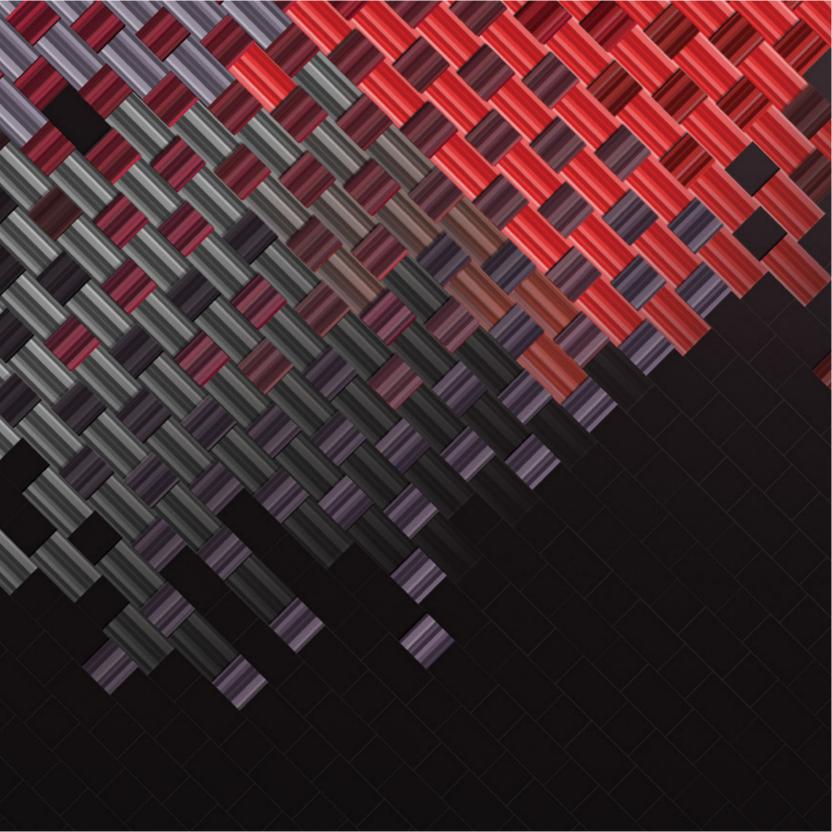


NATIONAL INNOVATING MALAYSIA

Creating Wealth Through Knowledge, Technology and Innovation





TRANSFORMATION INTO THE INNOVATION ECONOMY



Malaysia has come a long way in the 53 years since she gained independence, making the transformation from an agriculture-based economy to an industrial and service-oriented one.

Since independence, per capita income has grown from USD260 to USD8,000, while poverty has plummeted to 3%*. Despite scepticism from the international community, Malaysia's decisive leadership pulled the Nation through the 1997 Asian financial crisis in better shape than many of its neighbours. The country was also able to survive the 2008 global financial crisis relatively unscathed.

One of the reasons for our continued buoyance in the face of challenge is our flexibility in adapting to the changes taking place globally as well as our ability to take the best from the successful economic and business models of various countries and applying it to the Malaysian context.

This has hitherto ensured Malaysia a strong position as a global player and a leader in the region. However, competition from newly emerging markets in the region are already generating excitement in the international arena.

Malaysia's regional neighbours such as Thailand, Indonesia, Vietnam and the Philippines, while still lagging behind in many development sectors, are fast becoming a force to contend with. The BRIC nations of Brazil, Russia,

(* Source: RMK10)



India and China are all at a similar stage of new advanced economic development and by 2050, their combined economies could eclipse the combined markets of the current richest countries in the world.

Other countries that are being viewed as the key emerging markets of the future include South Africa, Turkey and Argentina, which enjoyed rapid economic growth during the last decade.

While we are in a stronger position than many countries, we risk being overtaken by these growing economies. There is no question that we need to step out of our comfort zone and speed up our own development pace if we are to continue to be relevant in the international community.

With the global economic landscape undergoing transformation at a rapid rate, the ability of any Nation to adjust and embrace change will determine its prosperity. As the Greek philosopher Heraclitus said, "Change is the only constant". To remain stagnant is to be left behind. To hop onto the bandwagon of change is to ensure economic growth and affluence.

"We cannot direct the wind, but we can adjust the sails," commented African-American activist and historian Bertha Calloway.

Catalyst For Growth

One of the strategies the Malaysian Government has instituted in line with "adjusting the sails", have been a number of high-impact programmes implemented under the purview of institutions set up with the aim of ensuring that the nation remains competitive and relevant in the changing economic environment.

Traditionally, the drivers of economic growth and wealth creation lay in the domain of land, labour and capital. Malaysia began as a factor-driven economy entrenched in agriculture and mining and then moved on to an investment-driven economy focusing on manufacturing, banking and real estate. Today, the focus has shifted to an innovation and knowledge-driven economy to ensure that the country remains ahead of the competition.



Amongst the government bodies set up to this end are Performance Management and Delivery Unit (PEMANDU) and Unit Inovasi Khas or UNIK.

The initiatives that have been introduced to ensure Malaysia continues to grow at a healthy rate include the 1Malaysia Programme, the Economic Transformation Programme (ETP) and the Government Transformation Programme (GTP).

The setting up of a national innovation agency with a mission that can be summarised as "Wealth Creation through Knowledge, Technology and Innovation" clearly indicates that innovation is high on the Government's agenda for achieving the aspirations set out in Vision 2020.

To realise this vision, Malaysia needs to dramatically improve her GDP within a relatively short time frame. The Government is implementing a variety of initiatives towards this end and innovation is foremost amongst them.

To achieve the bold ambitions that have been set out, we will need to change the way we have been doing things. In other words, we will have to innovate."

YAB Dato' Sri Mohd Najib bin Tun Haji Abdul Razak Prime Minister of Malaysia



New-Wave Wealth Creation

An Innovation Nation is not merely a Nation of inventors; it is so much more. It is more attuned to a mind-set change of the country. It is about providing the Nation and its people with the skills, knowledge and competencies required to overcome problems, challenges or obstacles, creating long term sustainability for the enduring development of a country and improving the lives of the people.

Innovation is all-encompassing and cuts across academia, industry, government and the Rakyat. AIM's role is to coordinate the integration of creative talent from all four components of society by adopting what is known as the Quadruple Helix approach, which advocates a holistic fusion of all four.

The government is keen to extract the wealth hidden in the decades of research and development work that has been conducted in the country. Enlisting the cooperation of industry in commercialising the work and unleashing the economic gains residing in intellectual property will contribute towards new wealth creation.

Once a prospective product, service or business has been identified, an assessment will be conducted to evaluate its potential to be transformed into a highgrowth, internationally competitive business that can generate revenue, jobs and prestige for Malaysia and her people. These fall under the strategic impact projects as they are destined to directly affect the country's GDP.

Secondary to this and equally important, are the ground-up opportunities, which are specific projects uncovered from a census of universities and public research institutes. These projects will be constantly appraised and fed into the Wealth Creation Unit for further analysis and research before commercial evaluation and realisation.

Using creativity as a building block, innovation results in activities that allow one to tap new sources of revenues which were not previously possible.

YAB Dato' Sri Mohd Najib bin Tun Haji Abdul Razak Prime Minister of Malaysia



ESTABLISHMENT OF UNIK

Under the Prime Minister's initiative, Unit Inovasi Khas (UNIK) was established in August 2010 to act as the focal point for innovation in Malaysia and to drive the surge forward towards developing an innovation-led economy.

UNIK was given the mandate to identify solutions to address the gaps in the innovation eco-system and to examine all areas of the eco-system: government, universities, the education system, funding and skills.

During its formative months, UNIK developed its blueprint, determined its strategy and distinguished

its role in the prevailing landscape. It has also endeavoured to identify successes, best practices and methodologies from around the world with a view to adapting them to the Malaysian context while taking cognisance of the innovation needs of foreign investors.

Based upon its initial work, UNIK proposed that the national innovation objectives of creating new wave wealth and nurturing the innovation eco-system were tasks best served by a dedicated statutory body. The statutory body will have the right structure to ensure delivery of the national innovation mandate.

