in allocating space to activities for which there is demand, but runs the risk of gentrification and expulsion of low-income communities that have historically provided the cultural base for the city — the hawkers stalls, fisher folk and others. Densification is needed to provide a critical mass or cluster of like-minded professionals, but it must be managed properly to avoid compromising the stress-free lifestyles and less congestion that liveable cities provide.

A revitalised George Town will lead to a new phase in Penang's economic development. The factors that determine competitiveness are changing away from a solely low-cost, high-productivity model to one where issues of liveability, high urban quality and a vibrant culture are more important and become the central objective of economic and urban planners. The designated World Heritage Site within George Town can be used as the place to demonstrate cutting-edge concepts of transformation and to become a model for others in the region to emulate.

A new George Town Transformation Programme (GTTP) can implement this vision of a Penang with greater drawing power and pull, with a larger global resonance and with a distinct image and identity. The GTTP can provide a holistic approach to the physical, social and economic elements of maintaining George Town as a heritage site and carefully choosing among the development tradeoffs that we face, based on citizen debate and participation in decision making.





Pictures courtesy of Penang Heritage Trust, Anak-Anak Kota and iGeorgeTownPenang



BOX 13: The George Town Transformation Programme (GTTP)

The George Town Transformation Programme (GTTP) is a concept study for the transformation of George Town from a moderately-functioning urban centre into a model 21st century “secondary” city. Implicit in the programme is the opportunity to position Penang and George Town as a regional hub serving the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT) and Bay of Bengal growth areas. The GTTP recognises that inner-city George Town is hollowing out and there is an overall decline in urban amenities and connectivity. As an urban regeneration strategy, the GTTP seeks to make George Town more liveable and connected. The programme will also meet the broader objective to transform the local economy from its current low-cost supply/manufacturing base to a value-added, high-tech regional economy. It argues that improved amenities and liveability are the key elements leading to this transformation. Leveraging off its rich cultural history, the central tenets are creating:

- A “sticky space” to attract local and global talent;
- A place where high-value individuals visit and conduct business; and
- A destination of choice for knowledge workers and creative industries.

The GTTP puts forward the idea that a repositioned George Town Conurbation must focus on the clustering of specialised industry sectors, developing education, research and development, and enhancing regional and local linkages. As part of this body of work, some tentative plans for the revitalisation of key areas have been developed and a grants programme has been implemented under Think City Sdn Bhd.

Thus the GTTP is central to the wider development of the George Town Conurbation. By enhancing the links between historic George Town and the future transportation hub across the Penang Channel in Butterworth, the GTTP will be the nexus of an integrated network linking up the major towns and business centres in the Northern Corridor Economic Region (NCER). The GTTP will also encourage more knowledge-centric activities to reside in a revitalised George Town whilst key interventions like the rehabilitation of the waterfront will help make Penang more attractive to high-income heritage and cultural visitors. Better transport infrastructure and improved “connectivity” together with new and attractive real-estate development across the channel will make Penang more attractive to global talent whilst improved liveability will raise the living standards of all Penangites.

George Town’s transformation into a liveable space and a global example of sustainable development will have a catalytic effect. Without sensitively and appropriately revitalising Penang’s heart, it is extremely difficult to make other economic strategies work. This is because history, heritage and a depth of culture are significant factors in the assessment of liveability.

George Town’s heritage designation provides a new opportunity for transforming the tourism industry in Penang to attract wealthy globally-oriented people whose vacation choices are based upon visiting “culturally rich” heritage sites. Heritage travellers are concerned with living culture and intangible heritage, as well as preserved buildings. They are seeking the unique and distinctive. It is the historic experience of George Town that will attract them, not skyscrapers one can see everywhere.

In this context, a link can be made to the living culture and the “creative tourism” movements associated with places like Santa Fe and Rotterdam. Here, the attempt is made to involve tourists far more intimately with the host sharing experiences and learning skills. Visitors may choose the kind of people they want to meet,

which ranges from imams, priests, urban planners, gardening enthusiasts and shopkeepers to craftspeople. They encounter people a normal tourist would never meet. Tourism becomes a way of earning money by exposing traditional lifestyles to others. It also becomes a way of strengthening personal connections and interactions between Penangites and foreigners. Those connections, in turn, form the basis of a competitive niche in the global economy.

The GTTP⁶ is a catalytic programme designed to demonstrate George Town’s capabilities to serve as a regional hub, a global example of sustainable development, and a regional leader in the creative industry. It is organised around four pillars:

- Support for nascent R&D and educational institutions;
- Greater public access to the waterfront;
- Improved public transport; and
- Promotion of culture, diversity and heritage.

6 *Envisioning Change: The George Town Transformation Programme*, November 2008.



PENANG'S PEOPLE

- PROVIDING BETTER LIVELIHOODS
- GROWING, ATTRACTING AND RETAINING TALENT
- A LOCATION OF CHOICE
- CONTINUED EXCELLENCE IN EDUCATION
- LEVERAGING THE DIASPORA

One of Penang's greatest assets is its people. In the last few decades, however, it has had problems retaining its talent. Penang's success, however, will be closely tied to its ability to grow, retain and compete in attracting talented youth. Penang cannot do this on the basis of wages alone. The competition among cities to attract top global talent depend very much on the "liveability" of a city, the ability to grow, retain and enjoy a high standard of living, engage in creative activity and develop a sense of community. Personal wellbeing, environmental balance and civic participation are independent, yet interconnected, aspects of liveability. As Penang becomes a better place to live, work and play, it can seriously reconnect with its diaspora, former residents and others who have spent stints studying or working in Penang, who demonstrate a strong sense of attachment to the place.

Providing better livelihoods

The purpose of Penang's new strategy is to improve the livelihood of its people. The state has achieved considerable success in reducing poverty with less than 0.3 per cent of the population below the poverty line as at 2006. Compared to the 29 per cent poverty rate in 1980, this is a major accomplishment.

Poverty has come down, thanks to employment opportunities and rising wages. Between 1995 and 2007, total wage rates in Penang grew by 4.5 per cent annually, while consumer price inflation averaged only 2.5 per cent. The pressing concerns of providing for immediate basic needs have now passed. Instead, the issues in Penang have to do with sustaining gains in livelihoods and managing success.

With success in economic growth, Penang faces growing inequality. That has continued despite the slowdown in economic performance in this decade. In fact, the ratio of wages between skilled and unskilled workers has widened. The gains in wages have been skewed towards those with better education. Workers with more than 12 years of education saw higher gains in real wages (2.1 per cent per year) compared to those with less than 12 years (1.1 per cent). Reflecting this, those in urban areas saw more rapid wage gains than those in rural areas. In fact, rural wages hardly grew at all in real terms (Figure 22).

Almost all the wage increases can be explained by higher levels of average education for Penang's workforce. For many years, women in Penang have had higher levels of education than men, and a higher rate of participation as wage earners. These trends have held true over the past decade. Female workers in Penang today have about 10.3 years of education, while male workers have about 9.8 years.

Typically, higher-educated workers would move into more skilled and better-paying occupations. But in the last decade, this has not been happening. In fact, the proportion of skilled workforce declined between 2002 and 2007 in the Greater Penang area (including Kulim). The high-paying occupations of senior officials and

managers, professionals and skilled technicians are fewer in number, while the bulk of the population continues to be employed as plant and machine operators and assemblers (Figure 23).

This is unfortunate. The wage gap between a skilled technician and a plant operator is substantial — the technician earns almost twice as much and professionals earn even more. This wage gap has been widening over time. The education system is producing workers with more education, but not producing workers who can move into different types of occupations.

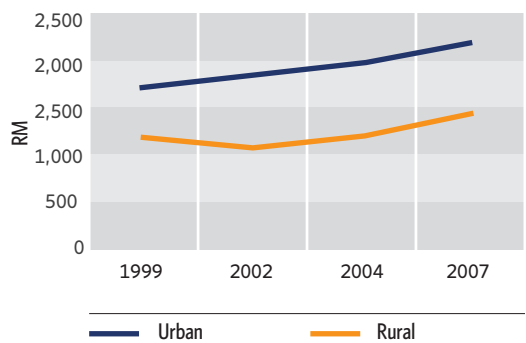


FIGURE 22: MEAN MONTHLY WAGES IN PENANG'S URBAN AND RURAL AREAS
Source: Household survey data, KRIS

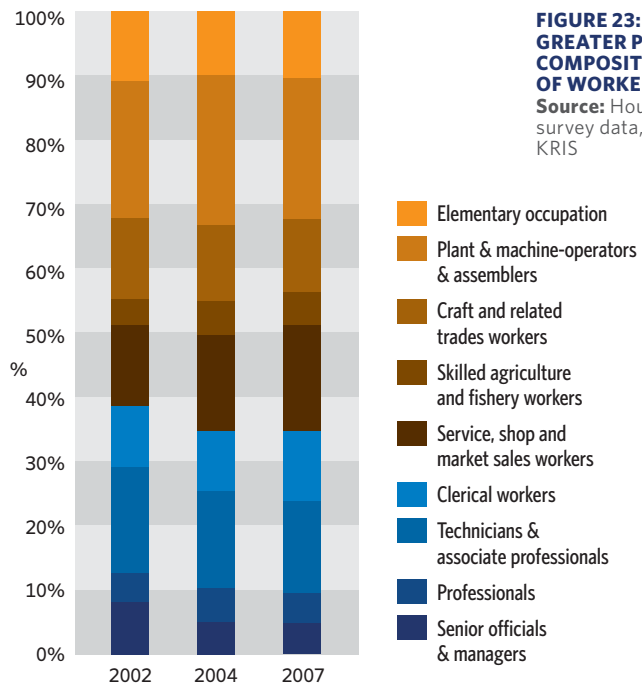
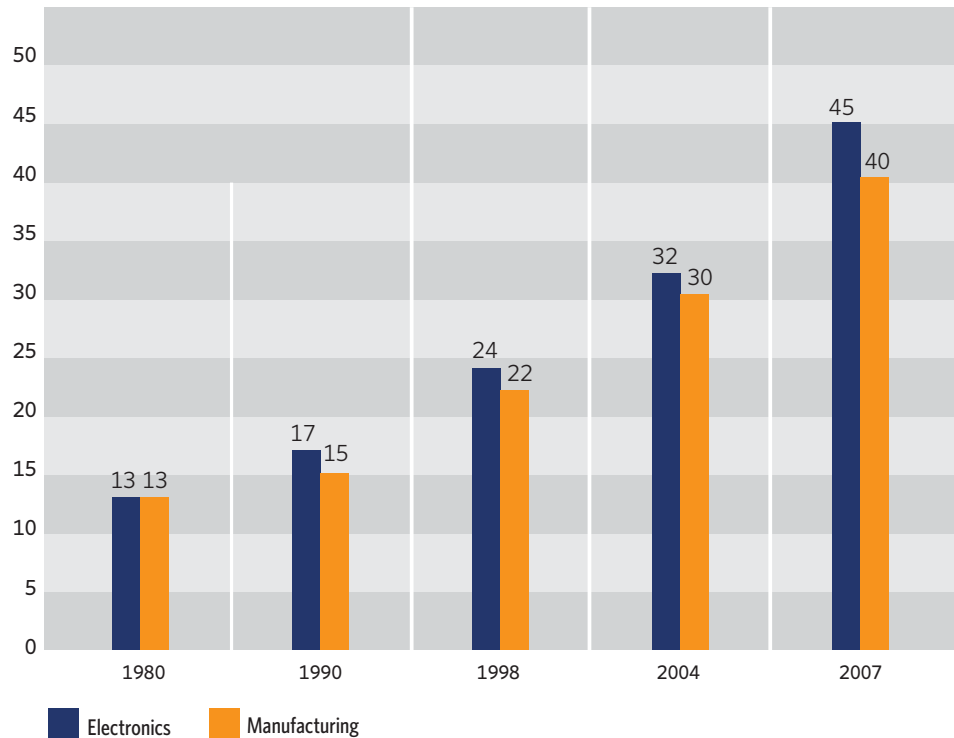


FIGURE 23: GREATER PENANG: COMPOSITION OF WORKERS
Source: Household survey data, KRIS

**FIGURE 24:
SKILLS INTENSITY
IN ELECTRONICS
AND IN
MANUFACTURING
IN PENANG**

Source: Rasiah, Hamdan and Gopalan (2009)



Without that, the potential gains from additional education are limited. Penang needs better-quality higher education to give workers the qualifications to enter new types of jobs.

