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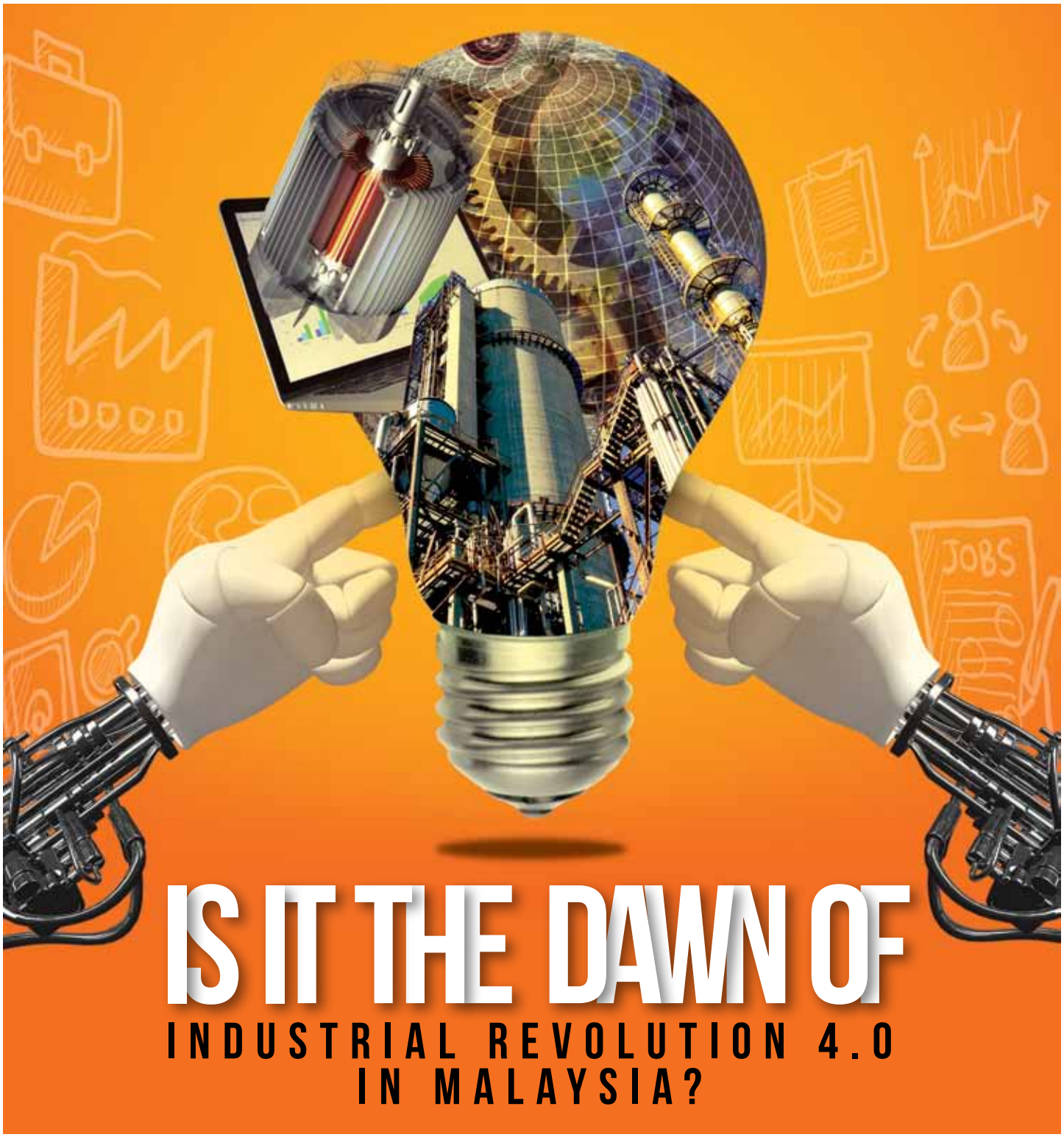

IS IT THE DAWN OF INDUSTRIAL REVOLUTION 4.0 IN MALAYSIA?