As a result of UNIK's recommendation, the National Innovation Agency (Agensi Inovasi Malaysia, or AIM) was set up by an Act of Parliament (Akta Agensi Inovasi Malaysia 2010).

UNIK will drive innovation strategies and policies while AIM will become the implementation arm for innovation-related initiatives. UNIK will continue to operate under the Prime Minister's Office with a direct line of reporting to the Prime Minister to ensure the outcomes of the innovation strategy are achieved.

THE AGENSI INOVASI MALAYSIA ACT 2010 (Akta AIM 2010)

The AIM Act 2010 was tabled for its first reading in Parliament on 13 December 2010 before being passed on its third and final reading on 21 December 2010.

The AIM Act 2010 spells out the rationale and philosophies behind AIM and also enumerates the specific mandate of the statutory body, which is to:

- formulate national strategies and directions relating to innovation
- organise, cooperate in and coordinate the performance of activities with the public and private sectors to stimulate innovation in Malaysia
- conduct enquiries, surveys and analyses of data, research and development relating to innovation and the national innovation eco-system
- promote and facilitate investment activities and initiatives by the public and private sectors in relation to innovation
- promote the culture of innovation in the public, private and education sectors in Malaysia
- advise the Government in matters relating to innovation, and
- make recommendations relating to the innovation component of existing or future strategic national projects.

To become an innovative Nation, we need a mental transformation in the Government, industry and the education sector. This is to shape the attitude of our future generations. This is our mission.

YAB Dato' Sri Mohd Najib bin Tun Haji Abdul Razak *Prime Minister of Malaysia*

The Act articulates the various measures incorporated to infuse good governance into the operations of the statutory body. Strong good governance measures form a key characteristic of the Act and protect against potential misuse while encouraging openness and transparency.

As part of the good governance mechanism, the AIM Act 2010 possesses a limited lifespan and will cease to exist after 31 December 2020.



AGENSI INOVASI MALAYSIA

Agensi Inovasi Malaysia (AIM) is a statutory body that is positioned to be the vanguard for innovation in Malaysia. AIM will be the driving force behind Malaysia's push towards establishing an "innovation economy" that will be instrumental in delivering new-wave wealth for the Nation and sowing the seeds of sustainability for future generations.

AIM has two clear objectives that provide the foundation for the innovation blueprint:

- 1. To bring about societal well-being through the cultivation of the innovation eco-system.
- 2. To drive the national innovation agenda to generate new-wave wealth.

In the short to middle-term, AIM will leverage on innovation to create new-wave wealth for the Nation. This objective revolves around maximising existing resources such as talent, intellectual capital and intellectual property to generate this new wealth.

'New-wave wealth' is the term used to indicate prosperity rising from sources that have not been tapped before through concerted strategies. Essentially, it will contribute towards raising Malaysia's Gross Domestic Product and increasing the Rakyat's standard of living.

The creation of a conducive innovation eco-system is imperative if the government is to succeed in its ambition of continuously generating new-wave wealth for the people.

Government initiatives to ensure a conducive innovation eco-system:

- Integrated funding for innovation
- Maximising return on investment for Government-funded innovation
- Raising the level of innovation in industry
- Laying the foundation for innovation for future generations through education
- Embedding innovation in the Bumiputera agenda

Pockets of innovation do exist, evident from the country being ranked 28 out of 132 countries in the Global Innovation Index (2009-2010) by the European Institute for Business Administration. However, for innovation to become the driver in new-wealth creation and a potent force in development, it has to become part of the national psyche. It has to cut across all barriers and permeate to every level of Malaysian society.

Government, industry, academia/research bodies and the Rakyat can no longer afford to innovate in silos; instead all four institutions must join forces to create an eco-system that will foster innovation and generate exciting new products and services that will capture the interest of the international markets, thereby generating new-wealth for Malaysia and her people.

This can be achieved by using the Quadruple Helix approach, where all parties work in synergy to achieve AIM's plan of ensuring that ideas are taken through from Creation to Commercialisation.

Innovation is inherent in national development and it must work in tandem with all of the other Government initiatives designed to push Malaysia forward. AIM will be working hard to inculcate innovation and innovation skills within Government to supplement the GTP and the programmes that PEMANDU is undertaking.

Given the nature of its mandate, AIM operates across the boundaries of government, allowing it to employ a whole-of-government approach in its operations. AIM will cut across borderlines to engage with all Ministries and Agencies on any matters relating to innovation to ensure the entire country's efforts are being effectively focused on accomplishing Malaysia's national innovation goals.

Innovation involves both the public and private sectors, so there is an evident need for representation from each side. AIM is governed by a council chaired by the Prime Minister with five Ministers and ten eminent persons from industry, academia and other organisations including non-governmental organisations and public-listed companies.

This balanced membership ensures perspectives from both the public and private sectors will be taken into consideration, resulting in well-informed decisions regarding innovation.





Vision

Wealth creation through knowledge, technology and innovation.

Mission

To stimulate and develop the innovation eco-system in Malaysia towards achieving Vision 2020.

Objectives

Generate additional revenue and contribute to Malaysia's GDP

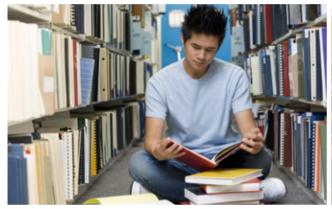
Provide additional jobs for the Malaysian workforce

Inspire and produce a new generation of innovative entrepreneurs

Facilitate the evolution of Malaysian companies into major global players

AIM'S PURPOSE

AIM has been created to improve and jump-start the national innovation eco-system and generate new-wave wealth through innovation. In striving to achieve its objectives, AIM will take a professional and strategic approach that is driven by governance and emphasises collaboration between the public, private and education sectors.





In relation to the eco-system, there are four key areas that need to be addressed. These are:

- Institutes of Higher Learning (IHL) and Public Research Institutes (PRI)
- Youth (education)
- Industry, and
- Government

Each of these areas are unique and will require different strategies, techniques and projects to foster innovation.





IHLs & PRIs

In countries with a well-established and thriving innovation eco-system, Institutes of Higher Learning (IHLs) and Public Research Institutes (PRIs) are the traditional institutional origins for innovation. This is the situation that Malaysia is aiming for.

Currently, the IHLs and PRIs here are doing good work, but their focus is too heavily predisposed towards fundamental research. While this is important for knowledge expansion and development, Malaysia's innovation eco-system is not mature enough to facilitate the translation of research into products with commercial potential.

There is widespread consensus that taking existing global knowledge and adapting it has a greater economic impact than focusing on developing frontier knowledge. While the pursuit of knowledge is significant in academia, we should also expand horizons and build on the work of others to develop products and services that have commercial potential.

Youth

Any long-term strategic programme must take into consideration a Nation's youth to ensure sustainability. If we are to be a Nation that is innovative in a holistic sense, there has to be a concerted effort to develop a workforce equipped with critical and analytical thinking skills. Mindful of this, AIM has developed a strategy that is aimed at imparting these skills to the next generation of Malaysians.

The formative first step towards creating a sizeable army of knowledge workers will begin at school level, where programmes to nurture innovation will be introduced. These will be fashioned to enhance the capabilities and thinking skills of students and familiarise them with the foundational skills of innovation. In short, the aim is to create a generation that knows HOW to think as opposed to WHAT to think.

Industry

Industry plays a huge and vital role in any economy and is often one of the key drivers for innovation. Industry players are constantly innovating their products, services and business models in order to differentiate themselves from the competition and attract higher revenues.

Compared with more developed Nations, Malaysia's industrial landscape is still in its adolescent stage where Small and Medium Enterprises (SME) dominate.

92% of Malaysian companies are classified as SMEs that contribute 31% of Gross Domestic Product (GDP).

AlM's objective is to assist Malaysian SMEs in moving up the value chain through innovation. It plans to do this by providing opportunities for them to take advantage of innovation methodologies, policies and outcomes and complement the initiatives introduced by SME Corp.

AlM's role in this is to stimulate rapid new-wave wealth creation by commercialising research & development, as well as inventions and innovations that have been developed but not capitalised upon.

