TABLE OF CONTENTS

FOREWORD BY HONOURABLE MINISTER OF MOSTI

The Government Transformation Framework highlights the importance of Information and Communication Technologies (ICT) in enabling sustainable economic growth of the nation. ICT will continue to be a critical factor to deliver and create advanced solutions for many Entry Points Projects, business opportunities and National Key Results Areas (NKRA) initiatives identified under the Government Transformation Programme (GTP) and Economic Transformation Programme (ETP).

The National Strategic ICT Roadmap was introduced in 2008 to provide a clear vision of the Government's ICT aspiration. It included positioning Malaysia as a global leader in ICT and moving towards a knowledge-driven economy. However, it is imperative that this Roadmap is revisited from time to time to ensure it continues to be relevant and in alignment with the current economic scenario and challenges.

As such, the Ministry of Science, Technology and Innovation (MOSTI) embarked on an exercise to review the 2008 Roadmap, validate its aspersions, update the overall assumptions and align it with the appropriate policies and plans. The Blueprint for the Implementation of Strategic ICT Roadmap for Malaysia is the result of the study that was undertaken with four key objectives in mind. First, to assert ICT as an enabler to drive key economic sectors. Second, for Malaysia to be ranked in the top 10 of the World Economic Forum's Innovative Index. Third, for the ICT industry to contribute 17% of the Gross National Income (GNI). Finally, to establish 5 globally recognised Malaysian brands.

I am confident that the Blueprint will galvanise the Government machinery and the Malaysian ICT industry alike in forging ahead with our technological transformation.

Lastly, I would like to take this opportunity to thank all our partners in the private and public sectors for their strong support and contribution to our endeavours to realise the aspiration as contained within the Blueprint.

Datuk Seri Panglima Dr. Maximus Johnity Ongkili

FOREWORD BY SECRETARY GENERAL OF MOSTI

MOSTI has been entrusted with stewardship of the national ICT agenda and has over the years formulated various roadmaps pertaining to ICT, whose objective is to provide focus and to serve as a guideline for planning and resource allocation.

Over time, with new technologies and dynamic approaches towards governance and commerce coming on-stream, and the varying degrees of implementation that has been achieved with the previous roadmaps, it is apparent that a review is necessary to ensure that the Strategic ICT Roadmap continues to be relevant and in line with the current transformation initiatives that have been introduced, namely, GTP, ETP, 1Malaysia and Digital Malaysia.

The Blueprint for the Implementation of Strategic ICT Roadmap for Malaysia is the result of the review of the National Strategic ICT Roadmap 2008 and Technology Roadmaps. The review constitutes an assessment of previous roadmaps coupled with the review of global megatrends, human needs analysis, past initiatives and country capabilities. The overall objective of the study is to produce key strategies to be adopted as well as an execution plan to establish a sustainable national ICT innovation ecosystem.

The Blueprint identified six Focus Areas (FAs) namely, Cloud Computing, Wireless Intelligence, Big Data & Analytics, Security, e-Services and Ubiquitous Connectivity. The FAs supported by 13 Strategic Initiatives will be the key to advance Malaysia technologically and economically for the next decade.

It is the sincere hope of MOSTI that this Blueprint will provide renewed vigour and energy to the various implementing agencies in the Government and the Malaysian ICT industries towards achieving the national aspiration.

Dato' Dr. Madinah Binti Mohamad

INTRODUCTION

The Malaysian Government recognises the importance of ICT in enabling economic growth. Pervasive adoption of ICT across all sectors of the economy not only support the growth of the sector but also increase efficiency, productivity and raise the nation's overall competitiveness. Proactive initiatives have been taken by the Government in promoting and developing ICT as a sector and enabler through successive economic development plans as well as various strategic policies and programmes.

Under the 10th Malaysia Plan and Government Transformation Framework, ICT continues to be the critical foundation for enabling delivery and creating advanced solutions for many initiatives identified under ETP and GTP.

Figure 1: Vision 2020 for Malaysia

*Source: http://www.epu.gov.my/html/themes/epu/images/common/pdf/eco_stat/pdf/nem.pdf*

This Blueprint seeks to assess the impact of the National Strategic ICT Roadmap 2008 on the development towards information and knowledge-based economy. It serves to address several issues such as, which policies were successful and how it may be repeated or scaled up; what was under achieved and the causes of the shortfall. Overall, the Blueprint will allow policy makers to review strategies to go forward, ensure it remains relevant and is to keep up with the advances in technology. With the Blueprint, the Government will be able to:

• Recognise the implications of ICT on development policy and quantify its impact;
• Identify critical success factors and best practices; and
• Formulate new policies to promote ICT utilisation within Government, businesses and the community.