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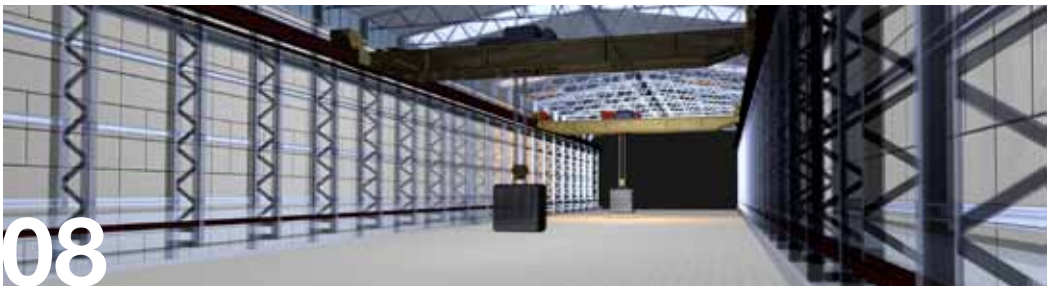
SCIENCE TO ACTION

04/2016

inside myForesight



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myForesight is a pioneering national level initiative dedicated to the prospecting of technology for business through the field of Foresight. It provides a common Malaysian based platform for the Government, Industry and Academia to share experiences, insights and expertise on the strategic futures issues, both at the loyal and global levels.

Its key components to its mission are intelligence, research, competency and community. myForesight® raison d'etre is to accomplish the following:

1. Shaping Malaysia's future possibilities;
2. Promoting and mainstreaming of foresighting in national, sectoral and corporate planning;
3. Identification of key technologies to support sectoral development;
4. Identification of key and potential industries from technology perspective.

EDITOR'S NOTE

Initial Thoughts

by **RUSHDI ABDUL RAHIM** *rushdi@might.org.my*

Greetings and Salutations!

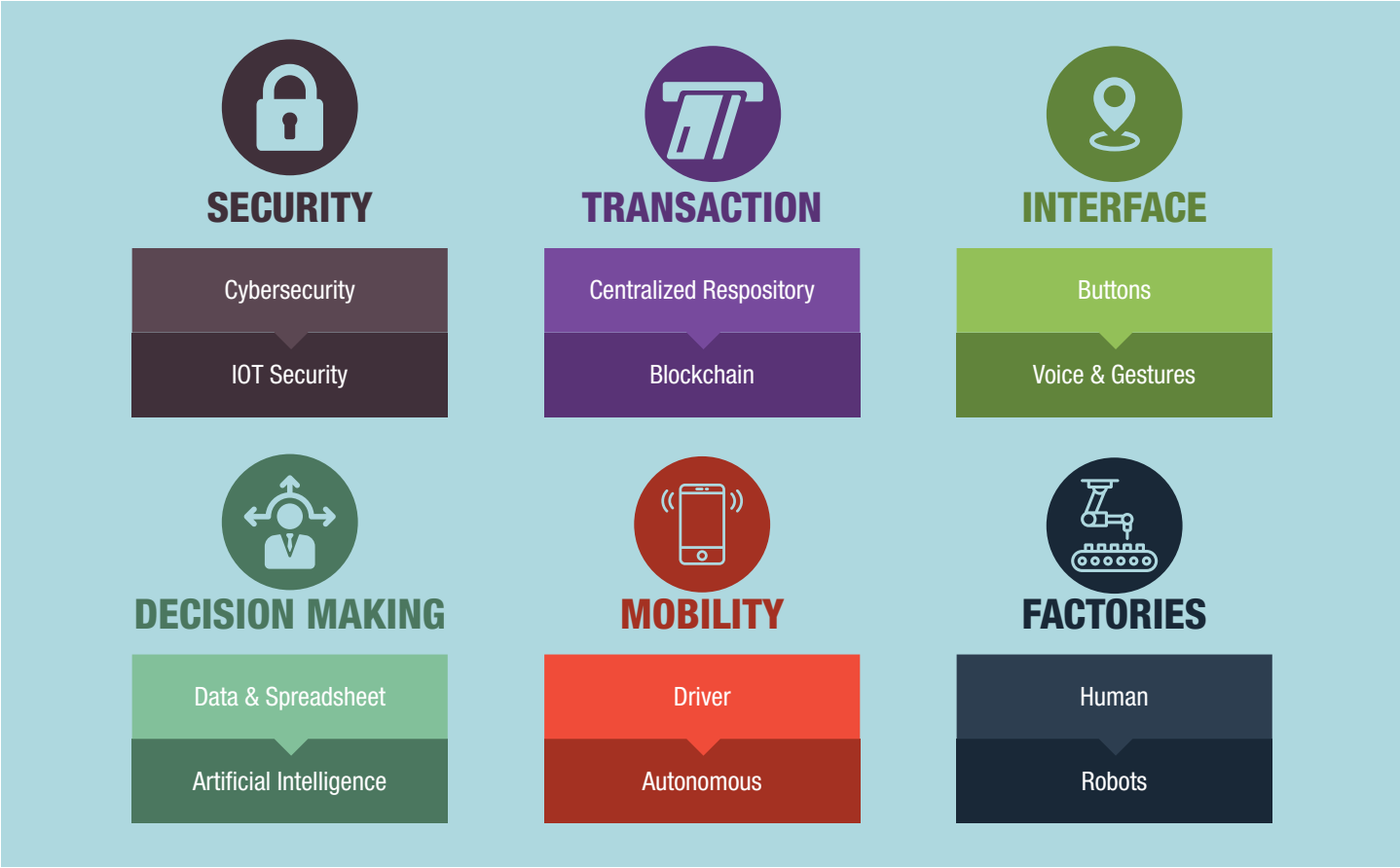
How time flies. I believe by the time you are reading this 2017 will already be upon us. Here, at myForesight® we continue to look ahead and get people to discuss about issues of tomorrow and I am glad that these issues are captured and presented to you in the form of this magazine.