Between the large corporations and the SMEs in Malaysia lie a number of companies that currently suffer from the "Middle Child" Syndrome. Unlike large companies that have the financial resources to take their business to another level, or the SMEs, which have recourse to SME Corp, these companies appear to be "stuck" as they do not know where to turn to for help and eventually flounder in a valley of stagnation.





The majority of companies that fall into this category are successful family-owned businesses that have grown from humble beginnings to become multi-million ringgit organisations. While they have generated wealth for Malaysia, created jobs for her people and contributed to her overall development, they now need to push themselves out of their comfort zone and start attacking new markets by expanding their target markets and upgrading their offerings.

To assist these Middle Tier companies, AIM will create an organisation who will provide the support structure that will enable them to expand beyond their boundaries and transform into large Malaysian firms.

The strategy for this would be first to identify the roadblocks that are stopping innovation in the Middle Tier companies. The next step would be to map out all resources, expertise and equipment existing in PRIs that can help these companies innovate and instill innovation methodology in them.

AIM will also facilitate innovation by establishing linkages and partnerships with foreign bodies and companies that can help the Middle Tier companies meet their business expansion objectives.

INNOVATING MALAYSIA

The Government has introduced a variety of strategy documents and initiatives to address some of the pressing issues facing the country. While no single instrument holds all the answers, the National Innovation Strategy or Innovating Malaysia is recognised as vital for promoting the foundation for future growth.

To be effective, strategies to promote innovation must reflect the ways in which innovation takes place today. Innovation encompasses much more than R&D; it also includes other intangible attributes such as software, human capital and organisational structures, as well as product and process innovations, organisational and societal innovations and marketing.

Driving Malaysia towards the innovation economy requires a framework that is structured so it provides reliable support, yet flexible so it can readily adapt to rapidly changing market forces to overcome any unforeseeable obstacles.

The framework must also promote accountability and the delivery of results as well as encompass all of AIM's objectives and provide the structure that will support the innovation blueprint.

AIM has strived hard to build the strongest foundation possible from which to launch its efforts

to propel Malaysia towards an innovation economy by incorporating two key elements.

2 Key Elements of framework:

- 1. Agensi Inovasi Malaysia Act 2010
- 2. National Innovation Strategy or "Innovating Malaysia"

Individually, either of these elements alone would provide a strong base for any framework; combined, they provide a solid bedrock upon which the rest of AIM's framework and blueprint is built.

The Agensi Inovasi Malaysia Act 2010 is an Act of law passed by Parliament that provides AIM with the mandate to revamp the current innovation landscape.

Innovating Malaysia outlines the principal course of action that the Malaysian Government needs to embark upon to support an innovation eco-system.

As it is multi-disciplinary and involves a variety of players, the innovation strategy is cross-cutting, integrating initiatives in multiple fields that complement each other to produce a holistic approach to innovation.

Innovating Malaysia's strategic approach to foster innovation

- 1. Identify drivers to enhance comparative advantage in selected growth areas
- 2. Facilitate an enabling environment to foster innovation in growth areas within the various industries.

The formulation and implementation of Innovating Malaysia involves a whole-of-government approach and calls for horizontal as well as vertical co-ordination of initiatives. The mixed approach policies to foster innovation recognises that "one size does not fit all".

To identify the areas for innovation led-growth, Innovating Malaysia has adopted a ground-up approach involving close collaboration with relevant Ministries, universities, research institutes, public innovation funding agencies, capital market intermediaries, private firms, industry associations and non-governmental organisations.

Innovating Malaysia will adopt the best practices and experiences of other countries, and adapt these to the Malaysian context to ensure they are relevant to the country's institutional environment, regulatory policies, markets and stage of socio-economic development, amongst others.

Innovating Malaysia will also seek a better match between supply-side and demand-side with emphasis for greater market-orientation.

A flourishing national innovation system will lead to an influx of foreign direct investment (FDI), domestic direct investment (DDI), and talent (reverse braindrain) while producing an output of adaptive talent and the creation of an innovative culture; all of which will benefit the Nation.

Benefits of successful National Innovation System:

- 1. Foreign Direct Investment
- 2. Domestic Direct Investment
- 3. Talent Growth & Technology Transfer
- 4. Output of Adaptive Talent
- 5. Creation of Innovative Culture
- 6. New Wealth Creation
- 7. Excellence in Industry Niches





Strengthen the Building Blocks of Innovation

The three mechanisms to achieve this are:

- Build FutureSkills Today
- Nurture and develop Intellectual Capital for Wealth Creation
- Create a seamless funding pipeline

Build FutureSkills Today

As the marketplace becomes more competitive, the demand for a more highly skilled workforce will grow more intense. One way to ensure a sustainable stream of skilled workers is to begin arming our young people right from the time they are in school with problem-solving skills and the ability to make rapid decisions based on facts and evidence. They must also be imbued with commercial awareness and the talent for spotting opportunities.

Graduates should be led to master Higher Order Thinking (HOT) Skills, which are the very foundation of innovation and lead to advanced problem-solving skills and full-spectrum thinking (design thinking). They must be given skills in Innopreneurship, the science and art of converting ideas into wealth, well before they enter the workforce.

The workforce, too, has to acquire new skills. In particular, firms must become skillful at using innovation methodologies that empower them to come up with innovative business models, internal processes, sales and marketing strategies, distribution networks and customer support schemes. Small and Medium sized firms (SMEs) have to emulate the methodologies, systems and processes of the large multinational corporations.

Innovation is not just for the private sector - the government too, must innovate. The government must become proficient in streamlining processes, improving the public delivery system and improving client satisfaction. This can be achieved by applying a systematic and structured innovation methodology, adapted from the private sector.



Embodied in both types of research is commercially valuable IP that has the potential to be converted to real wealth though commercialisation. Universities and PRIs have to partner with the private sector to commercialise IP, using the Quadruple Helix Model (industry, academia, Rakyat, government).

Malaysia has to radically transform the way it manages applied R&D. The Quadruple Helix Model has to be deployed before projects are initiated, not when they are near completion. Applied R&D has to commence with the identification of challenges and opportunities facing a particular sector by the practitioners within the sector, coupled with foresight in science and technology derived from competitive technology intelligence and centres of excellence in universities.

Business development teams will work on securing "anchor clients" who will become early adopters of the products or technologies. They will also test the viability of products and technologies by gauging the receptiveness of civil society towards them. In other words, there will be no commencement of an innovation until the path has been charted out and the actors fully engaged.

This is the model used by MNCs and, as reseach organisations are increasingly competing for funding opportunities, this "IP-driven R&D" becomes crucial.

In nurturing and developing human capital for wealth creation, several structural changes and enhancements are necessary. Each university and PRI currently has its own "Technology Transfer Office" (TTO) or its equivalent. The policies of the various TTOs have to be standardised and a healthy relationship with the private sector needs to be established to ensure innovation thrives.

Another area where structural change will bring benefit is in the setting up of an institute that can up-skill IP Agents in Malaysia. The drafting of IP documents is a specialised skill that makes the critical difference between the successful granting of IP or its rejection.

Factors such as prior art, novelty and the extent of claims determine the success rate of the applications and the skills to enhance and strengthen these factors must be built quickly in the IP fraternity. The setting up of a dedicated IP institute will hasten this process.

The third structural enhancement needs to be in the area of funding for innovators, both from universities and PRIs. The better we reward our innovators, the more wealth they will create for the Nation.



Create a Seamless Funding Pipeline

Funding is the lifeline of innovation. From conceptualisation to commercialisation to global penetration, funding provides the key resource that firms must have in order to grow, expand and spread their wings.

At the earliest stage, seed-funding is essential. While the seed-funding requirement for most sectors is usually not a large amount, some sectors like biotechnology or pharmacology are exceptions. Suffice to say, the ideation process cannot bear fruit unless there is access to adequate capital.

The Malaysian Government has always provided a healthy allocation for grant funding. That is available at various stages of the innovation process, from creating a proof of concept to the final deployment of the product, technology or service.