The ladders for advancement in traditional occupations can no longer be relied on to provide continued wage gains. New ladders are needed.

Thus, the fundamental dilemma for Penang is that while the workforce is gaining experience and becoming more and more qualified, they are not moving into higher-skilled occupations. There is a mismatch between the supply of and demand for labour. For less-skilled occupations, the labour force is improving in its quality — more workers are better educated. But for higher-skilled occupations, the improvement in workforce quality is lagging behind what industry needs.

The fundamental dilemma for Penang is that while the workforce is gaining experience and becoming more and more qualified, they are not moving into higher skilled occupations. There is a mismatch between the supply of and demand for labour.

Surveys of electronic firms suggest a shortage of engineers is a critical bottleneck in the expansion of higher value-added products. Medical hospitals report that a shortage of nurses and doctors is the critical bottleneck. Heritage reconstruction is slowed by a shortage of skilled construction workers. Broadening the scope of training institutions to recognise the needs of all sectors of the economy is desirable. For Penang to perform well, it needs a diversity of talent.

The key strategy for Penang today is no longer to maintain a cheap but literate workforce of assemblers. It is to produce a critical mass of skilled professionals to encourage businesses to locate in the area. What is happening is that the skill levels demanded in individual firms are going up, while the aggregate supply of skills is holding steady. That is constraining economic growth in Penang.

The financial rewards to education can be handsome. For those who have completed more than nine years of education, each additional year adds 20 per cent to lifelong earnings. By

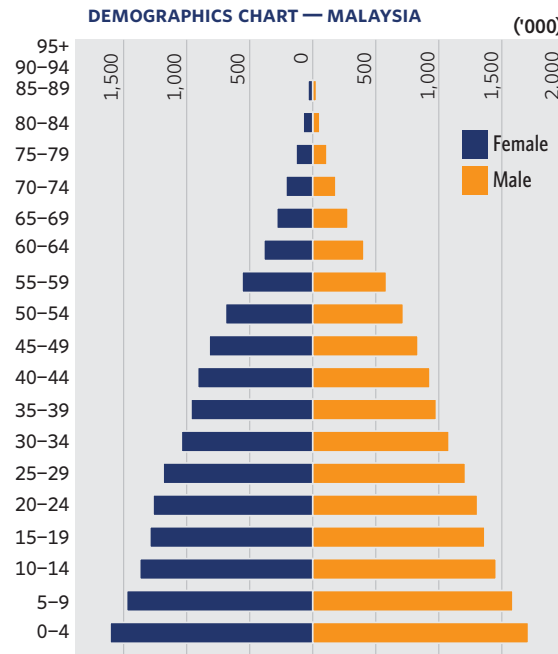
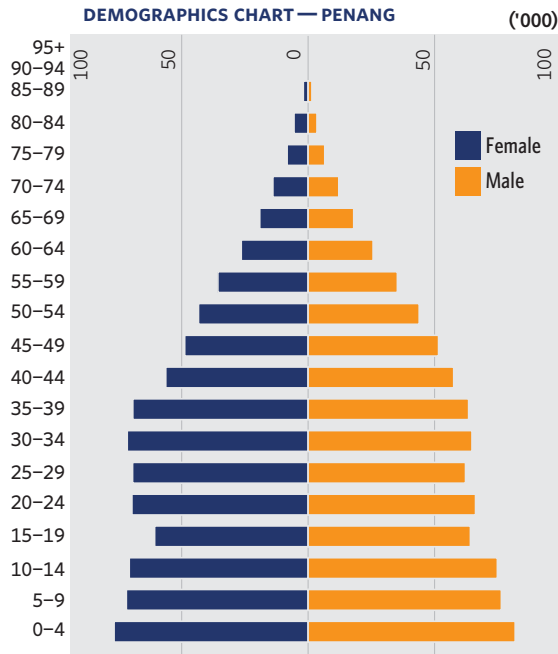


FIGURE 25: PENANG'S DEMOGRAPHIC PYRAMID COMPARED TO MALAYSIA
 Source: CLSA Asia-Pacific Markets, Economic Planning Unit

contrast, each completed year of education up to 9 years only adds 5 per cent to earnings. The difference between the two reflects the difference between equipping workers to achieve higher productivity within the same occupations versus providing them with the skills to venture into new occupations where productivity levels are higher. The latter was the driver of Penang's past success, as workers moved from farms to manufacturing assemblers.

The challenge is to raise the quality of schooling sufficiently to encourage students to continue their education, while at the same time raising the quality and quantity of higher education to produce the graduates demanded by industry. In education, the links between Penang's economy, its people and the city are most evident. Better education can attract talent. Those who come to Penang's universities from the rest of Malaysia tend to stay on in the area once they graduate. A larger pool of qualified graduates can create the preconditions for new business sectors to expand. And a greater diversity and density of people will add life to Penang's cities.

Growing, attracting and retaining talent¹

Penang has been able to attract young talent from the rest of Malaysia, thanks to its excellent universities, research institutions and economic opportunities. But that attraction is waning. Many of the best and brightest students leave Penang because of perceived limited job prospects in the area.

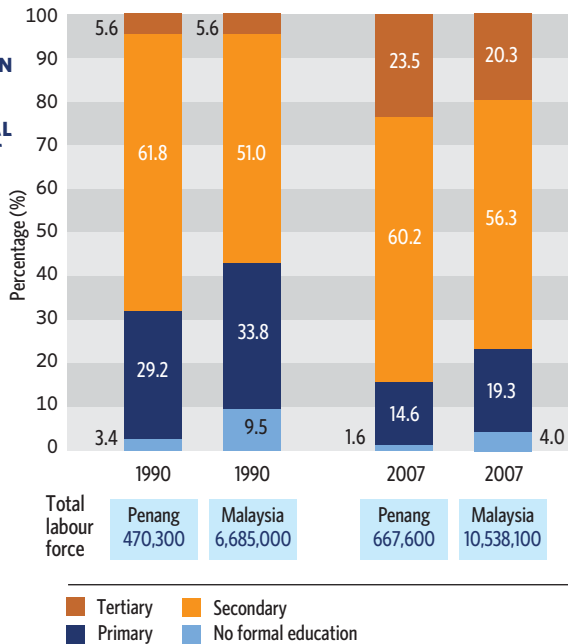
Figure 25 shows Penang's demographic pyramid compared to Malaysia as a whole. In Penang, there is a far higher proportion of workers in the total population, especially of workers between the ages of 20 and 40. There is a disproportionate number of female work-

A larger pool of qualified graduates can create the preconditions for new business sectors to expand. And a greater diversity and density of people will add life to Penang's cities.

¹ This section is based on background work done by the late Professor Ooi Giok Ling.

FIGURE 26: PERCENTAGE DISTRIBUTION OF LABOUR FORCE BY EDUCATIONAL ATTAINMENT IN PENANG AND MALAYSIA (1990 & 2007)

Source: Department of Statistics



ers, reflecting the job opportunities for women in assembly operations. At the same time, Penang has relatively few children. That means it does not have to bear the cost of education and

Penang's success will be closely tied to its ability to compete with other areas of Malaysia in attracting young graduates. It cannot do this on the basis of wages alone.

provision of other services for children, but it also shows that Penang's success in the future, and its potential for growth, will be measured by its success in attracting continued emigration from the rest of Malaysia.

The prospects for greater emigration depend partly on income levels. Workers in Penang get higher wages than the average workers elsewhere in Malaysia, taking into account their educational achievement, but they get fewer than workers in Johor, Selangor and Kuala Lumpur.

Penangites tend to be richer than Malaysians as a whole; per-capita incomes are about 45 per cent higher. But this gap is partly because of lower dependency ratios (fewer children and old people per worker) and only partly

because of higher wages. In general, wages in Penang have not grown as rapidly as wages in other major metropolitan areas.

For this reason, between 2002 and 2007, the share of skilled workers in Penang declined from 27 per cent of the workforce to 22 per cent. The fraction with tertiary education has also stalled. Almost 30 per cent of the workforce in the Klang Valley has completed tertiary education, while only 18 per cent of those in Penang have the same qualifications.

Penang's success will be closely tied to its ability to compete with other areas of Malaysia in attracting young graduates. It cannot do this on the basis of wages alone. In fact, a skilled worker could increase his or her wages by almost one third by choosing to move to Kuala Lumpur instead of Penang. With wage differentials of this size, it is not surprising that the major movement of population within Malaysia has been into Selangor rather than into Penang. In fact, seven of the 10 largest metropolitan areas in Malaysia are now in the Klang Valley. George Town is no longer one of the largest conurbations in absolute size, although it is still one of the top 10 most densely-populated areas (Zeufack, 2009).

The challenge for Penang is how to attract and retain creative and technically-advanced people. The state is not alone in facing this challenge. It is one that all small countries and less-advanced regions in large countries face. Policy makers have found that successful strategies involve three programmes:

- Developing Penang into a location of choice, where people want to live, work, raise a family and retire;
- Developing excellent educational establishments, with life-long learning that can ensure that professionals have continued opportunities for upgrading their skills and interacting with other leaders in their field; and
- Leveraging the diaspora of those who have left, but who still retain ties of family and culture.

A location of choice

Global cities generate economic density by attracting and retaining talented people. A major US survey 15 years ago noted that 80 per cent of educated people chose a job or company first and located wherever the job took them. By 2007, the same survey showed 64 per cent first chose the city where they wanted to live and then looked for a job in that city.

The challenge for Penang is to become the location of choice for a young, educated, and creative population. As mentioned earlier, air and water quality indicators have deteriorated with industrial growth. Traffic congestion around George Town has become a major challenge, partly because of limited success in coordinating transport and land-use development. The university is distant from the heart of George Town, so the city does not benefit from amenities like libraries, coffee houses and bookshops.

The competition among cities to attract top global talent can be condensed into the concept of the “liveability” of a city, the ability to enjoy a high material standard of living, engage in creative activity and develop a sense of community. Personal wellbeing, environmental balance and civic participation are independent, yet interconnected, aspects of liveability.

Certain elements of liveability can be measured statistically. Table 13 provides some indicators for Penang.

These indicators provide a snapshot of liveability in a static sense. They can be tracked over time to identify areas of improvement or deterioration. In the case of Penang, traffic volumes, road accidents and air pollution are headed in the wrong direction.

The competition among cities to attract top global talent can be condensed into the concept of the “liveability” of a city, the ability to enjoy a high material standard of living, engage in creative activity and develop a sense of community. Personal wellbeing, environmental balance and civic participation are independent, yet interconnected, aspects of liveability.

INDICATORS	
Ratio open space (ha) per 1,000 population	0.47
pH value* (measured in Bayan Lepas)	4.77
Persons per car	5.2
Persons per motorcycle	2.5
Range of normal growth rates of annual traffic volumes in Tg Bungah, Gelugor and Bayan Lepas (%)	5.7 – 8.3
Traffic volume (two-way, 16-hour count) in:	
• Gelugor	89,510
• Bayan Lepas	30,802
• Tg Bungah	16,615
Number of students enrolled in kindergartens and nurseries per facility	45.3
Life expectancy (years)	72
Public sector health expenditure (as % of GDP)	2.3
Low-income housing as proportion of housing stock (%)	51
Number of registered employees	780,281
Number of industrial accidents per registered employee (1998)	0.015
Juvenile crimes in 1995	270
HIV cases in 1998	138
Road accidents per 100,000 persons	14,406
Fatal accidents per 100,000 persons	415
Road accidents per 1,000 private vehicles registered per year	20.2
Library users per 1,000 population	49.52

TABLE 13: SELECTED INDICATORS FOR ASSESSING LIVEABILITY IN PENANG
Source: SERI (1999)

*Malaysian Meteorological Service defines acid rain as rainfall with a pH value of less than 5.2.

TABLE 14:
ECA-
INTERNATIONAL
RATING FOR BEST
CITIES TO LIVE IN

Source: ECA-
 International
 website

LOCATION	ASIA RANK	GLOBAL RANK
Year	2010	2010
Singapore	1	1
Kobe	2	3
Yokohama	3	4
Tokyo	4	5
Hong Kong	5	8
Taipei	6	55
Macau	7	57
Kuala Lumpur	8	62
Bangkok	8	62
George Town	8	62
Seoul	11	71
Shanghai	12	77
Bandar Seri Begawan	13	94
Nanjing	14	97
Beijing	15	100

A survey of Penangites resident abroad and those choosing to stay suggests that the attractions of Penang are its simplicity, stress-free lifestyle, low cost of living and relaxed attitudes. Parks, open spaces and sports facilities are praised. Food is highly appreciated. Social networks of friends and neighbours, and an openness to innovation and change are rated highly. Drawbacks include traffic volumes, road congestion, cleanliness of public spaces and

environmental quality. Professional networks are also thought to be limited. Some concern about growing crime rates is observed. While George Town ranks favourably among Asian cities (8th most liveable city out of 49 Asian cities), but globally, George Town ranks much lower (62nd).²

The principal reason for leaving Penang among young university graduates is lack of career opportunities and good jobs. This is inevitable in a secondary city where spe-

cialised skills are in demand. Jobs in engineering and logistics pay good salaries and these professions have less difficulty in retaining talent. But those interested in pursuing careers in a range of service industries, like event management, are likely to move to primary cities where opportunities are substantially greater.