You would have noticed that lately, the news is filled with market opportunities stemming from the buzzwords such as the Internet of Things, Artificial Intelligence, Industry 4.0, and the Digital Economy. Industry 4.0 or The Fourth Industrial Revolution was the centrepiece of conversations at the recently held World Economic Forum on ASEAN in Kuala Lumpur in June.

> **"This will effectively change both the products and services that will be offered, and the processes that is used to generate them, affecting almost every business facet and arenas.**

For the past few months, we here at myForesight® and MIGHT was invited to provide inputs and insights as well as be part of the conversations of how all these buzzwords will affect industry, government and education sectors.

Though few would look at this as a potentially massive opportunity, the majority of organizations are unprepared for how the fourth industrial revolution would transform their business or services. This will effectively change both the products and services that will be offered, and the processes that is used to generate them, affecting almost every business facet and arenas.



This is exemplified in the above diagram.

What the fourth industrial revolution does now is creates massive uncertainty. Government, business enterprises and education institutions are now looking at how best they could react towards this. Now, what's best to deal with uncertainties but through the use of foresight?

Therefore, this edition provides just the tip of the iceberg on discussion of impact on the fourth industrial revolution.

The cover story is by Dr. Ibrahim. His experience working as a senior official with the Economic Planning Unit, Ministry of International Trade & Industry as well as the Ministry of Science,

> **What the fourth industrial revolution does now is creates massive uncertainty.**

Technology & Innovation put him in a well-placed position to provide his thought on this subject matter on how this will affect government, policies as well as competitiveness. Another highlight is the insights provided by Razman of Aerospace Malaysia Innovation Center (AMIC) on the work done by AMIC in the area of virtual reality. We have also provided a compilation of insights by our analyst in the area of financial transaction whereby Blockchain has become quite a conversation starter as well as assistive technology through the use of various integrated technology.

As always, we hope you find the magazine beneficial and thought provoking.