Research has shown that successful Innovator Nations choose focus areas for their grants, ensuring that public

money is spent where the country can benefit most. The various public grants given out in Malaysia have to be streamlined to make Malaysia's competitive edge even sharper. Competition for these public grants has to be made keener, so that only the most compelling and convincing applications succeed in securing the funds. Market forces and market demands must prevail to ensure that government funding is channeled to the most deserving cases.

The disbursement agencies too, have to change and adapt to prevailing circumstances. They have to transform themselves and operate as competitive organisations, behaving like fund managers. This is a philosophical shift where grants are no longer regarded as "free money" but rather, government investment capital in innovation.



The performance of these agencies has to be regularly monitored and tracked, so that they deliver the agreed "Return on Innovation". Free market principles should apply to these agencies, so that they take pains to ensure the success of their "investee projects". The role of a "Performance Manager" therefore, should be created.

Innovation rarely succeeds in isolation. Both national and international linkages are important to build networks, enhance skills and learn from shared experiences. The role of an enabler organisation is necessary to build such bridges for the agencies that handle public grants.

In the longer term, Malaysians must reduce their dependence on grants, which provide outright cash to firms that wish to innovate. Grants create a "moral hazard" as the public money does not have to be repaid.

However, recognising that firms do need capital to innovate, especially in areas where there is a market failure or the market is simply not ready, other forms of funding instruments should be developed. These futuristic instruments should refrain from giving firms "hard cash" but instead, ensure that government investment in innovation is efficiently and transparently allocated. The funding of innovation itself should become innovative.

Where public funds for innovation are not available or are insufficient, market forces generally gravitate



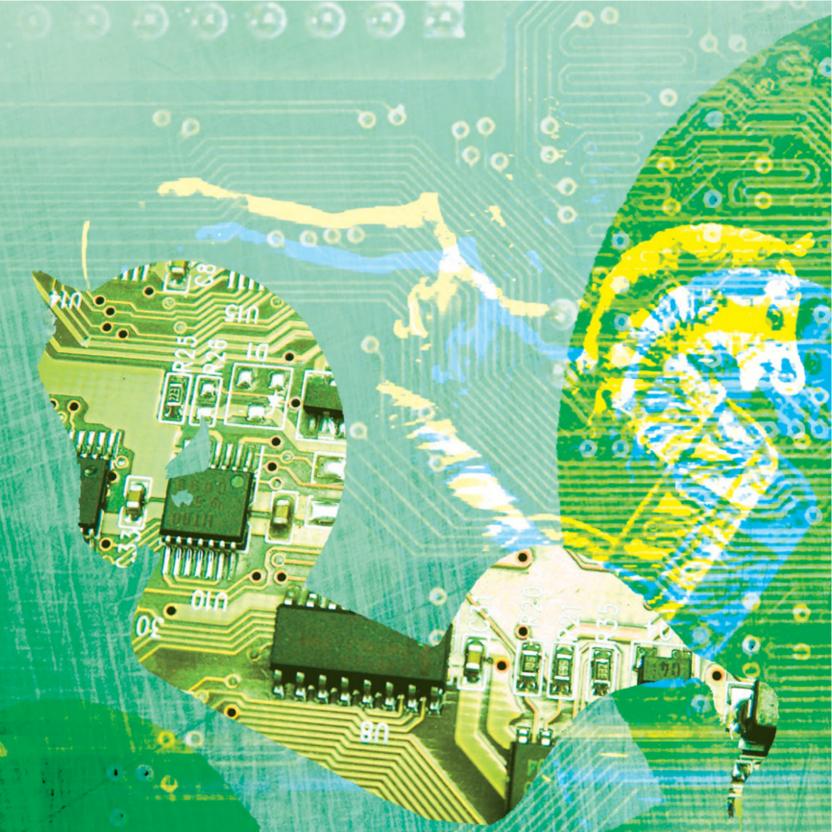
the innovator to angel investors. These high net-worth individuals provide risk capital, in exchange for equity of the venture at an early stage. A marketplace to facilitate networking between innovators and angel investors should be created to give both parties the opportunity to interact and embark on new businesses that will contribute to the GDP of the Nation.

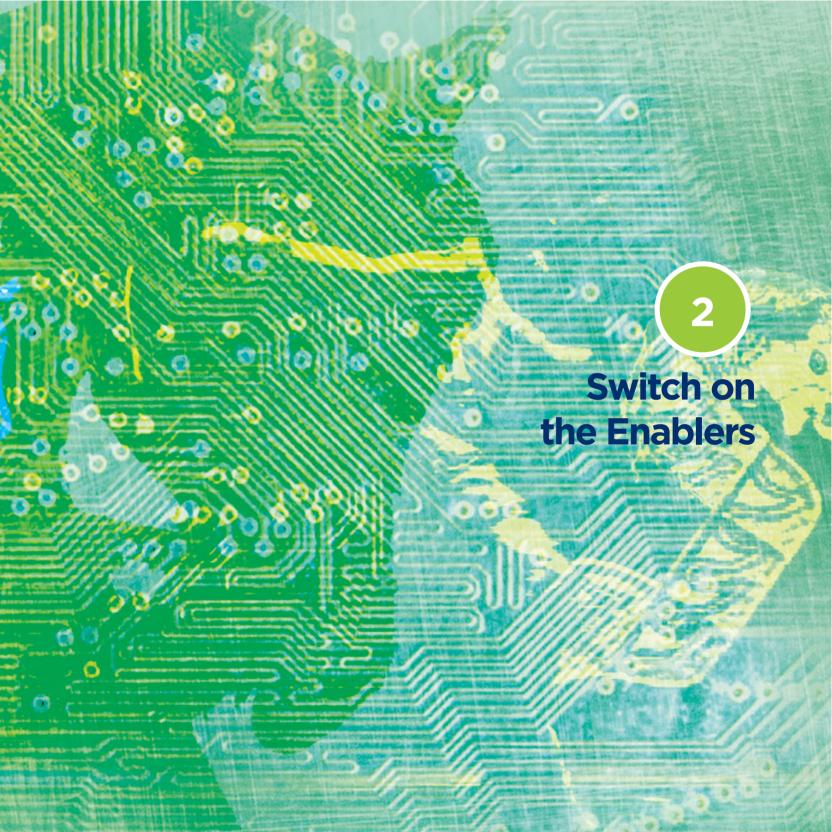
The second essential funding apparatus for innovation is venture capital (VC), which provides risk capital for growth. The success of innovation clusters worldwide has been driven by an active and energetic VC ecosystem, where free-market doctrines reign. Data from other countries illustrates that VC-backed firms show higher revenue growth, have greater employment progress and contribute a significant amount to the GDP of a country.

Malaysia has to create a platform for the VC sector to thrive. Obstacles and hurdles that prevent institutional investors from entering this sector should be removed and attractive incentives should be offered. The government has to slowly exit the VC sector and allow the private sector to take the lead when some of the inherent challenges such as skillsets of VC professionals, the quality of deal-flows and entrepreneurs have been addressed.

Private Equity (PE) usually comes in during the later stages of the innovation life cycle. By its very nature, PE is market driven and is best left to the private sector to manage. At the very least however, the Government can facilitate the setting up of a network that functions as a pipeline of deal-flow for the PE sector.