The economic development strategy for Penang must consider the impact of policy choices on attracting and retaining top talent by focusing on liveability considerations. The importance that residents attach to these considerations has already been seen in the community action organised by the Friends of Penang Hill in 1991 to combat the “Disneyfication” of a treasured landmark. As plans develop for Gurney Drive, downtown historic George Town and other places, the essence of Penang’s liveability must be improved. Otherwise, sustained densification and economic growth will not be possible.

One good index of the desirability of Penang as a location is the index of housing prices. The combination of housing prices and housing volumes helps separate two causes of higher demand — from more people and from higher incomes. In Penang, the housing market has traditionally been divided between the north and south of the island. In the north, commercial and residential development is more important; in the south, industrial development dominates. Since 2000, in the north, the growth in property transaction volumes has been driven by prices, which are up by 40 per cent since 2000, compared with just 30 per cent for Malaysia as a whole. There was a decline in transaction volumes, however, until 2008. Commercial development also saw flat development in this decade, until 2008.

The interest in new property developments and their rapid take-up rate suggest that builders have confidence in Penang’s future ability to attract residents. Most new developments are occurring on sites that will take advantage of the new connectivity between Penang Island and the mainland. This, along with MM2H, provides positive structural reasons to believe that an influx of population will continue to add density to Penang.

The economic development strategy for Penang must consider the impact of policy choices on attracting and retaining top talent by focusing on liveability considerations.

Penang’s liveability must be improved. Otherwise, sustained densification and economic growth will not be possible.

2 ECA Survey.

Continued excellence in education

In Penang, slightly less than half of labour value-added accrues to skilled workers. That percentage is about the same across both the manufacturing and service industries. Compared to other locations in Malaysia, the degree of skill intensity is middling. Penang ranks as a higher skill-intensive location compared to Perak and Kedah, but lower as compared to Selangor and Kuala Lumpur.

Within the important electronics sector, surveys suggest an improvement in skills intensity and firm-level training expenditures between 2000 and 2007. Although the intensity of R&D engineers in the workforce has increased, five foreign semiconductor firms contributed 5,549 engineers out of the total 7,010 engineers in a recent sample survey of electronics firms. It is no wonder that local small and medium-scale firms complained about their engineers being poached by foreign MNCs.

Skills intensity, training expenditure, the number of R&D personnel and expenditures all have a significant impact on productivity and export intensity of electronics firms in Penang. These findings point the way forward for public policy. The current approach of using less-skilled, imported foreign labour as a substitute for developing a more-skilled workforce is no longer sustainable. The profits of firms using this approach are being squeezed.

Instead, government policy should place emphasis on the stepping up of educational upgrading. A target for the number of R&D engineers and scientists in electronics should be raised gradually to reach at least 2,000 by 2015 and 3,500 by 2020.

The current production of engineers is inadequate to meet these goals. There has been a sharp decline in the number of enrolments and new entrants in Malaysian public and private universities in the information technology (IT) sector. The number of graduates in 2007 has fallen to 40 per cent of its level in 2002, a major step backwards for the economy.

Currently, Penang is home to two public universities, the Penang Medical College (a joint venture with the National University of Ireland) and more than 30 private colleges. In addition, the Penang Skills Development Centre (PSDC), founded in 1989, is one of the best training centres in Malaysia. PSDC offers courses on technical issues, leadership and business management, specialised skills and IT. It has trained more than 128,000 individuals in its 18 years, providing over 6,500 courses. Other training institutions have also proliferated in Penang in recent years — so much so that there is often an overlap of activities and underutilised facilities.

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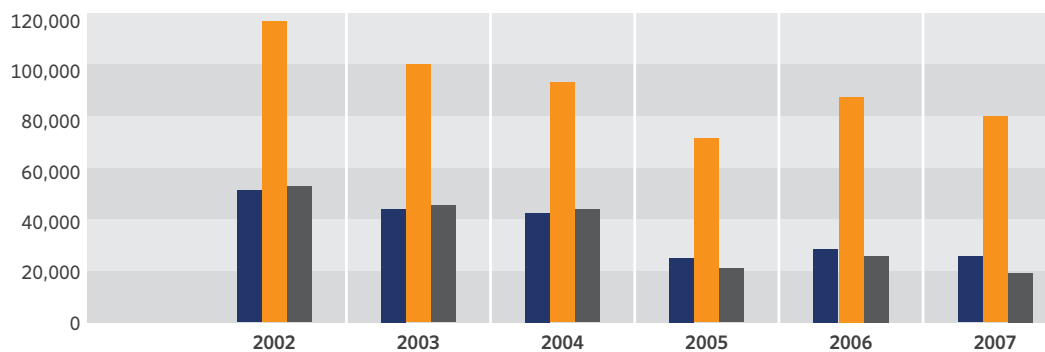


FIGURE 27:
TOTAL SUPPLY OF IT GRADUATES, 2002-07
Source: Rasiah, Hamdan and Gopalan (2009)

	2002	2003	2004	2005	2006	2007
New	57,934	44,168	41,698	25,377	29,432	24,102
Entrants enrolments	119,556	100,895	97,323	77,493	88,884	79,677
Output	53,712	45,052	44,595	22,862	26,313	19,496

The institutions of higher learning and vocational training are the core means for attracting and retaining talent through continued excellence in education. They play a central role in the transformation of the workforce that is required over the next decade.

Penangites of all categories — former residents, people living in Penang, returning residents and final-year university students — demonstrate a strong sense of attachment to the place that is called “Penang”. This diaspora and the rich array of personal, professional and social networks between those resident in Penang and those outside can be mobilised to encourage high-skilled individuals to maintain a connection with Penang.

The institutions of higher learning and vocational training are the core means for attracting and retaining talent through continued excellence in education. They play a central role in the transformation of the workforce that

is required over the next decade. They provide the basis for the incubation of new ideas as well as for industry-university linkages and public-private partnerships. One incubator of ideas is the Malaysian Institute for Pharmaceuticals located in USM.

The presence of private colleges is one way of facilitating the matching of industry demands and worker skills that a modern economy needs. But for some specialised skills, private colleges may be unable to generate the quality and scale that are needed. For Penang, the most urgent need is to revitalise the skills of the electronics and electrical sector. A new partnership between USM, the Indian Institute for Technology Kanpur and industry in Penang to create a Centre for Engineering Excellence (CEE) will fill this gap.

The CEE is a new public-private partnership that enriches the industrial ecosystem in Penang through a not-for-profit foundation. The centre provides an expert resource pool drawn from industry and academia. It conducts short courses, academic programmes, applied and fundamental research, as well as provide for sabbaticals, seminars and internships.

The collaboration with industry ensures that topics are relevant to the most pressing needs, while also providing the opportunity for

students to gain hands-on experience through internships. In its first phase, the CEE is focused on semiconductors and ICT, materials engineering, radiofrequency and microwave technologies, and optoelectronics and lighting.

Leveraging the diaspora

Penangites of all categories — former residents, people living in Penang, returning residents and final-year university students — demonstrate a strong sense of attachment to the place that is called “Penang”. This diaspora and the rich array of personal, professional and social networks between those resident in Penang and those outside can be mobilised to encourage high-skilled individuals to maintain a connection with Penang.

It is common for skilled labour to flow from small, developing economies and regions to larger, richer localities. Most of these migrants move in order to benefit from higher wages and better living conditions. But a significant fraction of them also point to the desire to gain experience, upgrade qualifications, work with others who are skilled and talented, and seek security and health for themselves and their families.

Penang will not be able to compete with other localities on wages, but it can offer better lifestyles, and plentiful opportunities. These attributes would provide an encouraging environment for migrants to return and use their global skills to develop new ventures.

The link between the business environment and the return of the diaspora is strong. But new businesses continue to face bottlenecks in Penang. There are obstacles to setting up a company and further obstacles to recruiting labour. The share of firms reporting dealing with procedures for local workers as a major business obstacle is the highest in Penang, compared to other regions in Malaysia. The number of weeks to recruit skilled professionals is also highest in Penang. Meanwhile, the number of entrepreneurs and new businesses has gradually fallen over time. The conclusion: Penang is

far from the easiest place to do business in Malaysia. Barring major improvements, the best students will continue to migrate abroad.

In many countries, a number of interactions take place between migrants and their home countries. Indian and Chinese immigrants to the United States have been important agents in developing manufacturing and IT hubs back in their home countries. Trade and investment links between countries are facilitated when there are large numbers of skilled migrants. Skilled workers serve as intermediaries, commercial ambassadors, role models, mentors, partners and investors for ventures back home (Clemens, 2009). They can help spread new industries and niches via international networks. There is evidence that international migration causes more rapid diffusion of science and technology as measured by patent citations, for example (Kerr, 2008). In Penang, potential future growth areas like biotechnology depend for their success on returning migrants.

Many countries have specific programmes and incentives designed to attract migrants to return. In Mexico, a Presidential Fund for Retention operated between 1991 and 2000 to give salary support for one year to returning graduates — about 2,000 took up the offer. Some may have returned anyway, but even direct subsidies are a limited substitute for better opportunities to work. Returning migrants are most likely to be attracted by programmes

that welcome them and their families to stay, provide security through granting permanent residency, and offer them an environment in which they can innovate and build a new business. Significantly improving efficiency of services and the quality of services delivery will be key to attracting the diaspora back to Penang. Further liberalising the services sec-

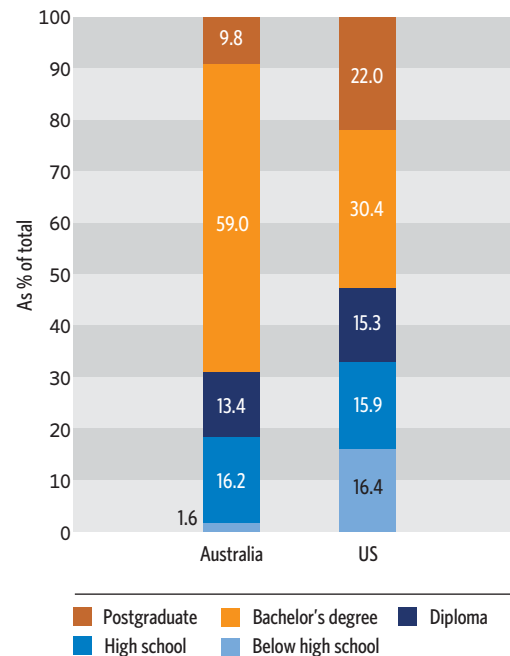


FIGURE 28: ADULT MALAYSIANS IN AUSTRALIA & UNITED STATES BY EDUCATIONAL QUALIFICATION, 2000
Source: Udomsaph and Zeufack (2010)

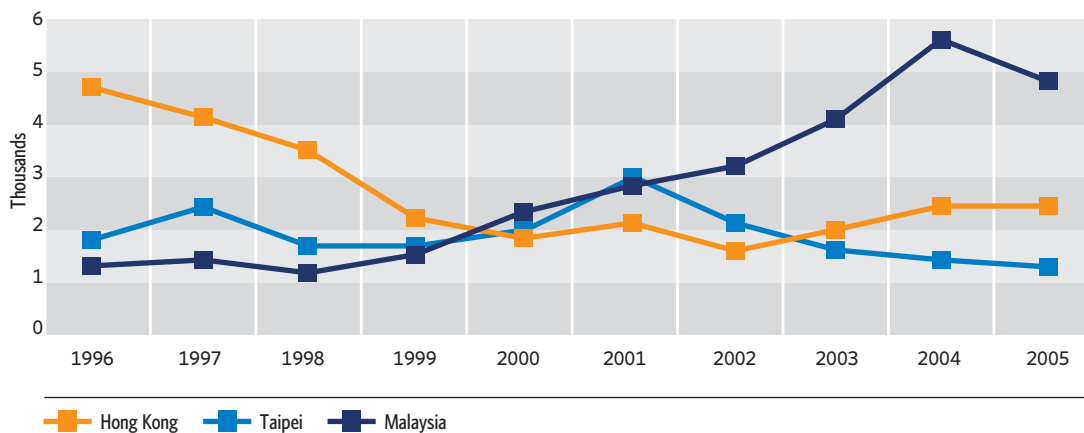


FIGURE 29: PERMANENT ARRIVALS IN AUSTRALIA BY NATIONALITY
Source: Udomsaph and Zeufack (2010)

tor and relying further on citizens' voice to enforce compliance and accountability would be critical. Equally important would be greater meritocracy, which would help realign the incentives system.