RATIONALE FOR THE **BLUEPRINT**

The impact of ICT is far reaching as its transformational effects spread horizontally and cut across other sectors of the national economy. Hence, ICT sector will continue to be the key focus for Malaysia and is expected to grow progressively driven by the convergence of industries due to digitalisation.

The contribution of ICT sector to the National Gross Domestic Product (GDP) has decreased from 12.9% in 2000 to 9.8% in 2010. The decline is due to substantial fall in contribution from ICT manufacturing sector even though the ICT services sector was growing consistently.

ICT Contribution to GDP %

Year	2000	2010
%	12.9	9.8
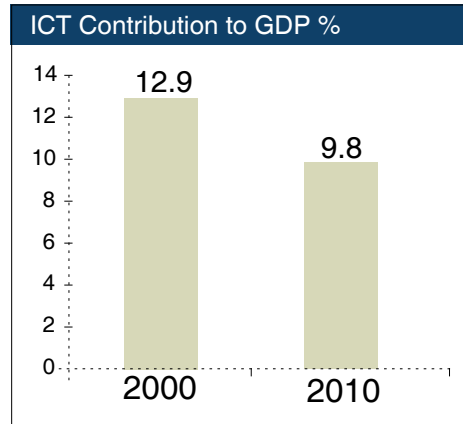
As Malaysia moves towards a knowledge-based economy and a high income nation, the services sector will play a dominant role in the wealth creation of the nation. For this reason, the Blueprint will provide a framework to enhance the productivity of key sectors of the economy and promote the development of new ICT-based and knowledge-intensive industries.

The Blueprint will set strategic direction for the establishment of a synergised innovation ecosystem that could create sustainable streams of ICT innovations to achieve the four key objectives as follows:
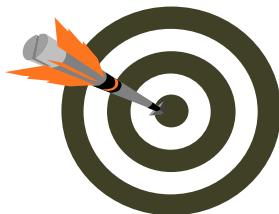
1 ICT as enabler to drive key economic sectors

2 Malaysia to reach top 10 in Innovative Index

3 ICT to contribute 17 percent of GNI

4 Establish 5 Malaysian global brands

FOCUS AREAS

The Blueprint identifies a set of development goals that is to position Malaysia as a global leader in six selected Focus Areas (FAs).
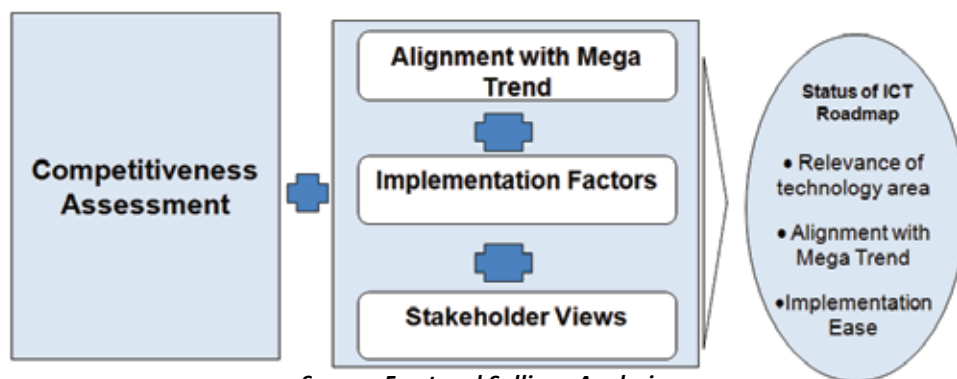
Source: Frost and Sullivan Analysis

The FAs were identified based on a framework which incorporates various criteria such as competitiveness, alignment with technology megatrends, factors for successful implementation and views of the various stakeholders. The technologies identified within the FAs are as follows:

Technology Area	Point Technologies
Cloud Computing	Datacentres, Homomorphic Encryption and Virtualization.
Wireless Intelligence	Wireless Data Encryption Technology, Wireless Sensors, M2M, Device Interconnection, Gestural Interface, 3-D displays, RFID, Image Recognition and Data Management Systems.
Big Data/Analytics	Inline Analytics, Massively Parallel Processing (MPP) Databases and Advanced Analytics Application based on Ontology.
Security	Antivirus Softwares, Intrusion Detection System, Intrusion Prevention System, Identity Management Softwares and Hardware, Biometrics, Video Surveillance, Next Generation Firewalls and Data Encryption.
e-Services	Digital Commerce, e-Governance, Online Finance, Virtual Education, Telemedicine and Digital Pathology.
Ubiquitous Connectivity	NFC, Social Media, Payment Processing Software, Location-based Services, Wireless Broadband, WiMax, LTE, GPS and GIS.