Switch on the Enablers

This will be accomplished with the following mechanisms:

- Engage the digital citizen through multi-platform technologies
- Open Innovation through the Quadruple Helix Model (Rakyat, Government, Academia, Industry)
- Inspire Human Capital through 1Malaysia Inclusiveness

Engage the digital citizen through multi-platform technologies

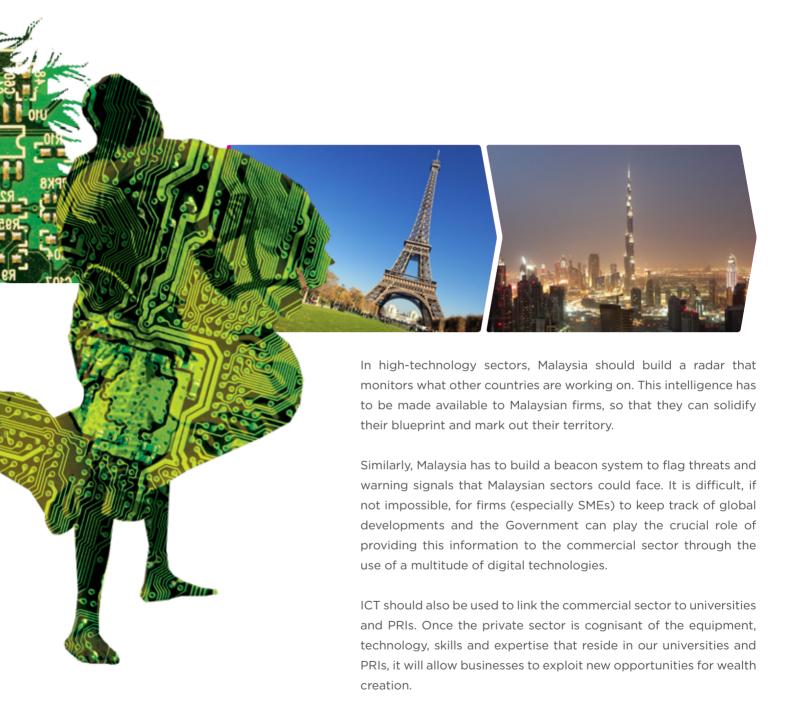
Malaysians are more connected today than they have ever been. Digital technology has made inroads and has altered the daily lives of the Rakyat. Malaysia's penetration of cellular phones is one of the highest in the world and our Rakyat have been quoted as being amongst the main users of social networking sites globally.

Malaysia must take advantage of the digital medium and deliver innovative and creative ICT services though a multitude of digital platforms – personal computers, laptops, tablet devices, smart phones, regular cellular phones, digital TV and satellite radio. These platforms will provide access to the whole of Malaysian society – from the farmers to the jetsetters. The ease and speed of digital technologies offer the most convenient and practical way to enhance the delivery system.

Wealth creation is greatly enhanced when information and knowledge are available on demand. Detailed facts and statistics about markets can ensure that firms make their foray into countries where they have a distinct advantage in their sector.

Knowledge about consumer patterns and behaviour allows firms to adapt and customise their products and services for a multitude of regional or global customers whose needs and demands may be polar opposites of those in Malaysia. It pays to have access to knowledge and the government should provide such access to firms in Malaysia through digital technologies so that their wealth creation efforts are greatly enhanced.





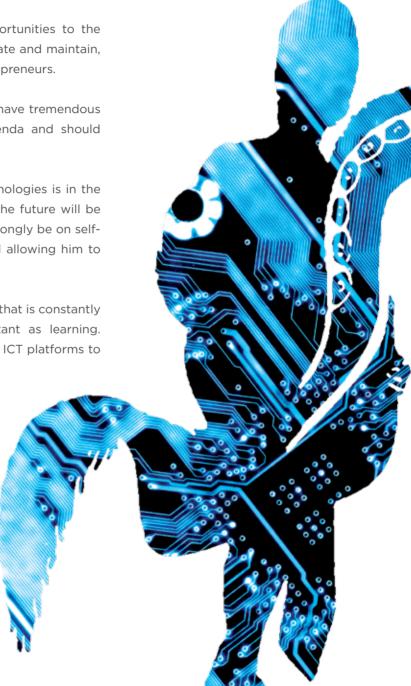
An ICT database that functions to broadcast the opportunities to the private sector is a podium that the Government can create and maintain, effectively providing a "wealth creation factory" for entrepreneurs.

The bottom line is that ICT platforms and technologies have tremendous potential to assist Malaysia in its wealth creation agenda and should become a core strategy in its innovation blueprint.

The second fundamental use of ICT platforms and technologies is in the area of education delivery. The outlook for learning in the future will be very different from what it is today. The emphasis will strongly be on self-learning, a powerful concept that liberates an individual allowing him to learn at his own pace, in his own place.

Life-long learning too, will become a mainstay in a world that is constantly rocked by changes, with unlearning being as important as learning. Malaysia must ride both waves by intelligently exploiting ICT platforms to deliver the FutureSkills described in Thrust 1.





Open innovation through the Quadruple Helix Model

The Quadruple Helix Model is an improvement on the "Triple Helix Model", which popularised the interaction between industry, academia and government. The Quadruple Helix Model (QHM) adds another dimension that is equally important today – the Rakyat.

QHM's premise is that all four actors have equal roles to play in stimulating innovation in a country. Industry and academia are two leading institutional spheres from the 18th Century, while academic involvement in innovation became institutionalised in the 20th Century through the advent of open innovation. The societal or Rakyat's position was firmed up in the early part of the 21st Century through the use of digital ICT technologies and social networks. When all four parties work in synchronicity, the multiplier factor of innovation kicks in.

The government has to facilitate and foster the adoption of these formidable constructs so that innovation can flourish in Malaysia. Initiatives to bring all four players closer together have to be started by the government as a close working relationship is generally lacking between these four stakeholders of innovation. A reward system should be provided for sponsors or champions of both open innovation and QHM.

In the innovation economy, knowledge no longer resides within the walls of an organisation. It is dispersed among employees, suppliers, customers, competitors, universities and research institutes. Open innovation is the mechanism for collecting and structuring this knowledge, leading to the identification of new opportunities that can generate wealth or remove the obstacles facing the firm. Every cog in the wheel is used, in the space where it has specialised knowledge that others don't. The accepted maxim is that if the firm does not use the knowledge it has at its disposal, its competitors will.

Inspire Human Capital through 1Malaysia Inclusiveness

Malaysia's true wealth lies in its people and 1Malaysia's inclusiveness will inspire its human capital to reach greater heights.

All communities must benefit from innovation. However, emphasis has to be given to the Bumiputera community to ensure it takes its rightful place on the innovation stage and benefits from the government's initiatives. The government has created many schemes, programmes and initiatives to benefit the community and these should be extended to the innovation agenda as well. Efforts have to be doubled to instill an innovation methodology into the Bumiputera community, especially in those active in the commercial sector.

To begin with, we have to determine the level, scale and extent of innovation in the community and develop the roadmap accordingly. Alongside this, we also have to study and appreciate the entrepreneurial landscape of the Bumiputera business community.

IMalaysia inclusion also means reaching out to those who aspire to own their own businesses but have not taken the leap of faith. Many such talented Malaysians can be found in middle and senior level positions in large companies as for decades now, Malaysia has been home to multinational corporations (MNCs) from around the globe.

These MNCs in Malaysia are staffed by locals who have been exposed to best practices adopted throughout the world. From engineers to business development executives to managers, Malaysian talent in these MNCs can truly be considered world-class.

The same is true for Malaysian human capital in government-linked companies (GLCs) and public listed companies (PLCs). Malaysia must entice these executives to leave their comfort zone to explore and expand their entrepreneurial potential.



Human capital becomes even more valuable when it has been exposed to skills, expertise, best practices and varied experience in other countries. Many Malaysians, have travelled abroad to study or work and have opted to settle in their adopted countries.

The majority of these Malaysians are skilled knowledge workers and are an asset to the country. For family and cultural reasons, many would like to return home if there are suitable opportunities for them to further themselves. Malaysia must create and offer innovative prospects and schemes that will entice its citizens to return.

While managers and executives can readily find good positions in the private sector upon their return, scientists and researchers struggle to find challenging and compelling options. Malaysia has to pay special attention to creating the "pull factor" to draw this highly valuable community by crafting tailored programmes, incentives and opportunities.