Overregulation of the services sector, in particular, is a major barrier for returning migrants. Many qualifications obtained abroad are not recognised domestically and criteria

other than quality may be applied. All pharmacists getting a licence to work in Malaysia must first work for the government for three years. Such measures discourage those who have gone abroad from coming home. Professional qualifications should be reviewed to ensure they do not become a barrier to attracting talent from abroad.





LEVERS OF CHANGE

- STRATEGIC DEVELOPMENT THRUSTS
- LIGHTING THE FUSE: POLICY AND INSTITUTIONAL REFORM
- CATALYTIC GRANTS AND INVESTMENTS FOR CHANGE
- MONITORING, DATA AND KEY PERFORMANCE INDICATORS
- NEW MINDSETS
- SUPPORTING PENANG TO SUPPORT MALAYSIA

This book offers a development strategy for Penang based on an understanding of its place in the global economy, in regional supply chains and of one of its key features: a secondary city in Malaysia. In order to escape the middle-income trap and become an advanced economy by 2020, Penang needs to be globally connected, regionally oriented and locally centred. Moving to high-income would require Penang to intensify activities with increasing returns to scale, foster agglomeration and seek specialisation. At the regional level, it will be critical to strive for unbalanced growth (in cities), but balanced development (of all people) through economic integration, moving from spatial targeting to spatial integration. This new spatial approach would bring speed, nimbleness and coherence — if there is devolved decision-making and local-agency autonomy. Most importantly, Penang will have to aggressively nurture, attract and retain talent, as talent breeds talent. For this strategy to succeed, implementation should be systematically monitored. A set of customised indicators that measures the outcome of this study should be adopted and actions to address weaknesses identified should be continuously taken.

The approach laid out in this study emphasises a macroeconomic scan of key challenges and issues undertaken through a process of consultation with stakeholders and policymakers at the local, regional, state and federal levels. The purpose is to foster a common vision for what needs to be done and the direction of change, along with a sense of urgency to address competition from abroad. This plan views Penang's progress as the development of an ecosystem where the economy, cities and people interact in mutually-dependent ways. The overview vision and concept provide the foundational base for coordinating the actions of elements of this ecosystem.

Coupled with this overview are a series of technical reports providing detailed recommendations for each subsector, and covering the economy, cities and people. The conclusions of these reports are as follows:

- Penang and the Northern Corridor are in a favourable geographic location;
- Funding for key projects is available;
- The timing is right for a fresh strategy that can take advantage of emerging global trends; and
- What is most lacking is the supply of skilled people and the capacity to execute the strategic plan in an effective way.

One finding of this book is that spatially-based planning needs to be accompanied by an institutional commitment to execute strategies. This requires a monitoring and trouble-shooting capability at the regional level and an institutional commitment to achieve key targets.

The technical reports, in turn, offer guidance for a series of policy and institutional changes to provide the foundation on which the new development model can be built. The focus on regional development is a new concept in Malaysia and requires a changed mindset and approach across a range of agencies, that goes beyond creation of the Northern Corridor Implementation Authority (NCIA). In some instances, granting greater autonomy to local bodies will be essential. Already, the Accelerated Programme for Excellence (APEX) under which Universiti Sains Malaysia (USM) operates is demonstrating the benefits that such an approach can yield.

In other cases, the incentives must be aligned to promote more efficient regional development. Budget processes which are based on sectoral considerations rather than regional/geographic concerns can produce incentives for local advocacy of projects, regardless of the economic benefits. Conversely, they can lead to high-return projects with large localised spillover benefits being sidelined until there is a fit with the national, sectoral programme.

With policies in place, a series of catalytic grants and investments provide critical ingredients for the implementation of the strategy and achievement of its objectives. These investments are identified below. They are the responsibility of different stakeholders. The federal government is responsible for most of the major projects, especially related to infrastructure, but local civil society groups and local authorities also have a role to play in identifying priorities for federal investments. In some instances, such as the Penang Global City Centre and the Penang Outer Ring Road, projects have been postponed as a consequence of lack of public consensus and lack of strategic fit with the new development model.

The federal government is making catalytic grants and investments through Khazanah Nasional Berhad to fill identified gaps in the ecosystem. This can give rise to change and provide the basis on which other elements of the system can grow organically.

The private sector is to provide most of the new investments, confident in the business environment and direction of the new Northern Corridor economy.

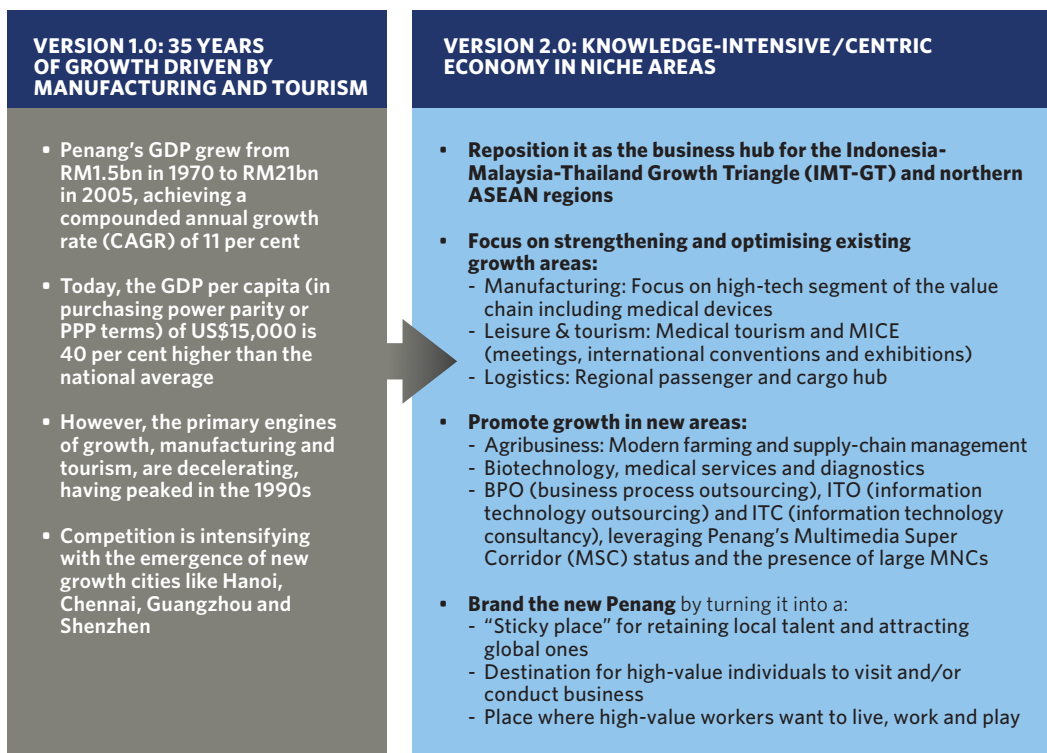
Implementation of the strategy needs to be monitored, preferably by an independent body or unit. As many stakeholders are involved in implementation, monitoring must be broad-based and cover the proposed programmes to develop Penang economically, spatially and in terms of talent.

Successful implementation of the strategy depends on the joint actions of the key stakeholders. Coordination and consultation among

The federal government is making catalytic grants and investments through Khazanah Nasional Berhad to fill identified gaps in the ecosystem. This can give rise to change and provide the basis on which other elements of the system can grow organically.

**FIGURE 30:
MOVING
TO PENANG
VERSION 2.0**

Source: Khazanah Nasional Berhad (2009)



these groups is new for Malaysia, but the challenges must be dealt with in a cross-cutting way.

Strategic development thrusts

The vision for Penang that is laid out in this study takes a holistic approach to development. In the past, the economic sector had pride of place, but strategies to promote cities and people development have lagged. These must be debated, elaborated and implemented to sustain future growth.

Although there is much talk about moving to a knowledge economy, Penang's strength continues to lie in its manufacturing prowess. More knowledge can be built into existing products as firms move up the value chain, but the old economy cannot be cast away. The characteristics of future development will be different.

If these three conditions are met, Penang can be transformed into a knowledge-centric, skills-intensive platform in selected areas.

The strategy is oriented globally, but recognises that new opportunities and the most rapidly-growing markets are in Asia. The strategy

is also based on the understanding that it is ever harder for small locations to make their mark on the global economy and that links with the hinterland are therefore a necessary element for continued growth of a hub.

The global economy provides ideas, best practices and standards of excellence. The regional economy will provide an increasingly important source of demand and an efficient supply chain. The local economy will provide the magnet for talent, the critical mass to support a cluster of activity, and an abundance of capital, people and natural resources to support growth.

This is a new economic model programme of catalytic grants, strategic investments, policy and institutional reform, and monitoring for results. The entire programme is based on the vision of an advanced economy, integrated with the world, the region and the hinterland, specialised in high value-added activities and offering job opportunities in an inclusive way across a range of sectors. It differs from the previous strategy based on export-led assembly manufacturing and tourism because of the changing economic conditions in Penang and the world (Figure 30).

Lighting the fuse: Policy and institutional reform

Business as usual is not an option for Penang. The hollowing out of industry would continue and competition from other localities would jeopardise progress that has already been made. A new strategy is required. Three programmes underpin the new strategy, each focused on one aspect of the triad of economy, cities and people that will drive sustainable development in the region in the medium term.

POLE (Penang's Offer of Logistic Excellence)

is a series of investments that re-establishes Penang as a good-value transaction hub, connecting some of the most dynamic economies in the world. These investments need to be approved and financed by the federal government. Penang can position itself as a hub, principally for the Indonesia-Malaysia-Thailand Growth Triangle where it is already the most developed area, and secondarily for a larger region including rapidly-growing areas in India and the Middle East. As South India develops, the economic centre of gravity in Asia will shift towards the south and Penang's geographic situation will improve.

The hub concept would restore Penang to its former position as a major transshipment port, and would build on historical linkages with India, the Organisation of the Islamic Conference states, ASEAN, and the rest of Asia. Hubs are based on having the lowest-possible transaction costs and the best-possible connectivity.

Penang can move ahead by:

- Improving physical connectivity with neighbouring countries through better and higher-frequency air and port connections to regional nodes. This would be helped by upgrading the seaport and supporting infrastructure, double-tracking the railway, establishing Butterworth as the northern transport hub, and improving air links and sea routes with the surrounding region;
- Improving connectivity within the Northern Corridor by expanding the Penang Bridge, constructing a second bridge,

upgrading public transportation (with the introduction of Rapid Penang), and expanding the industrial estate;

- Increasing bandwidth and virtual connectivity to enhance the value of existing networks of professionals and businesses; and
- Taking advantage of a completed free trade agreement with India.

EQUIP (Economic Quality Improvement Programme)

will shift the emphasis of policy-making from a concern over quantity to a focus on quality. The programme recognises that quality of economic activity (in terms of moving up the value chain, technology diffusion, linkages with local suppliers, human resource management, demonstration of new products and penetration of new markets) is as important as quantity in a sustainable development strategy. It will focus efforts on easing the regulatory burden on companies, providing incentives for high-quality activities, generating high-value products and processes, and easing entry and exit of firms in response to changing market conditions.

Initially, the programme aims to address issues highlighted by existing firms in manufacturing, services and logistics. Many of these firms have significant potential for growth, especially those that are trying to move up the value chain and raise productivity by specialising in higher value-added activities. That implies greater attention to technological upgrading and streamlining business regulation.

But firms entering new growth areas can also be helped. Selecting specific subsectors for support remains controversial, even in highly-successful economies like Singapore, where billions have been sunk into life sciences with as-yet scanty returns. New economic theory provides some guides as to which sectors offer the most potential, based on the revealed comparative advantage of the existing economic

Focus must be on quality, not quantity. That quality will be observed in three characteristics. The economy should be based on:

- **Sectors in which there are increasing returns to scale;**
- **Operations in niches within regional and global supply chains; and**
- **Areas where existing capabilities provide a competitive foundation.**

base, but such guides are rough and no guarantee of success.