CLOUD COMPUTING

Cloud computing aggregates demand for IT services from various users, allowing for economies of scale through the efficient delivery of computing resources from a shared computing platform. ICT functions such as systems, applications and security are now outsourced to a cloud provider and organisations simply subscribe to the service without the need to invest in new infrastructure, training of new personnel, or licensing new software. For Malaysia, cloud computing is seen as the next wave of ICT development due to several factors:

- Malaysia has already commercialised two products with another 30 with market potential. Given a sizeable market base of SME's in the country, there is a very strong growth potential for cloud services;
- Software as a Service (SaaS), Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) are potentially lucrative services offering for the healthcare, manufacturing, education, travel & hospitality and retail industries; and
- The growth opportunity in cloud computing represents a significant economic impact. Taking into account a global market potential, it may contribute to a GNI impact of about RM5.0 billion and the creation of about 11,500 job opportunities.

MALAYSIAN AND GLOBAL MARKET SIZE		
(All values in RM)	2011 (billion)	2020 (billion)
Malaysian	0.14	2.80
Global	120	723

| By Year 2020	Malaysian only Focus	Malaysian with Global impact
GNI Impact	RM1.4 billion	RM5.0 billion
Job Impact	3,018	11,494

WIRELESS INTELLIGENCE

As more and more machines and devices are integrated with on-board computers and connected wirelessly, the functionality and capability of devices will be further enhanced. The key related technology segments of wireless intelligence are Wireless Sensors, Machine-to-Machine Communications (M2M) and Radio Frequency Identification (RFID). The potential for Malaysia in Wireless Intelligence are as follows:

- The Wireless Intelligence industry in Malaysia is developing, with about five patents and 73 applications already registered;
- Growth in this area is represented by a global market size of RM447 billion by 2020. In Malaysia, these opportunities will be driven in areas like agriculture, environment and civil infrastructure monitoring;
- For RFID, market opportunities are represented by implementations in supply chain management, livestock tracking and the retail industry. For M2M, the creation of Smart Cities, Smart Infrastructure and Smart Grids hold numerous growth opportunities; and
- There is also a significant economic contribution potential, with a GNI impact of RM3.1 billion that can be achieved along with the creation of about 7,000 job opportunities.

MALAYSIAN AND GLOBAL MARKET SIZE		
(All values in RM)	2011 (billion)	2020 (billion)
Malaysian	0.13	1.80
Global	60	447

By Year 2020	Malaysian only Focus	Malaysian with Global impact
GNI Impact	RM0.9 billion	RM3.1 billion
Job Impact	2,547	7,072
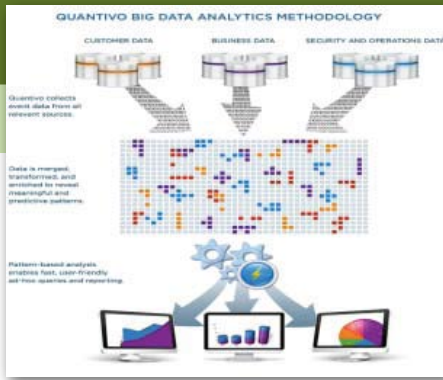
BIG DATA & ANALYTICS

Big Data & Analytics covers technologies related to managing and analysing large amount of unstructured data to generate useful and timely information for making better decisions. With the tremendous increase of data generation due to digitisation, Big Data & Analytics will be crucial for organisations to create value, enhance efficiency, productivity growth and innovation. Malaysia has good prospects in this area due to several factors, including:

- Currently there are about 15 commercialised technologies, two patents granted and another 21 being applied in this area;
- There is a good growth in both the Malaysian and Global market in this area. This will be driven by adoption of computing functions like data warehousing, business intelligence and data integration. The demand will come from a variety of sectors including financial services, healthcare, retail, public sector and manufacturing; and
- The economic impact on GNI with global focus will be about RM2.3 billion along with the creation of about 4,300 jobs by the year 2020.

MALAYSIAN AND GLOBAL MARKET SIZE		
(All values in RM)	2011 (billion)	2020 (billion)
Malaysian	0.12	1.56
Global	40	312

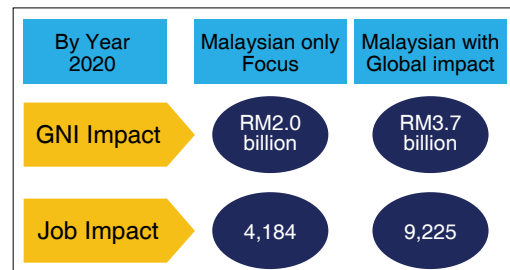| By Year 2020	Malaysian only Focus	Malaysian with Global impact
GNI Impact	RM0.8 billion	RM2.3 billion
Job Impact	1,311	4,298