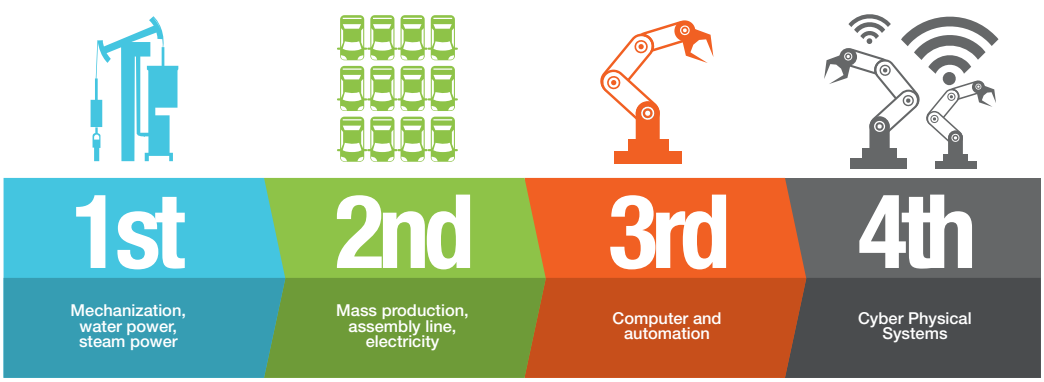
We expect you to have your opinion on certain matters. We want to hear them. We welcome your feedback, opinion piece and article contributions.

Rushdi Abdul Rahim

COVERSTORY

IS IT THE DAWN OF INDUSTRIAL REVOLUTION 4.0 IN MALAYSIA?

by **Dr. Ibrahim Abu Ahmad,** *Senior Associate, MIGHT*



After been watching many sci-fi movies on robots, androids and humanoids like the Ex-Machina, Spare Parts and The Avengers: Age of Ultron, some of us may dreaded the moments where these artificial intelligences would one day "control" and turn against their own creators. Others may view otherwise and look forward with great expectations. Their existence is inevitable as we progress technologically. They would become the new normal

to have amongst us, humans. Not only would they impact the way we live, work and play, they may even dictate how we should behave and adapt to the new way of life.

This sci-fi thing should get us thinking about the distant future. The future where the world would be technologically sophisticated and highly complex. The world will be so wired up. It will also be so integrated, physically and digitally, that we would find it difficult to separate and differentiate between "what is real" and "what is not". The mantra of this new technological era will be "convergence". The convergence of the physical and virtual technologies that would either be a blessing or a nightmare to some. It could either simplifies or complicates matters. Depending on their applications and the intended usage, it could be a boon or doom.

The beginning of such a journey towards a new technological age or revolution is evidently apparent with the announcement at the World Economic Forum (WEF) Conference in January 2016. The Conference has ignited a profound interest on the dawn of the "Fourth Industrial Revolution" or commonly known as "Industry 4.0". It's now on everyone lips, so to speak. Hotly debated at the international and regional fora, many so-called pundits and scholars have been offering their own thoughts, interpretations and prescriptions of what exactly the world should expect and react, and why should we as a global community cares its coming. Hopes also run high among the developed and advanced economies that are technologically ready or fully-equip to take advantage of or to be the potential beneficiaries of the new revolution. The less technology advanced economies, not wanting to be left behind, are busily preparing themselves too in joining the race.

> **"All these past industrial revolutions are fundamentally transformational in nature.**

But some contended that this intensely debatable topic: "Fourth Industrial Revolution" or "Industry 4.0", is not entirely fresh or new. It has been around since 1940, based on a document titled "America's Last Chance" by Albert Carr. Some were of the views that it has been made new or re-born by the WEF boss, Prof. Klaus Schwab. Using it as the central theme of the WEF 2016 Conference, he made it clear to the global business leaders, heads of state, public intellectuals, and NGO's on the dawn of the new industrial revolution. So 2016 is the year that make public on the arrival of the industry 4.0., soon to replace industry 3.0. that emerged about four decades ago.