What is more, identification of new growth areas is not the same as identification of public policy interventions to support such activities. The latter must be based on a detailed understanding of the obstacles to private sector development and the opportunities for public policy to coordinate activities (critical mass issues), compensate firms for market externalities (discovery and learning externalities), and to provide appropriate incentives, policies and infrastructure.

Despite the risks involved, there are several promising areas where new businesses can thrive in the local economic environment, if appropriate supporting public-private partnerships can be developed. Medical tourism, biotechnology and aquaculture are examples of areas where potential for growth appears to be significant. Bureaucratic regulations affecting these industry segments should also be targeted.

Two words summarise the key needs for developing growth opportunities across a number of sectors: *technology* and *institutions*.

Technology upgrading is a prerequisite for developing a globally-competitive industry in a specialised niche area. About one-third of all firms in Penang report introducing new technology that markedly changed the way a product is made in the last two years. Almost two-thirds report upgrading machinery and equipment. But the core technological capabilities of firms have not improved significantly in the last five years. This needs to change.

Institutional change is one way to encourage better use of technology. This book evaluates some of the critical changes that are required to foster R&D, boost university-business linkages, encourage venture capital and promote proper planning to transform George Town and its surrounds into a dynamic space. Institutional coordination is needed to provide better security for goods, reduce delays between the airport and the industrial zone, provide needed educational skills, and promote coherence across different levels of government. Growth suffers from the perception that regulation poses large costs to business. New firms and exporters are particularly affected. The key priorities for the federal government are to:

- Abolish the system of Approved Permits (APs) and replace it with a short negative list;
- Introduce a “single window” licensing through e-government portals to encompass all state and local government approvals through creation of a one-stop authority with genuinely-delegated authority from central ministries;
- Review legislation on the firing and hiring of workers and ease other bureaucratic obstacles to doing business;
- Review and adapt bankruptcy laws to support high-risk ventures in innovation-based firms, encourage risk taking and eliminate the stigma of failure;
- Negotiate sanitary and phytosanitary (SPS) agreements for tropical fruits with neighbouring countries; and
- Provide catalytic grants for R&D for selected firms deemed important to cluster development in the selected priority areas.

The state government also has responsibilities to contribute to productivity growth. It must:

- Speed up approvals for business permits, especially on construction permits, warehousing and other local ordinances;
- Encourage linkages between local universities and businesses;
- Adopt the concept of an agricultural free trade zone (AFTZ); and
- Promote better land-use planning and management.

TARGeT (Talent Attraction and Retention in George Town) meets the need for George Town to become identified as a place where young, high-skilled professionals want to live. It seeks to provide a new brand for Penang. In the competitive global labour markets for skilled professionals, each location has niche comparative advantages that serve to attract and retain the needed talent to drive knowledge-centric growth.

In other words, efforts must be made to make Penang a “sticky place” where professionals choose to live. Strategies that enhance the

liveability of Penang can help sustain growth. Those that reduce it, through congestion or environmental effects, can be damaging to the brand. From this perspective, culture, heritage and the arts must take on a more prominent role to ensure that development is inclusive and sustainable.

The federal government strategies to support this would be to:

- Introduce a fast-track procedure for work permits for high-tech and high-skilled businesses and individuals, and for work in research and universities;
- Review and shorten the process for obtaining Permanent Resident status for foreigners;
- Pursue further autonomy for higher education institutions based on their track record of success in placing graduates;
- Encourage more students to take technical, engineering and science-based degrees; and
- Assess the need for a national Talent Authority to play the same role in human resources, as MIDA does for investment promotion.

At the state or local level, there is a need to:

- Create the Penang Centre of Engineering Excellence as a pilot centre for the introduction of global best-practices, in collaboration with MIT and the Indian Institute of Technology (IIT) systems;
- Establish a non-profit organisation to foster links and networking with the Penang diaspora; and
- Implement the George Town Transformation Programme effectively.

Catalytic grants and investments for change

Federal projects

The federal government plays a critical role in ensuring connectivity, improving the business environment and enhancing liveability in Penang. Ten major projects have been identified, of which seven have been approved for a combined funding of approximately RM5.24 billion, while another three projects are under consideration.

1 Improvement of bus service

Given the deterioration of public transport services, the federal government in February 2007 announced the establishment of Rapid Penang Sdn Bhd, a new entity operated by Rapid KL, with an initial allocation of RM50 million to provide seamless, reliable and safe public transport service.

Rapid Penang has already made inroads into alleviating congestion in the state. The first phase of operations started with 150 buses while the second phase will introduce an additional 200 buses, by 2010.

2 Upgrading the ferry service

The Penang Ferry Service, connecting the Sultan Abdul Halim ferry terminal in Butterworth to the Raja Tun Uda ferry terminal at Weld Quay in George Town, is the oldest ferry service in Malaysia. It began operations in 1920, under the management of a Chinese-owned company. Today, it is jointly operated by the Penang Port Commission (PPC) and Penang Port Sdn Bhd (PPSB). It was the only link between the island and the mainland until the bridge was built in 1985. High-speed ferries to the resort island of Langkawi, Kedah in the north as well as to Medan, Indonesia, are also available daily.

The ferry service that is being provided does not meet demand and public service standards. Little has been done to upgrade the infrastructure as the operator has been incurring losses over the last 10 years. The federal government is considering taking over the responsibility for operations and upgrades. This project is important for the success of the Northern Transportation Hub, which will see the integration of road, rail and sea.

3 Penang Sentral

Penang Sentral is the gateway to the Northern Corridor of Malaysia. A new centre of connectivity, it will be a hub for integrated rail, ferry and bus services, serving the Northern Corridor. The hub also integrates retail, commercial and residential development within a planned 6 million square feet of development. The project is estimated to cost RM2 billion.

Penang Sentral will be developed in two phases, starting with the transport hub and fol-

**TABLE 15:
CITIES, PEOPLE
AND THE
ECONOMY
- 10 KEY
POLICY AND
INSTITUTIONAL
SOLUTIONS**

ISSUE: SHORTAGE OF DOMAIN EXPERTS / TALENT		
PROPOSED SOLUTIONS	KEY MEASURES FOR ACTION IN 12 MONTHS	REMARKS
<p>①</p> <ul style="list-style-type: none"> Actively attract foreign talent both directly and leveraging on the Malaysian diaspora Allow flexibility for entry, exit and residence for 10,000 highly-skilled professionals and domain experts with clear deliverables 	<ul style="list-style-type: none"> Introduce a fast-track procedure for work permits for high-tech/skills businesses and universities Review and shorten the process of delivering the Permanent Resident status for foreign talent 	<ul style="list-style-type: none"> Follow the H1 Visa system in the US to attract talent Singapore is a model for retaining foreign talent
<p>②</p> <ul style="list-style-type: none"> Attract the diaspora as a principal source of talent 	<ul style="list-style-type: none"> Establish a non-profit organisation to foster links with the diaspora 	<ul style="list-style-type: none"> Enterprise Ireland / Singapore International
<p>③</p> <ul style="list-style-type: none"> Establish high-end research centres to nurture & retain talent, attract global talent Provide a suitable work environment for the diaspora 	<ul style="list-style-type: none"> Establish CEE as a pilot centre in collaboration with global research centres like IITK with free access to foreign talent and flexible mechanism to involve the diaspora 	<ul style="list-style-type: none"> ITRI (Taiwan), Cambridge Science Park, A-Star (Singapore), R&D labs in Bay Area: CEE is a hybrid learning from these four models

ISSUE: PERCEPTIONS OF MALAYSIA AS A DIFFICULT PLACE TO DO BUSINESS		
PROPOSED SOLUTIONS	KEY MEASURES FOR ACTION IN 12 MONTHS	REMARKS
<p>④</p> <ul style="list-style-type: none"> Increase the ease of doing business Reduce the regulatory burden from Approved Permits (APs) requirements 	<ul style="list-style-type: none"> Abolish the system of Approved Permits and replace it with a short negative list 	<ul style="list-style-type: none"> Improve security for both the living and business environment
<p>⑤</p> <ul style="list-style-type: none"> Reduce the lack of transparency in the licensing system stemming from multidepartmental functions 	<ul style="list-style-type: none"> Introduce "single window" licensing through e-government portals and to include local / state governments 	
<p>⑥</p> <ul style="list-style-type: none"> Promote technopreneurship and high-risk ventures in targeted sections by reducing cost of entry and exit 	<ul style="list-style-type: none"> Review and adapt bankruptcy laws to support high-risk ventures in innovation-based businesses, allow more risk taking and eliminate the stigma of failure in these targeted areas 	<ul style="list-style-type: none"> Explore best practices in the developed world similar to Chapter 11 for innovation ventures

ISSUE: ABSENCE OF AN URBAN CENTRE THAT SERVES THE IMT-GT AND THE BAY OF BENGAL AREA		
PROPOSED SOLUTIONS	KEY MEASURES FOR ACTION IN 12 MONTHS	REMARKS
<p>⑦</p> <ul style="list-style-type: none"> Create a viable and vibrant urban centre for the IMT-GT region Focus on establishing Penang as a leader on sustainability and liveability 	<ul style="list-style-type: none"> Focus on enhancing the George Town Conurbation and develop an integrated plan for George Town and Butterworth Redevelop the waterfront and ensure seamlessness like Hong Kong-Kowloon Island 	<ul style="list-style-type: none"> Penang Sentral needs to be well designed to ensure integration of various modes of transport and access to the public Adopt a city strategy to reinvent Penang as a leader for sustainability
<p>⑧</p> <ul style="list-style-type: none"> Enhance virtual connectivity with high-speed data and voice connection 	<ul style="list-style-type: none"> Increase bandwidth and virtual connectivity to technology hubs 	<ul style="list-style-type: none"> Ensure seamless connectivity, both virtually and physically
<p>⑨</p> <ul style="list-style-type: none"> Improve physical connectivity through frequency of air and port connections 	<ul style="list-style-type: none"> Establish flights to Chennai and enhance port and rail connectivity to IMT-GT 	
<p>⑩</p> <ul style="list-style-type: none"> Create a seamless business environment within the IMT-GT, so as to create greater synergies for businesses in the region Leverage historical ties to strengthen business linkages with India, China, ASEAN and OIC 	<ul style="list-style-type: none"> Reduce TPT for imports / exports and transshipment items so as to boost the position of Penang as a value-adding transshipment hub Integrate into the region and reduce barriers through multiple FTAs with key partners primarily India and the South Asia countries 	<ul style="list-style-type: none"> India and Malaysia are targeting to sign Comprehensive Economic Cooperation Agreement (CECA) by end of 2010

lowed by the commercial hub. The first phase is scheduled for completion by 2013, but the project remains in the planning stage and implementation is behind schedule.

4 Broadband in Penang

Broadband is the backbone of knowledge-economy sectors, and critical in realising the vision of Penang firms moving up the value chain through knowledge, creativity and innovation. The industrial parks in Penang have been identified as amongst the first to be upgraded with high speed broadband infrastructure under the high speed broadband (HSBB) programme. This provision of a globally-competitive and reliable high speed broadband service is a prerequisite towards driving higher value-added activity in the region. There is a need to widen the implementation to include the conurbation as a whole, in order to improve virtual connectivity.

5 Expansion of the Penang International Airport

The expansion of the Penang International Airport (PIA) began in 2009 and is expected to be completed by 2010. The airport handles more than 3.4 million passengers a year and cargo of more than 193,000 tonnes annually. It is responsible for more than 30 per cent of Malaysia's total manufacturing exports and is the second major entry point for international visitors into the country.

The expansion of the airport, which will cost RM250 million, was one of the key projects approved under the Second Stimulus Package. It will involve physical expansion to handle greater passenger capacity, a major facelift to improve its ambience and provision of better facilities such as multistorey carparks, improved security and better retail outlets. These, coupled with the intensive promotional efforts of the relevant agencies, are expected to result in an increase in the number of domestic and international passengers.

There is also a need to upgrade the airport cargo terminal, which is scheduled under the next phase of development. Increased industrial activity in the region and the opportunities which can be derived from better air connectivity can make the PIA a major gateway for the region.