SECURITY

Security covers technologies that address cyber security, security surveillance and security platform development. Its market can be segmented into three areas, namely, cyber security, video surveillance and biometrics. With the growing importance of ICT, there is also a corresponding rise in its risks and threats to its security. To address such risks, ICT security is a growth industry in which Malaysia is able to leverage base on the following observations:

- Current competency of Malaysia in security field is modest, with around 73 patent applications, 19 patents granted and 7 commercialised products;
- Cyber security is the biggest segment of the market. Opportunities for cyber security can be seen from growing cyber threats, increased in regulatory and statutory requirements and a rising awareness in the market;
- Video surveillance, a growing demand from offices, smart buildings, integrated security systems, and wireless city surveillance hold the key opportunities;
- Biometrics growth will be generated from the increase in identity cards, travel documents, public office access control and law enforcement; and
- A significant economic potential can be realised with a potential GNI impact of RM3.7 billion and about 9,000 job opportunities.

MALAYSIAN AND GLOBAL MARKET SIZE		
(All values in RM)	2011 (billion)	2020 (billion)
Malaysian	0.75	2.52
Global	158	326

By Year 2020	Malaysian only Focus	Malaysian with Global impact
GNI Impact	RM2.0 billion	RM3.7 billion
Job Impact	4,184	9,225

e-SERVICES

Corresponding to the proliferation of smart phones and tablet PCs usage, the amount of e-Services transactions have increased exponentially. As computing power becomes more readily available and connectivity becomes more pervasive, the demand for e-Services will grow even more. In addition to the above mentioned drivers, factors that are likely to act as a catalyst for e-Services can be highlighted by the following :

- Current competency of Malaysia in the field of e-Services is illustrated by 51 commercialised products, two granted patents and 23 patent applications. This indicates a great propensity towards commercialisation;
- There are significant opportunities represented by e-Governance, e-Health and e-Learning. These will drive a market size of about RM3.6 billion in Malaysia by 2020; and
- There is a significant economic impact that can be generated by this FA. This includes an overall potential GNI impact of about RM5.7 billion and 13,140 potential jobs.

MALAYSIAN AND GLOBAL MARKET SIZE		
(All values in RM)	2011 (billion)	2020 (billion)
Malaysian	0.83	3.68
Global	300	767

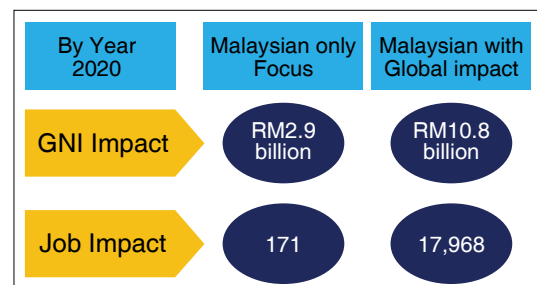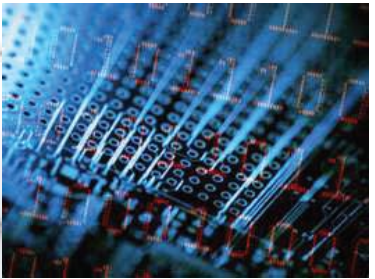| By Year 2020	Malaysian only Focus	Malaysian with Global impact
GNI Impact	RM1.8 billion	RM5.7 billion
Job Impact	3,039	13,140

UBIQUITOUS CONNECTIVITY

With the rapid adoption of highly personalised mobile devices such as smart phones and tablets coupled with the increase of mobile internet penetration, everyone has the option to be stay online all the time, from any location. Various point of technologies related to this opportunity are Near Field Communication (NFC), Long Term Evolution (LTE), WiMax, Global Positioning System (GPS), Geographic Information Systems (GIS) and Location-Based Services (LBS). The developments within this area include:

- Seven commercialised technologies, one granted patent and 19 applied patents in the area of Ubiquitous Connectivity in Malaysia;
- Malaysia will have a market size of about RM16.6 billion by 2020 whereas globally the market will grow to RM2.7 trillion. Opportunities in this FA are primarily represented by the adoption in tourism, retail and transportation; and
- There is a significant economic potential of about RM10.8 billion with global markets in consideration. The potential of job creation is tremendous with an estimated 17,968 job opportunities.