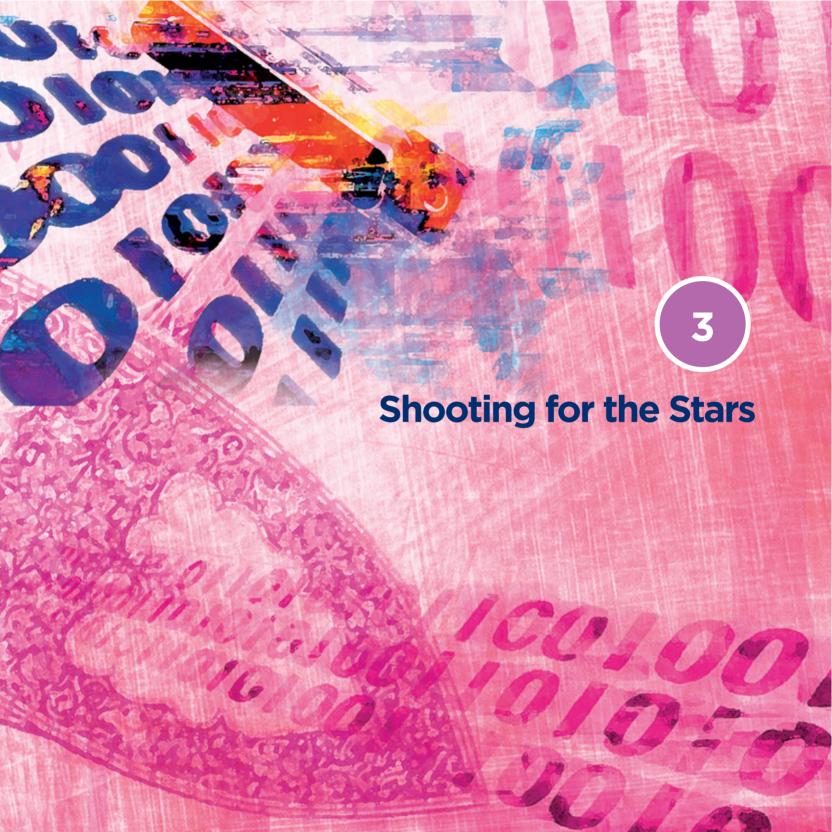
For example, scientists who have achieved breakthroughs in new products and technologies could be offered "green-lane access" to commercialisation funding if they were to return home. Similarly, Malaysia could attract academics and researchers by establishing specialised laboratories that will allow them to continue their work when they return to Malaysia.

Innovation must not only be about high-end or complicated technology, it should also encompass simple improvements that the ordinary man makes to improve his life and those of others around him. Grassroots innovation must be recognised and rewarded, so as to become an encouragement for the man on the street.

Another source of innovation that is sometimes overlooked is the community affectionately labeled "garage inventors". These highly creative and inventive individuals are often bustling with energy and enthusiasm that is highly infectious. Malaysia must nurture and further develop the capabilities and skills of garage inventors and empower them to become innovation ambassadors who motivate students and the youth.







Shooting for the Stars

The three methodologies for the third thrust are outlined as:

- Develop World-class PRIs and COEs in Niche Areas
- Nurture Firms for Distinctive Advantage
- Raise the Bar Break the Mental Ceiling



Develop World-class PRIs and COEs in Niche Areas

Studies show that Innovator Nations have a strong network of PRIs that are closely linked with the commercial sector and form a support infrastructure that empowers industry to venture into higher-value products and services. They play the crucial role of being intermediaries between the creation of raw knowledge by universities and the subsequent exploitation of this knowledge by the commercial sector.

Malaysia has 33 PRIs, a mix of stand-alone organisations and departments within Ministries. They must be realigned to play this critical role for the commercial sector. Several governance and institutional challenges must be overcome as these prevent the private sector from playing an active role in the PRI eco-system.

PRIs contribute most to the Nation when their direction and research is done in collaboration with and validated by industry, in line with the Quadruple Helix Model. The roadmap and blueprint of the PRIs is not an administrative matter for the government to decide but rather should be "signed off" by the key private sector players of the specific industries. This approach will realign and transform the PRIs to become relevant to their stakeholders - the government, industry and the Rakyat.

Centres of Excellence (COEs) in universities provide thought leadership in their respective domains. Driven by acknowledged experts, COEs provide the markers that show the development of specific fields of science or technology and if appropriately applied, point the direction that industry should look towards.

COEs must immerse themselves into the identification of Megatrends that have the potential to change the entire landscape of their domain, science or sector. The Quadruple Helix Model should be used to bring about commercial benefits from the knowledge developed and possessed by the COEs.

Nurture Firms for Distinctive Advantage

Innovation has to be driven by the private sector. The Government can act as a facilitator and enabler, creating forums, platforms and instruments that will foster innovation but ultimately, the private sector has to go into overdrive to generate new sources of revenue from innovation, created from its own distinctive capabilities. Firms must begin to focus on areas where they have a clear competitive advantage and can compete in the open market without subsidies or government assistance.

Studies have shown that innovative firms see higher revenue growth, higher return on investment and enhanced customer support. Malaysia's GLCs and PLCs must take centrestage in the Nation's push to drive the economy through innovation.



Some GLCs enjoy certain forms of market protection and are shielded from external competitive forces. For these GLCs, innovation appears (falsely) to be optional. Other GLCs that do not fall into this category have innovated and ventured out to become regional, if not global, companies.

In a mixed-bag environment of this nature, the government has to adopt both a push and pull mechanism to nudge and encourage GLCs to innovate as their future growth depends on it. Suitable mechanisms and instruments must be found so that voluntarily, GLCs participate in innovation activities that will ensure their long-term sustainability.

Malaysia's public listed companies (non-GLCs) should also be enticed to participate in the innovation playground. Financial and non-financial instruments and schemes should be crafted to facilitate and encourage their involvement. To create a "pull factor", the government could initiate an innovation index, which would show where and how these PLCs are active in innovation.

Malaysia's "middle-tier" companies can become a powerful engine of growth if innovation is injected into various parts of their value chain. These firms, larger than SMEs but not yet PLCs or global companies, do have marketable products or services that appeal to their target markets. They should be nurtured to adopt innovation and innovative practices to extend their reach and customer base, thereby increasing their contribution to the economy.

Naturally, SMEs too, have to be brought into the picture so they can begin the process of innovating their products, services and the internal aspects of their companies. As they make up more than 90% of Malaysia's commercial sector, they are an integral component that has to be strengthened.

The Government must take it upon itself to invest in the identification and dissemination of Megatrend knowledge to the business community, so that their distinctive capabilities can be refined and honed to take advantage of the trends.







Raise the Bar - Break the Mental Ceiling

Malaysia has to "manufacture scenarios" that drive its citizens out of their comfort zones and encourage them to push the envelope and out-perform themselves.

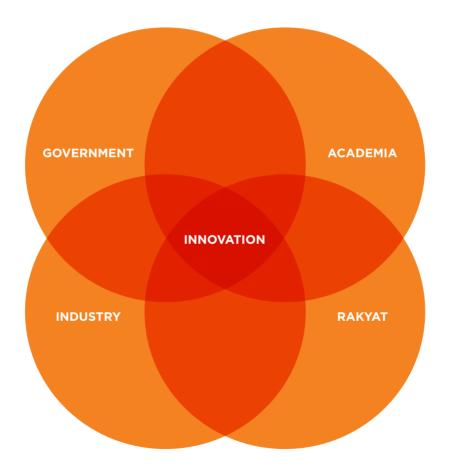
Global experience has demonstrated that challenges that offer attractive prizes inspire and motivate individuals and firms to overcome their mental ceilings and achieve ambitious goals. These prize-based challenges have been shown to work more effectively than grants or contracts.

Challenges are a form of "crowd-sourcing", where the sponsor can set highly ambitious goals, without preselecting the team or approach that is most likely to succeed. The number and diversity of minds that engage to solve a problem create a plethora of solutions that are worth many times more than the prizes awarded for the challenges. Malaysia should create national level challenges, sector-specific challenges and special challenges for the education sector.



STRATEGIES FOR INNOVATION

To develop the innovation eco-system and ensure its sustainability, AIM has identified several tried and tested models and mechanisms that can be successfully adapted to the Malaysian context. They include the Quadruple Helix Model, Onion Model and Innovation Accelerators.



Quadruple Helix Model

The Quadruple Helix Model is an improvement on the "Triple Helix Model", which popularised the interaction between industry, academia and government.

The Triple Helix Innovation process is characterised by academia, government and industry playing fully integrated and overlapping roles, creating an environment where the boundaries between academia, industry and government become blurred as the three areas blend together to create a hotspot of creativity, problem solving, innovation and high-value collaborations.