6 Expansion of the Penang Port and deepening the North Channel

The federal government expansion and upgrading are outlined in the NCER blueprint; it has invested RM1.1 billion over the last five years to upgrade infrastructures at the port and container terminal as part of initiatives to improve the infrastructure. Penang has the potential to be the leading port in the Indonesia-Malaysia-Thailand Growth Triangle and a premier port in the region. This also depends on the deepening of the North Channel. The depth of the current port, which is between 9m and 11m, must be deepened to between 15m and 17m to enhance the port's competitiveness and allow it to grow beyond a small, feeder port.

The federal government had shelved this project in the context of the Ninth Malaysia Plan (9MP) Mid-term Review but has since announced its intention to resume work. The project is a critical component of POLE.

7 Penang Bridge expansion

The Penang Bridge, which was mooted in the 1960s and planned in the 1970s was opened to traffic in 1985. Upon reaching its capacity, expansion work was commissioned by the bridge operator to improve traffic flow, enhance connectivity and reduce congestion. The bridge is also linked to the North-South Expressway in Prai and Jelutong Expressway on the island. At 13.5km (8.4 miles) long, it is among the longest in the world, the longest in the country, and has become a national and state landmark.

There have been continuous efforts to improve services, and ensure commuter safety and satisfaction. The bridge operator and concession holder, Penang Bridge Sdn Bhd (PBSB), has introduced upgrades to facilitate toll payment, improve traffic flow, strengthen the bridge structure and maintain the system. The Penang Bridge was expanded to three lanes in each direction in 2008-09 at a cost of RM585 million. Carrying capacity has been increased by 30 per cent and the expansion has eased traffic flow, enhanced connectivity and reduced congestion.

8 Second Penang bridge

The proposed RM4.5 billion second bridge spanning 24km comprises four-lane dual carriageways in each direction. It provides a link to the PIA and the major road network on the mainland. This project has been included as one of the 9MP national projects. It will be the longest bridge in Southeast Asia. Work has commenced and the targeted to be completed in 2013.

The completion of the second bridge, like the expansion of Penang Bridge, will play a major role in improving Penang's connectivity with the mainland. Due to its close proximity to the airport, it could serve as a land-based cargo-movement corridor.

9 Multimedia Super Corridor (MSC Malaysia) Cybercity in Penang

The MSC Malaysia Cybercity is an area designated by the Multimedia Development Corporation to catalyse and support the growth of ICT industries. Penang is the first state in Malaysia to be officially granted "cybercity" status, providing it with a platform on which the knowledge economy can flourish.

To date, 116 companies have been granted MSC status in the 923ha Penang Cyber City 1 (PCC1), a zone upgraded at a cost of RM240 million. PCC1 covers the entire Bayan Lepas Industrial Zone, Bayan Mutiara and the Commercial Centre of Bayan Baru. Penang now needs to expand the geographic basis of the MSC and leverage the presence of MNCs.

10 Penang Eco-town

The Penang Eco-town concept aims to reduce the environmental impact of human activities so that the ecological sustainability of the area within the eco-town is increased. A project concept was developed in 2006 by the United Nations Environment Programme (UNEP) at the request of the Majlis Perbandaran Pulau Pinang (MPPP).

It focuses on the Penang Cyber City of Bayan Baru and covers the industrial zone, residential areas, institutions of higher learning — USM and International College — and commercial establishments such as hotels, offices,

supermarkets and shops. The main objective is to reduce the environmental and ecological damage within the eco-town, through waste and pollution minimisation. The project introduces the concept of green productivity to Penang. It is a catalytic component for improving liveability in the area. In 2008, UNEP officially appointed the Socio-Economic & Environmental Research Institute to be the implementing agency and chief coordinator for this project.

Khazanah Nasional grants

Several grants programmes have been initiated by Khazanah Nasional to catalyse development in key sectors and to revitalise the Penang economy. These initiatives are undertaken in partnership with other stakeholders and are aimed at improving the overall environment. By sharing the fixed-cost of activities with substantial externalities, the grants make commercial investments more viable and so are expected to catalyse significant complementary investment by partners. The current experience suggests that small grants can be an important new form of public-private partnership that permits deep engagement with the private sector and the flexibility to provide what the private sector needs and wants. By demonstrating positive change to public-private partnership, these initiatives will spur rapid economic development.

1 Shared Services Centres for Industry

The concept of Shared Service Centres for Industry is aimed at providing centralised facilities in the form of equipment, design and testing services and software, which is accessible to industry on a pay-as-you-use basis. These centres sharply reduce lead times and costs for companies and individuals to undertake design and development activities. They also lower the entry barrier for startup companies, by way of providing these services at an affordable level.

This project, which is done in partnership with PSDC, will focus on three priority areas:

- Embedded systems;
- Radio frequency/wireless testing labs; and
- Electro mechanical chambers testing facilities.

The project was allocated RM30 million under the Second Stimulus Package and is expected to be commissioned and in operation before the end of 2010. The technical specifications and the process of determining the equipment and services were managed through consultation with the relevant industry players.

2 Allied Healthcare Professionals Centre of Excellence

This centre is focused on the provision of facilities to enhance and upgrade human capital in the healthcare sector, specifically, allied healthcare professionals. This is done with the direct involvement of private-sector hospitals, which will also be the main beneficiaries of the centre.

The centre, set up as a company limited by guarantee, draws its membership from five major hospitals in Penang, which have come together to address this need. The centre also has the support of the Association of Private Hospitals Malaysia (APHM). It will focus on programmes aimed at upgrading the nursing profession, the skill sets of therapists and continuous skills upgrading for the hospital support staff. It is aimed at providing a higher level of professionalism and care within the industry.

With a launching grant of RM30 million, the centre commenced operations in July 2010 and has already rolled out its first programme.

3 Centre of Engineering Excellence (CEE)

The Centre of Engineering Excellence is aimed at bringing together industry and academia onto a common collaborative platform, which focuses on research projects, postgraduate education and enhancement of technical knowhow.

The centre has the full support of major industrial companies operating in Penang, Universiti Sains Malaysia (USM) and the Indian Institute of Technology, Kanpur (IITK). A taskforce comprising industry leaders actually identified a total of 187 academic programmes, 34 research programmes and 83 shared services, for the centre to collaborate on. USM and IITK signed a memorandum of understanding (MOU) to establish this centre in August 2009.

To date, two short training programmes have been conducted jointly by USM and IITK, and at least two research programmes are ongoing with industry.

As Rasiah, Hamdan and Gopalan (2009) has pointed out: "In Penang, the supply of R&D engineers and technicians is too small for the MNCs to upgrade further into research activities". The CEE can reduce this bottleneck.

4 George Town Grant Programme (GTGP)

The George Town Grants Programme (GTGP) is a small-grants programme designed and implemented to encourage private-public partnerships. Its initiatives help build resilient local communities living in the George Town UNESCO World Heritage Site. The programme:

- Enhances George Town's "outstanding universal values" including its multi-ethnic and multireligious heritage, and provides incentives for the conservation of Southeast Asia's largest collection of pre-World War II built heritage;
- Promotes awareness about George Town's multicultural history, building and developing local capacity for the protection of both living and built heritage; and
- Provides support for the planning of the historic city into a sustainable liveable urban space.

It is funded by the Malaysian Ministry of Finance with catalytic interventions in four areas: physical realm, social capital, knowledge, and capacity building.

Think City Sdn Bhd (TCSB), a special-purpose vehicle, was set up by Khazanah Nasional to manage the GTGP. It also supports the national urban regeneration efforts by promoting the transformation of urban centres into ecologically and economically sustainable cities. In line with the 10th Malaysia Plan with its emphasis on cities as engines of growth, TCSB provides thought leadership about the best practices in global urban rejuvenation. Some of its key objectives are to promote best ideas about city making; advocate urban regeneration based on the principles of sustainability; meet new demands

for knowledge and management of multicultural cities; provide a multidisciplinary approach to solving urban problems; and be at the forefront of knowledge creation and play a catalytic role in the shaping of a new city paradigm. TCSB also helps build capacities of local stakeholders including governmental agencies and civil society to better manage cities. To achieve its vision of becoming an enabler of sustainable urban rejuvenation, TCSB works closely with a wide range of global organisations like The World Bank, UNESCO, the Aga Khan Trust for Culture, Aus-Heritage, and the British Council, among others.

Monitoring, data and key performance indicators

The vision of Penang as an advanced economic region at the centre of a dynamic Northern Corridor will only be realised if implementation is systematically monitored and follow-up action initiated where execution weaknesses are identified. Some of the components of the strategy, like streamlining of business visas, the rollout of broadband and the prevalence of costly business

regulations have been identified as obstacles to growth in Penang for several years. Yet, action to resolve these problems has been limited. Individually, each obstacle may appear small. Collectively, they have become considerable.

This history underlines the importance of a monitoring, review and follow-up capability in implementing the new growth strategy. Monitoring must be broad-based, covering the three key aspects of the development strategy: the economy, cities and people.

There are no provisions in the current institutional landscape for such a monitoring unit. The Northern Corridor Implementation Authority (NCIA) could undertake this function, provided that it is

less concerned with implementation of its own projects but focus on monitoring the whole array of investments and policy changes that form the body of the plan. It would need to have processes in place for consultation with the people and for data collection that are needed to underpin an effective monitoring function. This process should include bodies like local authorities, SERI, Majlis Tindakan Persekutuan Negeri (MTPN), Khazanah Nasional, civil society and private business. A successful monitoring function must be built on greater transparency, sound empirical measurement and benchmarking of outcomes against others, both within and outside Malaysia.

Monitoring must capture progress on key investments, policies and institutional changes as well as outcome indicators and results. The latter must be based on sound data. Major data sources, including the quality of life survey, the household income and expenditure survey, the investment climate survey, and regional GDP, are not generally available to the public and, in some cases, the collection of data has been discontinued. Monitoring needs may require new data collection efforts. For example, surveys of the diaspora and tracking surveys of recent graduates from Penang-based universities could provide a basis for measuring the success of programmes to attract and retain talent.

The heart of a spatially-based development strategy is that it should be fact-based and data-driven, with comparisons to other localities used as a benchmark to assess performance. Key results should be monitored in the following domains. Mostly, the databases should be compiled by the National Statistical Office (or other federal agencies) in a manner that permits benchmarking of Penang and the Northern Corridor with other localities in Malaysia:

- **Economy:** GDP (state, Northern Corridor); GDP per capita; wages; employment; investment (foreign and domestic); tourism receipts; exports; number of new firms in new growth sectors; technological capability of firms; technological upgrading by firms; output in new growth sectors; broadband connectivity; logistics connectivity; hectares planted with new crops; innovation activity (patents); land

The vision of Penang as an advanced economic region at the centre of a dynamic Northern Corridor will only be realised if implementation is systematically monitored and follow-up action initiated where execution weaknesses are identified.

A successful monitoring function must be built on greater transparency, sound empirical measurement and benchmarking of outcomes against others, both within and outside Malaysia.

values and property rates.

- **Liveability of cities:** Security, health and sanitation; schools and education; public services and transport; traffic accidents and average peak-hour road speed; affordable and quality housing availability; consumer-goods availability; environment pollution (ambient air quality, noise, water quality) and waste; civic engagement and participation; culture, sports and entertainment; heritage; citizen satisfaction.
- **People:** Education; worker-skills upgrading; locational choice of new graduates; expatriate employment; poverty reduction and inclusiveness of economic opportunity; shortage of skilled workers; wage differentials (by skills, compared to other locations in Malaysia); links with diaspora; global networks and connectivity; employment in creative sectors (scientists, engineers, professors, poets, novelists, artists, designers, architects, analysts, journalists).

Baseline data must be developed immediately. A mid-term plan review will be prepared based on updated information on the above key indicators.

Key performance indicators for federal and local agencies charged with helping to develop Penang should include these outcome measures. In some areas, like training or provision of incentives, agencies have focused on their own activities, losing sight of the bigger picture of what is happening as a result of their programmes. That approach risks duplication and ineffectiveness. In other instances, agencies have not recognised the high-costs of their action (or inaction) on other parts of Penang's ecosystem. A common set of outcome indicators can help ensure a common understanding of progress in implementing the strategy.

New mindsets

This book offers a concept for the development of Penang's economy, cities and people. It is based on an understanding of Penang's place in the global economy, in regional supply chains and as

a secondary city in Malaysia. It presents a strategy for moving to an advanced economy by 2020, globally connected, regionally oriented and locally centred. Penang would become a destination of choice for firms, tourists and Malaysian citizens.

Malaysia long ago understood the global nature of finance and the strategic gains from attracting finance to its shores. It must now recognise that the same applies to talent. Penang and the Northern Corridor can become a magnet for global talent in Malaysia.