MALAYSIAN AND GLOBAL MARKET SIZE		
(All values in RM)	2011 (billion)	2020 (billion)
Malaysian	9.90	16.58
Global	1,620	2,737

By Year 2020	Malaysian only Focus	Malaysian with Global impact
GNI Impact	RM2.9 billion	RM10.8 billion
Job Impact	171	17,968

STRATEGIC INITIATIVES FOR THE BLUEPRINT

Based on the key objectives of the Blueprint, the 13 Strategic Initiatives (SIs) that have been identified to be implemented are:

Figure 2: SIs Driving the Blueprint

1. **FAs Development Initiative**
2. **Prioritization of R,D&C to FAs**
3. **Aligning Human Resources Roadmap with FAs**
4. **Attracting MNCs To Set Up R,D&C Centres in Malaysia**
5. **Enabling ICT Technology for ETP/GTP/DM**
6. **Research-Industry Communication: Enhanced Web Portal KRSTE.my**
7. **Bridging Gaps in IHLs/RIs to Further Commercialisation Agenda**
8. **Strengthening IP Management & Commercialisation**
9. **Enabling the SMEs and Start-Ups for Innovation**
10. **Central Technology Rating & Valuation Body**
11. **Transitioning Existing Funding Model Towards Efficiency**
12. **Local ICT Champions - Promotion, Branding & Go-Global Strategy**
13. **Preference to Local Technology for Procurement by Government and Government-Linked Companies**

- FA SIs
- Funding SIs
- National Transformation Program SIs
- Local Industry Support SIs
- Strengthen Institutions SIs

1 · FAs Development Initiative

Malaysia had achieved significant success in promoting and developing an ICT innovation ecosystem through various strategic plans. In order to reach the next level of technology leadership, it would have to invest and channel its resources to the six FAs that were identified on the basis of globally emerging opportunities and the maturity of local technical capabilities. This strategic development of the six FAs is based on two key recommendations:

- Strategic roadmap to develop industry and market in the identified FAs; and
- Create funding support for strategic IP filing and acquisition in the six FAs.

With these two approaches, a basis for achieving global leadership in the FAs is envisaged. The market scenario, projections and local industry context are the basis on which the broad market and industry development direction are outlined for each FA in this initiative. In addition to local technology development, it is also considered necessary to acquire global technology and protect local technology in other markets, so as to support the development of IP portfolio that is critical to Malaysia's strategic focus on the identified FAs.

2 · Prioritization of R,D&C to FAs

Giving priority to R,D&C in areas related to technology is core to the pursuit of global competitiveness in the identified FAs. The same is expected to be accomplished by:

- Linking the technology roadmaps to identified FAs: Suitable institutional mechanisms that lead to further development and implementation of technology roadmaps have been proposed. Enhanced and linked technology R,D&C roadmaps and the Blueprint for the Implementation of Strategic ICT Roadmap for Malaysia are the supply side of the ICT innovation ecosystem. This supply feeds into DM programme, which envisages to influence the ICT demand and application (refer Fig. 3); and

- Plan for R,D&C in the various Institutions of Higher Learning (IHL) as per the identified FAs: conducting a workshop with the various IHLs to identify specific area of R,D&C in line with the IHL's strengths.

Figure 3: The Blueprint in the Context of other ICT Roadmaps and Programmes

The Blueprint

---
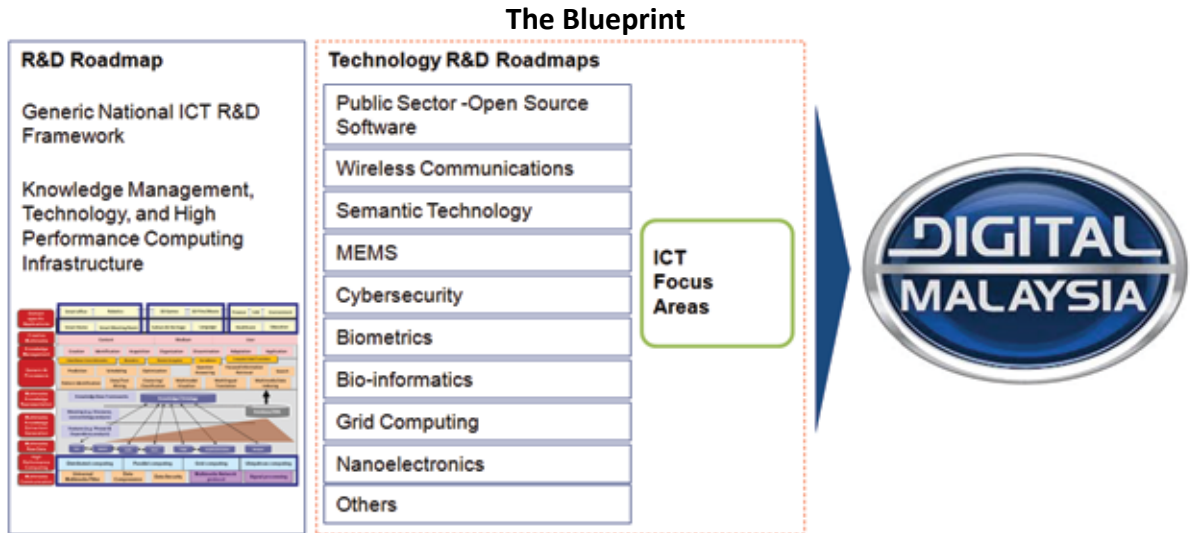
3 | **Aligning Human Resources Roadmap with FAs**

The availability and the quality of human resources is one of the critical factors for ensuring the success of the implementation of this Blueprint. The issue is not just the availability of ICT human resources which has been a declining trend in terms of both new entrants and the graduate output, but also visible quality gap between the output and the industry expectations.