The Triple Helix Model is an approach that has been successfully implemented in some of the most innovative countries in the world. Sweden and the Netherlands are strong advocates of the model and have demonstrated its effectiveness through their achievements.

The success of the Triple Helix Model has been so great that the individual elements of the three areas now actively seek one-another for collaborations so as to leverage upon their combined expertise to realise higher quality research, industry desired solutions and strategic national objectives.

Taking the Triple Helix concept to greater heights, Malaysia has added another dimension to the equation that is as important as the other three – the Rakyat, or civil society.



The Quadruple Helix represents a shift towards systemic, open and user-centric innovation policy. An era of linear, top-down, expert driven development, production and services is giving way to different forms and levels of co-production with consumers, customers and citizens.

Increasing user orientation can bring benefits in narrowing the innovation gap. Public authorities can develop environments which both support and utilise citizen-centred innovation activities.

It must be noted here that moving towards the Quadruple Helix model requires a significant cultural change, adaptation of processes, acquisition of new skills and a re-distribution of power. If public authorities are able to rise to the challenge of changing the way services are designed and delivered it means allowing citizens to take a turn 'in the driving seat'.

Innovation Accelerators

To kick-start innovation in selected niche areas within specific industries where Malaysia has a strong potential for growth, AIM has established Innovation Accelerators that will centre around a business model that is not only profitable, but also advantageous to the development of the National Innovation System.

Each Innovation Accelerator embodies the Quadruple Helix approach and will be formed through Private-Public Partnerships (PPPs) consisting of the following entities:

- One foreign technology partner in the selected industry
- One local institution of higher learning (public or private) or public research institute with relevant expertise and
- The Malaysian Government through AIM
- Consumers, customers and citizens

The Innovation Accelerators will not conduct fundamental research, instead they will build upon the work of the foreign technology partner to develop and adapt existing research to produce new products and services. Each Innovation Accelerator will focus on a specific domain or field of expertise and all its efforts will revolve around this domain.

By having numerous small scale Innovation Accelerators, AIM can mitigate the risks of failure and act quickly and more flexibly to developing situations. It will also allow for rapid prototyping where various approaches can be tested on a small scale before being shared with the other Innovation Accelerators.

AIM recognises that scientists and researchers are great at investigation and development but they often lack the business acumen required to commercialise their work. The Innovation Accelerators will therefore be split into two parts: the Collaboratory and the Commercial Arm. Each will have separate roles and responsibilities but will work closely together to achieve the broad goals of the Innovation Accelerators.

The Collaboratory, a word coined from the pairing of "collaboration" and "laboratory" is the development section of the Innovation Accelerators and will be responsible for creating products and services relevant to the specific domain that can be fed into the product pipeline. Here, foreign technology partners will bring their expertise and work together with Malaysian experts on the development of ideas, products and services.

The Collaboratory will advocate an open innovation approach and will identify Technology Feeder Cells, both local and foreign leaders in the relevant domain, to assist in the development work, as well as outsourcing work to other research institutes if required.

Scenario and foresight mapping will also be a key responsibility for each of the Collaboratories. To do this effectively, they will engage with the National Science Research Council for guidance as well as appoint international thought leaders as mentors.

By leveraging on this highly interactive combination of industry experts, the Collaboratory will be in a strong position to embark upon the development of cuttingedge innovations, which is the key deliverable of the unit.

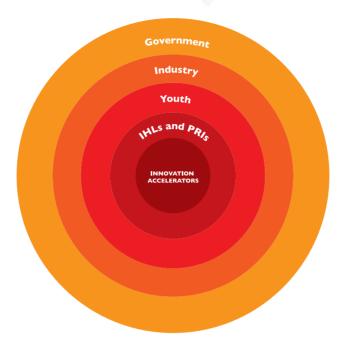
To further enhance Malaysia's expertise in the specified domains, the Collaboratory will develop a mechanism for offering PhD Scholarships/ Sponsorships to students who wish to advance their knowledge in the related field. The sponsoring of PhD students, alongside the Open Innovation approach, will augment the skills and capabilities of Malaysian talent to undertake future innovative projects.

The Commercial Arm of the Innovation Accelerator is tasked with supporting the efforts and validating the work of the Collaboratory. The Commercial Arm will work very closely with the Collaboratory to plot the Innovation Accelerator Roadmap. It will advise the Collaboratory on what development work has commercial potential and suggest promising areas that should be investigated.

Once the Collaboratory is engaged in developing potential products and services, the Commercial Arm will explore avenues to commercialise them, even before the product or service has been completed. The Commercial Arm will be responsible for putting together business plans for potential products and services, assessing the market, and securing test and anchor customers. It will identify and establish links with venture capitalists, angel investors and other sources of funding so they can be readily approached when the time arises.

Any resulting intellectual property rights (IPR) from the Collaboratory will be managed to protect the assets of the Innovation Accelerator. The work must be assessed to identify the value of the products and services to determine if patent application is worthwhile.

The IPR process will start before any development work begins so that time is not wasted pursuing development work that has already been conducted elsewhere. To assist the work of the Collaboratory, the Commercial Arm will establish a network of global InnoScouts to feed them business intelligence about the progress that other countries are making in the same domain. This will help the Innovation Accelerator stay up-to-date with the latest advances in its domain to ensure its work remains relevant.



The Onion Model

To embrace, enhance and encourage synergy between the four key mainstays - Government, youth, institutes of higher learning (IHL) or public research institutes (PRI) and industry - AIM is embarking upon a model that is similar in structure to that of an onion.

As the name implies, the Onion Model takes on a layered design similar to that of an onion. Each of the four mainstays will form a separate layer of the onion and they will all rely on the efforts and support of the other layers to help them achieve their goals. Collectively the layers bring about a positive change and form the keystone for Malaysia's innovation eco-system.

Numerous "onions" will sprout up around the country, each one focused on a specific area of innovation, and each one responsible for developing the relationships between the mainstays in that area. The first layer of the Onion Model consists of the IHLs and PRIs. As the core of the Onion Model, the Innovation Accelerators will be located within one of these establishments. The Innovation Accelerators will also develop an Innovation Methodology Dispersion Centre within the IHL or PRI.



The innovation methodology will first be spread through the Faculty or School in which it is located, beginning with research staff and post-graduate students. Following this, the innovation methodology will be dispersed throughout the rest of the IHL or PRI and to undergraduate students.

The Commercial Arm of the Innovation Accelerators will also offer a pre-screening of invention reports to assess the commercial potential of research and development being conducted in other faculties or schools within the institute. In return for providing feedback and assistance, AIM will have the first right of refusal to commercialise and market the products or services it assesses.

As the Innovation Accelerator matures, it will reach a stage where it is able to assist the host IHL or PRI to market its pre-screening service and innovation methodology to other institutions. The effects of this will be two-fold: first, the methodology will begin to

spread further and deeper into the culture of Malaysian IHLs and PRIs, and second, it becomes a potential revenue-generating resource for the host.

An IHL outreach programme will be initiated to further engage the graduate and undergraduate students. The Commercial Arm of the Innovation Accelerator will work closely with multinational companies to identify specific problems that need to be solved, or areas of opportunity that are ripe for exploitation. University and college students will then be given a challenge brief asking them to address the problem or opportunity.

The students will be required to work in teams and adhere to various limitations such as time and resources in their quest to win the challenge. Various incentives will be offered to entice and encourage participation.

The beneficiaries of the IHL outreach programme will include students, the IHLs and industry. The students





gain the opportunity to learn and understand industry needs and to put into practice the theory they have been taught. It will encourage the students to think differently and boost their problem-solving abilities. It will also provide the participants with a platform from which they can showcase their talents to potential employers.

The benefit to the institutes of higher learning is that they will have the chance to develop and strengthen their relationships with industry and collaborate with them to learn how the courses and programmes they offer can be improved. It will help them become more aware of industry needs so they can fine-tune their strategies and become more relevant to the market.