Designing a set of customised indicators that measure the outcomes of this book will be one of the key elements of implementation. Such indicators should benchmark Penang against other areas within Malaysia as well as competing cities in the region as far as possible.

The approach here suggests that there is no "one-size-fits-all" strategy that can be applied everywhere in Malaysia. There needs to be a strategy for the country as a whole, plus strategies for different localities.

Thinking about development from a spatial point of view is new for Malaysia and requires a change in mindset for federal and other agencies. Although the NCIA has been explicitly established as a geographically-oriented agency, most other federal agencies do not have this mindset. Even in the NCIA, some final decisions have to be referred back to government officials, risking that they will become another bureaucratic layer. The nature of their authority needs to be clarified.

Data in Malaysia is not organised on a spatial basis. The importance of the speed of decision making and local understanding of problems and issues suggest a need for a greater degree of local autonomy and accountability. A spatial approach asks only how to encourage business and talent to locate in the northern part of the Peninsular Malaysia. It focuses on the development of a dense, clustered ecosystem and tailors policy and programmes to activities that improve the health of that ecosystem.

The heart of a spatially-based development strategy is that it should be fact-based and data-driven, with comparisons to other localities used as a benchmark to assess performance. Designing a set of customised indicators that measure the outcomes of this book will be one of the key elements of implementation.

**FIGURE 31:
CONTRASTING
THE PROPOSED
APPROACH
WITH THE
CURRENT
PRACTICE**

CURRENT	PROPOSED
<ul style="list-style-type: none"> ▪ Set national targets ▪ Develop regions in a balanced manner ▪ Plan sectorally ▪ Build infrastructure ▪ Attract FDI ▪ Pick sectors ▪ Identify “sector of the future” ▪ Invest in rural areas ▪ Building centres for training ▪ Silos of people, industry and institutions 	<ul style="list-style-type: none"> ▪ Set targets for cities ▪ Build density and agglomeration ▪ Achieve coherence spatially ▪ Enable connectivity ▪ Attract talent ▪ Develop clusters ▪ Facilitate firms’ evolution ▪ Link rural to urban growth ▪ Building skills ▪ Networked economy

The strategy concept laid out in this book responds to the challenges posed to a middle-income region in a globally competitive world.

By contrast, sectoral strategies of federal agencies are often oriented towards spreading activities evenly across the nation. There is no strategy to develop critical mass in any area. By operating in silos, federal agencies cannot guarantee cohesiveness of their policies at a geographic level and so, when their activities are large and potentially transformational for the local economy, they cannot realise externalities in the rates of return on investments.

Globally, economic activity is concentrated in cities and cities compete with each other, domestically and internationally. Each city must develop its own distinctive comparative advantage. A heritage of stress-free, environmentally-conscious, and neighbourly approaches to life differentiates Penang from other Asian cities. That differentiation can be turned into a strategic advantage through a deliberate branding that focuses attention on the “creative economy” and “conviviality” aspects of life, coupled with a strong technological economic foundation. The cultural vibrancy that delights professionals and skilled workers, along with natural and culinary attractions, provide a local identity that will shape the contours of economic development.

Supporting Penang to support Malaysia

Strengthening Penang’s development is not a standalone objective. Penang with the Northern Corridor is one of the principal engines for Malaysia’s economic development. The targets of Vision 2020 cannot be achieved without successful development in Penang.

Penang is at the heart of the Northern Corridor. The new strategy for Penang focuses on building stronger connectivity with the mainland. Greater density of economic activity in the Northern Corridor will benefit all states and accelerate the reduction of poverty in Malaysia.

The strategy concept laid out in this book responds to the challenges posed to a middle-income region in a globally competitive world. Business as usual is not an option. That would lead to a slow erosion of hard-won development gains since Independence. This book lays out what the government can do to facilitate sustained development in a middle-income region. Penang’s experience will provide lessons for other states in Malaysia as they too become more advanced.

This book charts a path for citizens to understand the direction of change and the nature of global trends and forces. That will help highlight the limitations of the government’s ability to manage development and the importance of citizens’ participation, responsibility and accountability for their own economic wellbeing. That change in mindset can start in Penang and become an example for the entire nation.

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ANNEX 1: THE CONCEPT NOTE TEAM

Core team

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- Ernst & Young (E&Y)
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- Penang Skills Development Centre (PSDC)
- Socio-Economic & Environmental Research Institute (SERI)
- The Boston Consulting Group (BCG)

ANNEX 2: LIST OF BACKGROUND PAPERS, TECHNICAL AND RESEARCH REPORTS

Background papers

- Albert Zeufack (December 2009), "Positioning Penang: The economy"
- Albert Zeufack and K Gopalan (December 2009), "Can manufacturing still drive Penang's next transition?"
- Andrew Sheng (January 2009), "Penang as an example of economic geography"
- Charles Landry (February 2009), "A pocket sized metropolis: The prospects for Penang"
- Hiau Looi Kee (February 2009), "Performance of the services sector in Penang"
- John E Lamb, Julian Velez and Vedini Harischandra (March 2009), "Agriculture as a source of growth for the Penang region and the Northern Corridor"
- Kim Tan (December 2008), "Promoting life sciences as a key growth engine"
- Leong Yueh Kwong (October 2009), "Environmental issues in Penang"
- Muhammad Ali Pate and Ai Gek Beh (July 2009), "Opportunities and challenges for expanding medical tourism services in Penang"
- Ooi Giok Ling (in memoriam), (February 2009), "Attracting and keeping talent, liveability and Penang"
- Rajah Rasiah, Hamdan Abdul Majeed and K Gopalan (September 2009), "Positioning for a catch up in the electronics industry in Penang"
- Shahid Yusuf and Kaoru Nabeshima (July 2009), "Can Malaysia escape the middle-income trap? A strategy for Penang"
- Shahrizan Faiez (May 2010), "Penang as a hub of support services for aquaculture industries"
- Yoon Chon Leong (December 2008), "Emerging niches in the electrical & electronics sector"

Technical and research reports

- A T Kearney (September 2007), "Strategic roadmap for Penang logistics hub"
- Ernst & Young (E&Y) (September 2008), "Concept paper on the set-up of a allied healthcare professionals 'centre of excellence' in Penang"
- GTTP Team (November 2008), "George Town

- Transformation Project (GTTP) concept note & technical report: Envisioning change"
- Kim Tan (January 2008), "Strategic roadmap for the development of Life Sciences Industry in Penang"
- Penang Skills Development Centre (PSDC) (November 2007), "Technology roadmap for the electrical and electronics industry of Penang"
- Socio-Economic & Environmental Research Institute (SERI), (December 2002 and May 2005), "Penang quality of life report"
- The Boston Consulting Group (BCG) (February 2008), "Medical tourism strategy for Malaysia"

ANNEX 3: LIST OF CONSULTATION PROCESSES

"Positioning Penang" policy study

- **30 July 2008:** "Positioning Penang" review workshop
- **17 & 18 December 2008:** "Positioning Penang for sustainable growth: A dialogue on Penang's future growth strategy" conference
- **14 January 2009:** Launching of the *World Development Report*
- **6–8 May 2009:** Brainstorming session with The World Bank and Economic Planning Unit experts: "Strategies towards higher growth & income"
- **June & December 2009:** Workshop with Dr Shahid Yusuf, Economic Planning Unit and the Penang State Government
- **1 September 2009:** Discussion on "Positioning Penang" policy study with the Penang State Government and industry leaders, for the 10th Malaysian Plan
- **3 September 2009:** Presentation of "Positioning Penang" findings to the Economic Planning Unit
- **6 February 2010:** Review meeting for the "Positioning Penang" policy study
- **29 March 2010:** Presentation to the Economic Council: "Policy lessons from a study on Penang"
- **26 April 2009:** Presentation of findings at "Penang blueprint roundtable"
- **April–May 2010:** Presentation of findings for the 10th Malaysian Plan
- **2 July 2010:** Workshop on "Agriculture and agribusiness as a source of growth for the Northern Region" with key stakeholders

ANNEX 4: NAVIGATING THE PRODUCT SPACE — A TECHNICAL APPENDIX

The concept of proximity is used to capture this intuitive idea that the ability of a country to produce a product depends on its ability to produce other ones. Unfortunately, this intuitive definition of proximity is difficult to measure. It requires quantifying the overlap between the set of markets related to each product. Proximity is therefore measured by using an outcome based method founded on the assumption that similar products are more likely to be exported in tandem. Following Hidalgo *et al* (2007), the product space of relatedness among products is computed from the pattern of revealed comparative advantage in world trade.

The first step is the computation of revealed comparative advantage (RCA). The RCA is then used to compute proximity between products. If two goods are related because they require similar institutions, infrastructure, resources, technology, or some combination thereof, they will likely be produced in tandem, whereas dissimilar goods are less likely to be produced together. Formally, the proximity between products i and j is the minimum of the pair-wise conditional probabilities of a country exporting a good given that it exports another.

The matrix of these proximities characterises the product space. These matrices can be compared to understand how the product space has evolved over time. The proximity matrix can be considered a complex network, where each product represents a node in the network while the edges between them and their intensities are denoted by the proximities between the products. Given the symmetry of the proximity matrix, the network resulting from it can be characterised as a weighted, undirected network. This perspective then allows us to analyse the product space and its evolution in terms of the properties of the network.

In a product space chart, the vertical axis is basically a measure of a particular product's sophistication from the average sophistication of a country's export basket. This index is obtained from using two variables *PRODY* and *EXPY*.

PRODY is the RCA-weighted average of income of country j . The underlying assumption is that a product is more sophisticated if wealthier countries export them more.

$$PRODY_i = \sum_j \frac{(x_{i,j} / X_j)}{\sum_j (x_{i,j} / X_j)} Y_j$$

where the numerator of the weight $(x_{i,j} / X_j)$ is the value-share of product in a country's overall export

basket. The denominator of the weight $\sum_j (x_{i,j} / X_j)$ is the value-share of product x in global exports. Together

$$\frac{(x_{i,j} / X_j)}{\sum_j (x_{i,j} / X_j)}$$

is the formula for revealed comparative advantage (RCA) of product x , often used to measure export competitiveness of a particular product. Y_j is GDP per capita.

EXPY is the weighted average of *PRODY*, weighted by the value-share of product x in a country's overall export basket or $(x_{i,j} / X_j)$

$$EXPY_j = \sum_i \left(\frac{x_{i,j}}{X_j} \right) PRODY_i$$

EXPY is therefore a proxy measurement for the average sophistication of a country's export basket.

The difference between *EXPY* and *PRODY* gives the degree of a product's sophistication from the average sophistication of a country's export basket. Hence, the values of the vertical axis are derived from *PRODY-EXPY*.

The horizontal axis, on the other hand, captures the amount of related products that a country exports, used here to proxy "capabilities" developed for particular products. Products that are located closer to the origin indicate higher capabilities.

This is based on the following premise: the more number of countries exporting both goods A & B (related products), the higher the capability of a country exporting only good A to also export good B. The underlying assumption is that certain capabilities are shared for different products.

DENSITY is thus defined as the number of related products that a country exports. Higher density means that a country exports a high amount of related products, which then implies more capabilities developed.

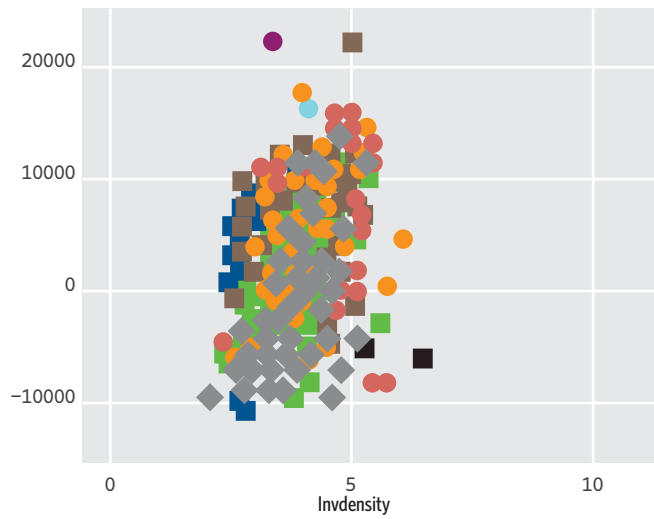
INVDENSITY as shown in the product space analysis is the inverse of density. Therefore, for horizontal axis, the closer the product is to the origin, the more capabilities have been developed.