Review of National ICT Human Capital Development Framework which has the objective of producing world-class ICT human resources was conducted. It incorporates in its Strategic Thrusts, the suitable policy measures needed to bridge the areas of concern. Still, considering the strategic direction that this roadmap provides to the entire ICT landscape from R,D&C to industry, we recommend the following:

Total Supply of ICT Graduates
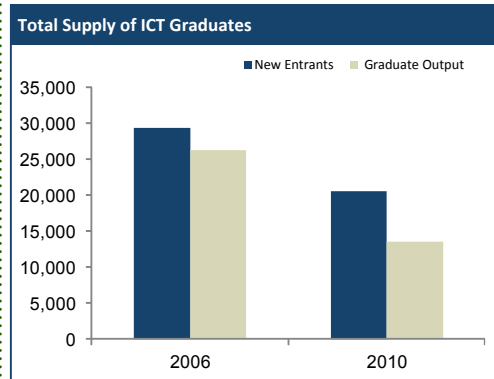
Source: Ministry of Higher Education (MOHE)

- ICT curriculum review to take into account the identified FAs; and
- The identified FAs to be incorporated into the recommended policy of "Channel R,D&C and Commercialisation towards strategic FAs".

4   **Attracting MNCs To Set Up R,D&C Centres in Malaysia**

A strong link in the global innovation network is important for a nation to build a synergise ICT innovation ecosystem. Hence, it is important to encourage and attract Multi-National Corporation (MNC) to setup their R&D centres in Malaysia.

As such, explicit incentive programme should be introduced for relevant MNCs related to FAs to setup R,D&C labs. Suitable incentives and tax structure could be used as levers to attract such MNCs.

Such an initiative will greatly help Malaysia by not only ensuring awareness on the latest development in FAs across the world, but also enabling its people to get trained on the latest technology being developed in these labs.

5   **Enabling ICT Technology for ETP/GTP/DM**

National Transformation Programmes offer potential opportunities for ICT enablement and leveraging of local ICT. Inadequate awareness of opportunities in ETP/GTP/DM along with lack of knowledge about local ICT is inhibiting the potential of local supply meeting key local demand for ICT.

Linkages between ICT opportunities in ETP/GTP/DM and available local technologies need to be developed. Accordingly, a database of local technologies was created and mapped with existing opportunities in National Transformation Programmes. In summary, more than 130 opportunities have mapped onto more than 600 technologies.

The mapped opportunities are also linked with the potential local firms operating in the respective domains and capable of forming partnership with the technology owner.

6 Research-Industry Communication: Enhanced Web Portal KRSTE.my

An analysis of ICT R,D&C ecosystem in Malaysia revealed that there is a serious issue of low rate of IP creation and even more significant is the low rate of commercialisation. While pursuing FAs as strategic FAs is an effort to align to a few technologies to create maximum impact, several other supporting initiatives are required to strengthen R,D&C ecosystem and enable better IP creation and commercialisation rate.

To start this reform of our R,D&C ecosystem, what is possibly the most critical is to influence the dynamic relationships between the research community and the industry. Due to the need for improved communication, there is a significant need for transparency in our labs across the country to create some grounds for collaboration, both between the labs and between the labs and industry.

A web portal www.KRSTE.my that has ICT and other research project information exists. This portal could be leveraged to create a forum for research – industry collaboration. It is proposed that the portal and the related database at the backend should be upgraded and updated to include:

- Complete transparency on project funding and status of progress; and
- Capturing ICT industry needs.

Leverage KRSTE.my to create an active forum for research-industry interaction

7   **Bridging Gaps in IHLs/RIs to Further Commercialisation Agenda**

Out of more than 4,000 ICT research projects, there have been only 200 patents and about 60 commercialised technologies indicating a commercialisation rate of about 2%[1]. The core issue of low rate of IP creation and commercialisation is also a reflection of IHLs/Research Institutes (RI) orientation towards the same. Several surveys and discussions have reinforced the understanding that the Malaysian research community in IHLs and RIs has limited orientation, awareness and know-how to pursue commercialisation and IP management. Accordingly, three initiatives focused on bridging key gaps in our IHLs and RIs are to be implemented:

- Develop education and awareness programmes to ensure researcher orientation towards IP management and commercialisation;
- Strengthen the Innovation and Commercialisation Centres in our IHLs to provide adequate support to our faculty and research students' on IP management and commercialisation; and
- Create a Community of Practice (CoP) for technology transfer amongst various ICT labs in Malaysia to ensure sharing of know-how across the labs. This will also help overcome the lack of professional service providers required to support IP protection and commercialisation in Malaysia.