Industry will gain from this model by being able to tap into a wealth of resources that would normally be out of their reach. Instead of having a few minds working on a problem or opportunity, industry will be able to utilise the combined thinking power of hundreds of brains.

This will result in an abundance of ideas being generated; while some of these maybe unusable, it will still result in a larger number of viable ideas being generated. The IHL Outreach Programme also provides industry with a means for identifying and assessing future talent and introducing the talent to the culture and practices of the working environment. It is akin to conducting an extended practical interview and it enhances the likelihood of selecting new-hires who are well-suited for the position.

To ensure the sustainability of the Innovation Eco-System we need to cultivate future generations to be critical, creative and constructive thinkers as these are the core skills for innovation to flourish. We must therefore ensure that we nourish our youth with the skills and knowledge that will allow them to harness not only their potential, but also the potential of the Nation. We must inculcate within them the right mind-set and attitude for continued growth, betterment and advancement to be able to take on the challenges of a rapidly globalising world.

AIM is conscious of the fact and will look towards supporting and supplementing the accomplishments of the Ministry of Education through a youth outreach programme. This will not interfere with the existing education system but will instead augment the capabilities and thinking skills of students. The basic premise of the youth outreach programme is similar to the IHL outreach programme with some key differences in implementation. As with the IHL model,



an industry multi-national corporation will work with the Innovation Accelerator to identify a specific industry problem for the programme. A Mental Protein Toolkit will be developed to assist the participants in solving the problem.

Participants will form teams to take part in the programme, which will be designed so that locality and language will not be a barrier to participation. All the required resources and information will be made available in Bahasa Melayu and English and youth from all over Malaysia should be able to join the programme, even if the Innovation Accelerator leading the programme is based in KL and the team members live in Sabah or Sarawak.

To help with the operations of the programme, undergraduate and postgraduate students will be recruited and trained to mentor, coach and manage the youth teams. They will be encouraged to do this virtually through ICT tools.

To promote participation from youth teams and student mentors as well as sponsorship from industry in line with their corporate social responsibility, incentive schemes will be put in place.

After successfully completing the programme, participants will receive an industry endorsed award that recognises the skills and knowledge they will have acquired through the programme. The award will be developed in partnership with key stakeholders to ensure it is recognised by employers and IHLs.

Industry forms the third layer of the Onion Model although its participation has also been embedded into the first two layers. Numerous programmes will be implemented to connect with industry and to strengthen their role in the National Innovation System.

Domain specific innovation challenges will be established to drive development and competitiveness within industry, while domain specific networks will evolve to encourage open innovation and collaboration.

Companies will also have the opportunity to have their innovation capability measured and rewarded for positive movement along the scale. In conjunction with this, incentive schemes such as Innovation Vouchers will be offered to companies to encourage the development of new products and services. Innovation Vouchers allow an organisation to conduct development work on an idea with very little risk.



The concept is that companies can apply for Innovation Vouchers that are of fixed value and can only be redeemed at approved IHLs or PRIs. The latter will provide services (research and development) to the company up to the value of the voucher and AIM will make the monetary payment once the work has been completed and the IHL or PRI provides an invoice and an authorised youcher.

Government is the fourth and final layer in the Onion Model and it encompasses the efforts of all of the other layers. AIM will assemble a band of Innovation Ambassadors to permeate throughout the whole of Government and spread the concepts, best practices and application of innovation.

These Innovation Ambassadors will be specially trained in innovation methodologies and theories, their application, and how to convey this knowledge to others. They will impart their knowledge to other arms of Government and provide guidance and support where required.

Each Innovation Ambassador will be embedded into the day-to-day operations of the selected Ministries, Agencies and Departments so that they can obtain a deeper understanding of the issues that each one faces and the areas in which innovation can lead to greater results.

Aside from this, AIM will also organise a series of innovation seminars for top level Government officials and Ministers. These seminars will involve talks from some of the world's most renowned thought leaders and showcases of ground-breaking and game-changing innovations. This will provide a top-down approach to supplement the ground-up work undertaken by the Innovation Ambassadors.

In addition, large public sector projects will be encouraged to incorporate some measure of innovation in the undertaking. An innovation impact assessment study will be conducted on the project







This improvement could be in the form of a costreduction to the project, or if the cost cannot be reduced, in the form of increased benefit to the Rakyat. Experience has shown that entire industries can be transformed based on this principle.

Ultimately, once the Onion Model has been implemented and is up and running, the role of the Government will be transformed from that of an operator to a regulator.

There are a number of public research institutes in Malaysia that cover a diverse range of interest areas, from agriculture and biodiversity to telecommunications and wireless technology.



Each of the PRIs conducts valuable research in their respective areas, most of which is funded by the Government. To maximise the value of the work the PRIs embark upon and ensure ROI, AIM will work closely with the relevant Ministries and the PRIs to revise their current goals and strategies to make them more industry-relevant.

Finally, there is a need to build a network around all the PRIs to understand their skill-sets and capabilities and resources, even up to their equipment. This knowledge will be made public to allow industry to have a firm grasp of where best to go to for resources, but more importantly, this allows for the PRIs to be industry-linked and industry-driven.

A SHOUT OUT TO ALL MALAYSIANS

It is the duty of each and every Malaysian to play our part in contributing to the development of a balanced innovation eco-system. We must not rely upon the Government to shoulder the burden of transformation; we too must play our part and engage ourselves with the process.

In the spirit of the Quadruple Helix Model we must open ourselves up to develop far reaching and stronger networks, to openly collaborate with one-another, and to work together to help drive Malaysia forward.

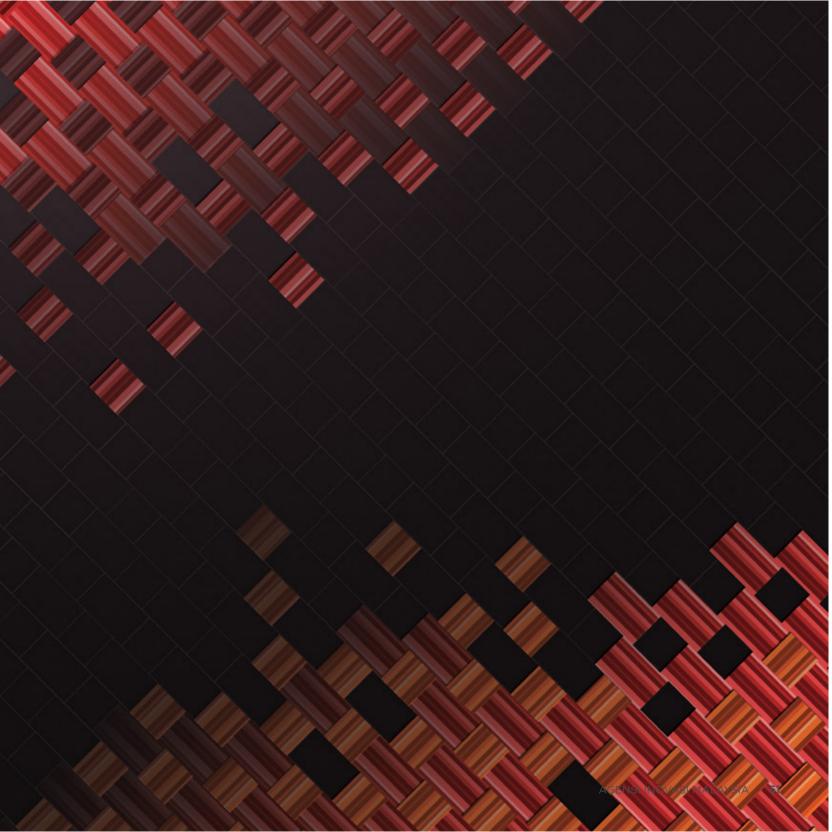
We must be ready to receive the challenges ahead and face them head on. We must not fear but instead embrace the changes that are inevitable and we must all strive to play our respective roles in helping Malaysia fulfil her true potential. AIM will be here to provide guidance, direction and support but we cannot do this alone, your active participation is crucial.

We welcome your involvement and look forward to your participation. You are invited to register your interest by visiting our website at:

www.innovation.my

If we stand shoulder to shoulder, we can only move forward.





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