Source: Hausmann, R and Klinger, B (2007)

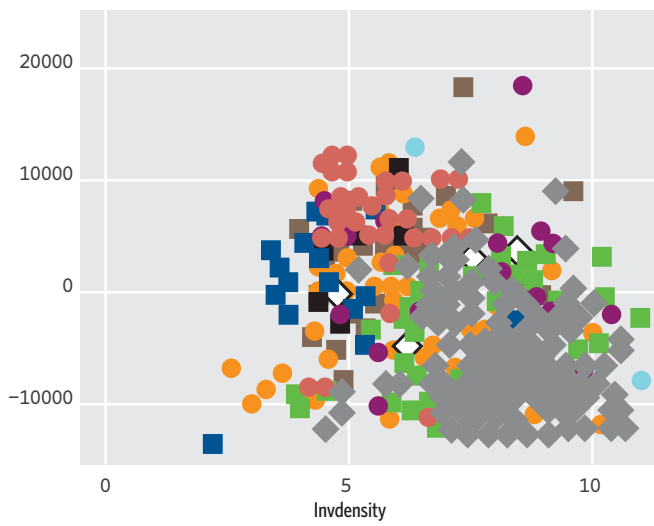
ANNEX 5: THE PRODUCT SPACE FOR PENANG, MALAYSIA, SINGAPORE AND THAILAND

- Electronics and electricals
- ◇ Automotive
- Engineering
- Other, resource-based
- Other, low-technology
- Other, high-technology
- Process
- Textile, garment & footwear
- Agro-based
- ◇ Primary products

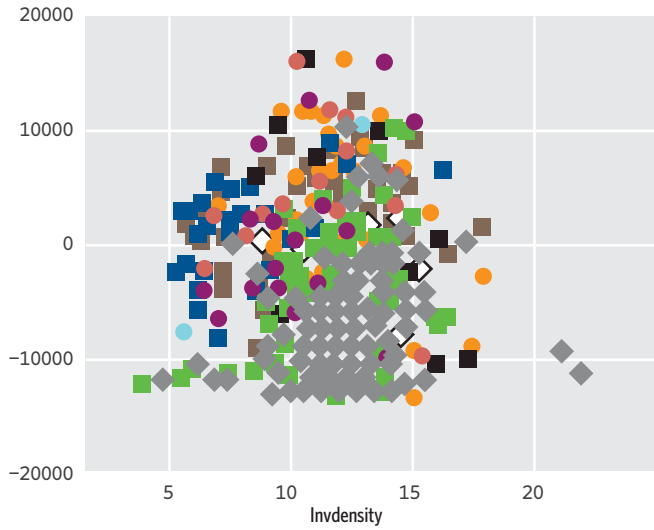
Thailand



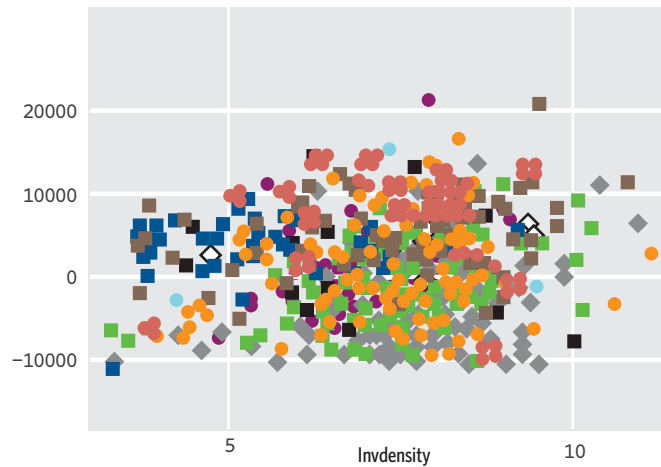
Singapore

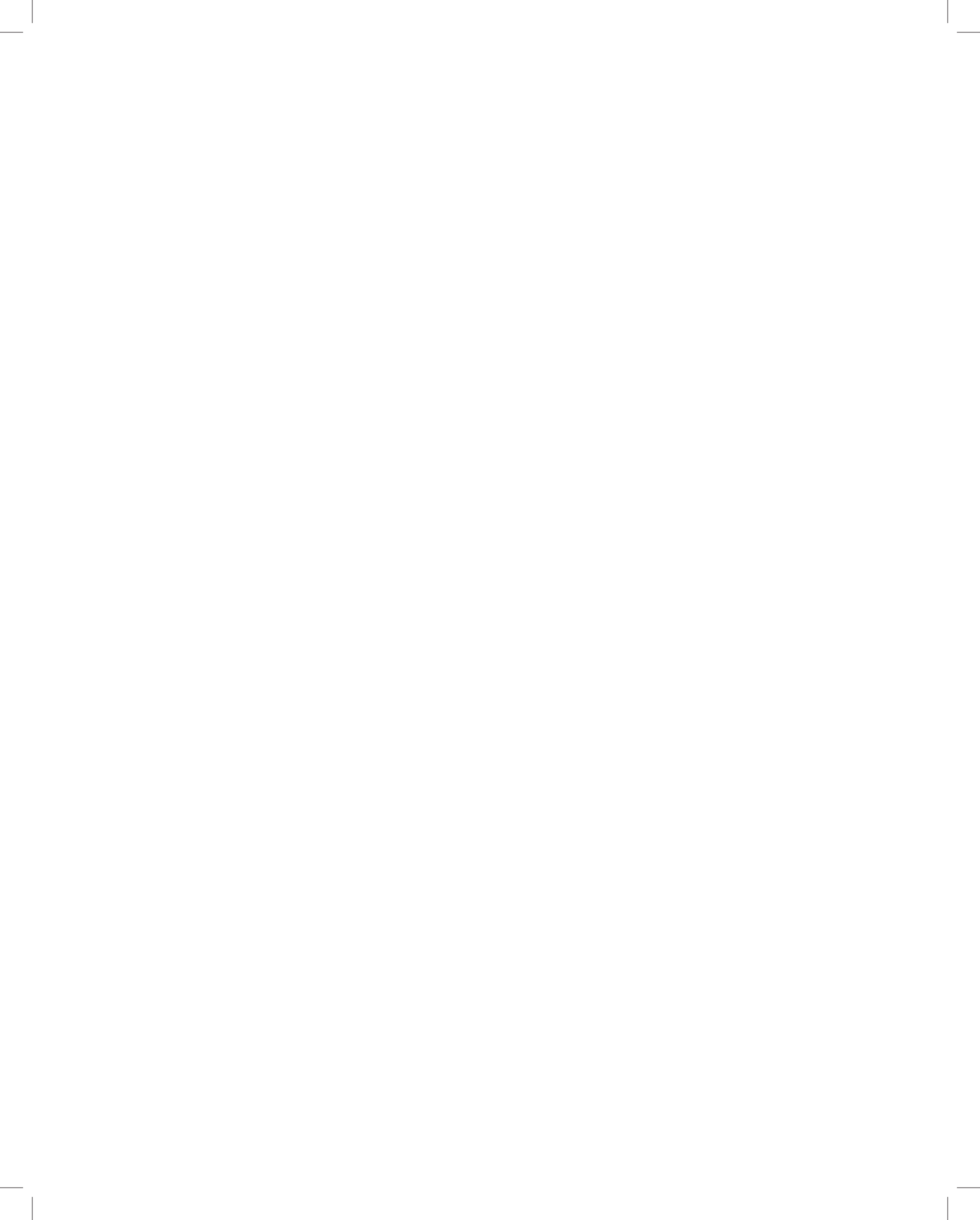


Penang

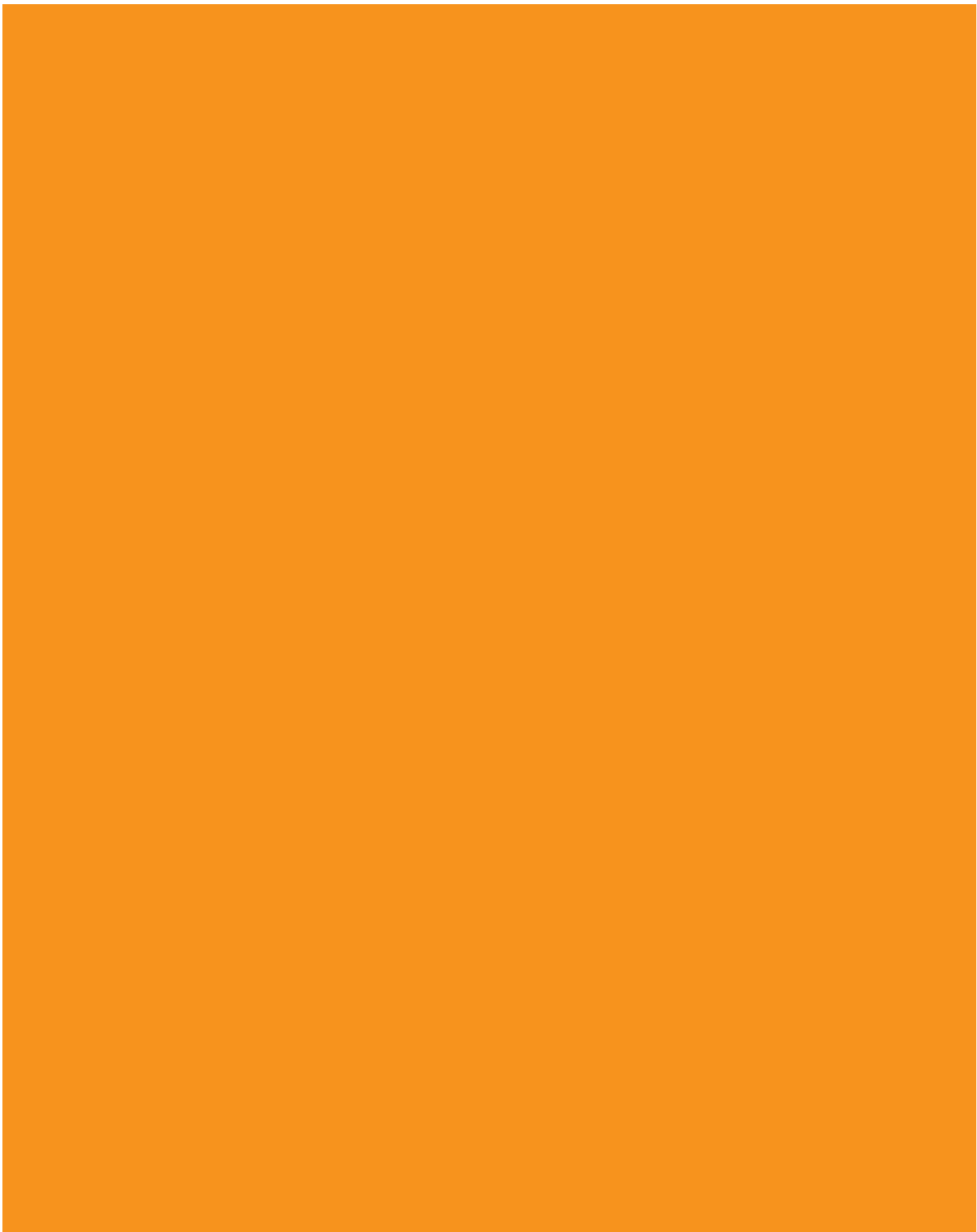


Malaysia









This book is an output of the “Positioning Penang” study, a collaborative research project between Khazanah Nasional Berhad and The World Bank, identified by the Economic Planning Unit (EPU) as one of the inputs to the 10th Malaysia Plan. This book, which primarily targets policy makers, draws on a strong body of empirical work conducted in a dozen technical background papers contributed by a team of internationally-renowned researchers and field practitioners of the Malaysian economy. These background papers will be published in a separate volume.

The premise of this book is that a regional strategy to develop the “Northern Corridor” of Malaysia is critical in encouraging the emergence of globally-competitive clusters. For the Northern Corridor to succeed, Penang, its largest conurbation, must succeed and vice versa. However, it seems to be caught in the “middle-income trap” and needs to reinvent itself. Penang cannot rely for much longer on cheap labour, subsidised infrastructure and its ability to provide suitable land for low-tech manufacturing. It must focus on developing industries which provide economies of scale, where on-the-job learning provides the base for continuous improvement in productivity. This requires a new growth strategy that positions Penang to take advantage of the new global trends. If the Northern Corridor can escape the middle-income country (MIC) trap, then, so can Malaysia.

The book proposes a multidimensional growth strategy which embraces three elements: cities, talents and the economy.

A publication by Khazanah Nasional Berhad