8   **Strengthening IP Management & Commercialisation**

In order to improve the commercialisation rate of the local technologies being developed within the country, it is also important to take concrete steps to institutionalise various methods and processes which provide necessary impetus towards improvement in commercialisation rate. It is therefore proposed to:

- Develop IP Management Standards and Governance Structure that provide a standard template for our IHLs and RIs;
- Ensure funding availability for commercialisation of locally developed technology;
- Provide preference to commercialised output along with patents & publications by suitable weightages to indicate the same;
- Technology Business Advisory (TBA) set-up at each IHL and RI to support spin-offs and start-ups;
- Standardise the definition of commercialisation; and
- Adopt the concept of Pretotyping (i.e. testing the appeal and usage of a new product by simulating its experience using small investment of time and money) at IHLs, RIs and local industry to ensure better utilisation ofresources.

All these steps are purveyors of change in the commercialisation approach of research institutions. These steps once implemented will improve and sustain high commercialisation rate of locally developed ICT.

[1]The research projects are estimated projects in all publicly funded ICT research labs. Patents data is based on estimated granted patents by MYIPO. Commercialised technologies is for all funded projects by MOSTI and MOHE for IPTAs in 9/10 Malaysian Plan.

9   Enabling the SMEs and Start-Ups for Innovation

The previous three SIs approach the issue of commercialisation from the standpoint of strengthening public research set-ups (SI 7), their practices and processes to bring outcomes to market (SI 8) and their industrial linkages (SI 6). What is also required is to enable the pull from the private enterprise through a mix of measures.

A look at the leading activators of licensing in the United States indicates a significant share of SMEs (more than 60%) over and above the large enterprise (~30%) and start-ups (~10%).

While most IHLs and RIs in Malaysia do engage in significant R,D&C activity, there seems to be a lack of commercialisation enablers for SMEs. SMEs looking into commercialise local R,D&C outcome from the IHLs/RIs or from their own efforts, lack a single window support to productise the research outcome or platform. It is in this regard that a productisation excellence centre is proposed as one-stop-shop for productisation support for SMEs and start-ups.

Additionally, to enable SMEs and start-ups to innovate, it is recommended to provide:

- Income Tax deduction for local companies commercialising local ICT IP; and
- Policy support to start-ups and spin-offs in IHLs.

10   Central Technology Rating & Valuation Body

A significant gap exists in our innovation ecosystem in terms of assessment of technology and the associated valuation of technology. Additionally, with the lack of quality professional services, technology evaluation and valuation is a challenge. This creates potential hurdles for raising funds, most significantly for SMEs and start-ups, with limited proof of their commercial viability, or past track record.

In addition to the above, it is also in Malaysia's long term strategic view that the funding model should gradually transition to enable private sources of funding.

Take a look at KOTEC, a Korean agency that supports technology funding based on its rating and guarantees, provides a possible option relevant in Malaysian context as well. Accordingly, a body for Techno-Commercial rating of technologies is proposed on the lines of KOTEC.

This entity should give ratings to potential and developed IP and technology from technical as well as commercial standpoint. This body is termed as Techno-Commercial Rating Centre (TCRC) for discussion and reference in this Blueprint.

The TCRC key roles are outlined as:

- Develop and adopt a definitive standard for evaluation of IP/technology;
- Obtain buy in from the financial sector for its valuation/rating; and
- Coordinate with government funding schemes to help in commercialisation and IP filing.

An independent body, TCRC is
proposed on the lines of KOTEC
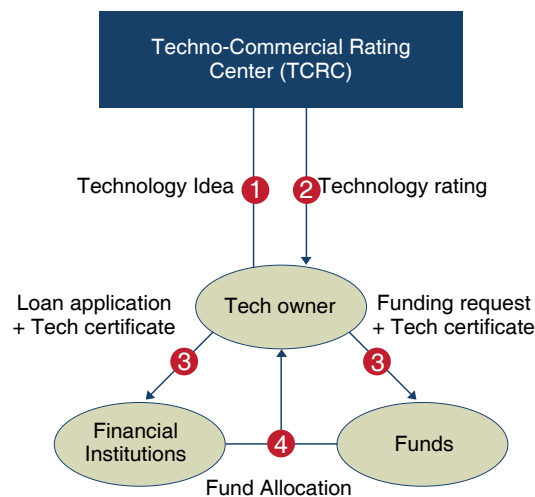
11 Transitioning Existing Funding Model Towards Efficiency

A standardisation of filing funding applications, its approval process, and a monitoring mechanism would ease the entire process of availing research funding.

Accordingly it is proposed that:

- Fund approval panel to have similar mix of industry participants and technical experts prioritise projects with Industry collaboration;
- Commercialisation timeline should be accepted as part of project application and to be stringently pursued via a post-disbursement monitoring system;
- Standardise fund commercialisation definitions across funds; and
- Each application to quote a unique ID from the same system as KRSTE.my.

This will lead to strengthening of existing funding model and provide great amount of support to the research community.

⑫ Local ICT Champions - Promotion, Branding & Go-Global Strategy

The nature of ICT industry in Malaysia is such that it largely comprises small and medium enterprises. Such companies often find it difficult to access overseas market and make their mark due to lack of financial, operational and human resources. It is therefore proposed that a selected group of companies are supported and nurtured over time to go-global and create a brand for themselves and boost the image of Malaysian ICT sector as a whole.

Key initiatives in this regard are suggested as below:

- Branding and showcasing of strengths of ICT in niche technology areas and highlighting adoption of ICT in globally competitive economic areas such as Halal Industry, Islamic Banking and Oil & Gas;
- Promotion of local players in trade fairs, organisation of Business-to-Busines (B2B) match-making initiatives in key regions such in Eastern Europe and Africa, development of an online catalogue and promotion of success stories; and
- Go-Global Strategy in a tiered waves starting with emerging markets like Eastern Europe, Latin America, Africa and selected nations in South East Asia.

These strategies would enable the local champions to be identified as technology leaders. It would also help in establishing 'Made in Malaysia' brand abroad.

⑬ Preference to Local Technology for Procurement by Government and Government-Linked Companies

One of the key issues that is cause of concern for local technology companies is the fact that while procurement of high-technology products is an area of strength for the Malaysian government (Malaysia ranks no. 4 on Government Procurement of High Technology products, one of the factors in WEFs innovation index), the local technology industry does not seem to get any benefits from the same. It is also argued that perhaps the high-technology procurement by the Malaysian government is beyond the required specifications and it is possible for the government therefore to provide some preference to local technology. There exist laws and procedures in many countries (for example China through Government Procurement Law, Brazil through "Buy Brazil Act" Law) that prioritise government procurement of domestically produced goods and services based on certain conditions and criteria.

It is therefore proposed that providing support to locally developed IP with the government sector and Government-Linked Companies (GLCs) should be considered. The same is expected to be accomplished by following:

- Providing preference to products/services leveraging locally developed technology as one of the guidelines for all government and GLCs procurement; and
- All products and services leveraging local ICT to be accredited by a central body to ensure preference is given to relevant companies only.

CONCLUSION

As a conclusion, this Blueprint has bridged the gaps of the National Strategic ICT Roadmap 2008 and Technology Roadmaps by identifying six FAs and it is also supported by 13 SIs to be adopted as well as action plans to establish a sustainable national ICT innovation ecosystem. The ultimate outcome of this blueprint is in line with the aspiration of moving towards a knowledge-based economy and high income nation and more importantly, it is in alignment with the national transformation agenda in delivering greater positive impact on the economic development of the nation.

GLOSSARY

B2B: Busines-to-Business
COP: Community of Practice
DM: Digital Malaysia
EPP: Entry Point Project
ETP: Economic Transformation Programme
FA: Focus Area
GDP: Gross Domestic Product
GIS: Geographic Information Systems
GLC: Government-Linked Company
GNI: Gross National Income
GPS: Global Positioning System
GTP: Government Transformation Programme
IaaS: Infrastructure as a Service
ICT: Information & Communications Technology
IHL: Institute of Higher Learning
IP: Intellectual Property
IT: Information Technology
KOTEC: Korea Technology Credit Guarantee Fund
LBS: Location Based Services
LTE: Long Term Evolution
M2M: Machine-to-Machine Communications
MDeC: Multimedia Development Corporation
MNC: Multi-National Corporation
MOHE: Ministry of Higher Education
MOSTI: Ministry of Science, Technology & Innovation
MPP: Massively Parallel Processing
MSC: Multimedia Super Corridor
NEM: New Economic Model
NFC: Near Field Communication
NKEA: National Key Economic Area
NKRA: National Key Results Area
PaaS: Platform as a Service
PRI/RI: Public Research Institute/Research Institute
R&D: Research & Development
R,D&C: Research, Development and Commercialisation
RFID: Radio Frequency Identification
SaaS: Software as a Service

SME: Small and Medium Enterprises
SI: Strategic Initiative
SRI: Strategic Reform Initiative
TBA: Technology Business Advisory
TCRC: Techno-Commercialisation Rating Center
WEF: World Economic Forum