According to Schwab, the First Industrial Revolution that began in 1784 has benefitted mankind greatly through the introduction of the steam engines and mechanized production processes to the world. Close to a century later, the electric power and mass-production processes were introduced and this period was then known as the Second Industrial Revolution. The Third Industrial Revolution saw the entrance of the digital technology and "now a Fourth Industrial Revolution is building on the Third" and "characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres", as argued by Schwab. All these past industrial revolutions are fundamentally transformational in nature. They have huge impacts on the humankind, socially and economically. In other words, they have revolutionised and transformed the global economy and brought immeasurable benefits to the humankind. At the same they have caused havoc and irreversible damages to our blue planet, earth.

Coming closer to home, we also have readily accepted the advent of industry 4.0. As reported in "2016 GE Global Innovation Barometer" recently a "significant number of Malaysian executives are more positive about entering the fourth industrial revolution as compared to their peers globally." Though globally, the U.S., Germany and Japan remained as the top three leading innovation champions, surprisingly Malaysia, together with other countries such as Australia, Canada and Switzerland, emerged as one of the new entrants to the list. This is a piece of good news for the country. But the GE Global Innovation Barometer survey reported that the Malaysian businesses only favoured incremental innovation and internal innovation in terms of their innovation strategy, quite a stark contrast to their global peers. It is also revealed talent remained the main challenge for the country. However, Malaysia's future productivity growth is highly dependent on the capability of the workforce to innovate and apply advanced knowledge and technologies. The issue of human capital development is critical to ensure long-term sustainable economic growth and development.

We have our Third Industrial Master Plan 2010-2020 (IMP3) and the new STI policy (2013-2020) to assist and to propel the country into the new era of industry 4.0. IMP3 has been executed half way now and the new STI implemented about 3 years ago. But none of the Plan and the policy documents have

[1] GE's Global Innovation Barometer is an international survey which takes place across 23 countries, gathering perceptions of innovation in the world today. The recently compiled fifth edition of the barometer gathered insight from over 2,700 innovation business executives and nearly 1,350 innovation educated members of the public to deliver a comprehensive report on the global perception of innovation.

specifically mentioned about preparing or building the country's economy based on industry 4.0 though undeniably there are some elements or dimensions in these two documents reflecting such move towards it. For example, in IMP3, it's about going for transformation. Since the theme of IMP3 was "Malaysia - towards global competitiveness", it reflected the country's natural progression and its next destination of becoming a high income and advanced economy by 2020 through greater utilisation of technology and heavier emphasis on product or process improvement via R&D.

Looking back on the performance of first two industrial master plans, IMP1(1986-1995) has laid down the foundation for the development of the manufacturing sector, which became the leading growth sector of the country's economy. IMP2 (1996-2005) with its two key thrusts, "manufacturing plus-plus and cluster-based industrial development", has somehow deepened the development of the manufacturing sector which led to increased value-added activities, enhanced productivity, greater industry linkages as well as growth of manufacturing-related services. Now IMP3 aimed to improve the country's global competitiveness by moving the economy up the value chain beyond the "middle development" stage to a more productive, value-added and knowledge-intensive stage.

We can see that the period of IMP1 is akin to the era of second industrial revolution with mass production at its core. While the period of IMP2 sort of reminiscing the age of third industrial revolution with greater automation and rising application of the digital technology. These industrial transformations in the last three decades is currently being spiced up with a tinge of industry 4.0. Advanced intelligent (AI) and robotics, cloud computing, the internet of things (IOT) and the like, including advances in biotechnology are some of the areas that are actively been on-going in the recent years.

Similarly, the new STI policy put emphasis on the importance of science, technology and innovation (STI), particularly in facing the rapid changes of a globalised and competitive world. Realising that innovation-led growth is central to propel the nation forward, it is imperative that STI be strengthened and mainstreamed into all sectors and at all levels of national development agenda. The clarion call by our Prime Minister at Global Science International Advisory Council (GSIAC) in London recently spoke highly on the needs for the country to be industry 4.0 ready. This call was reiterated at the recent National Science Council (NSC) Meeting in August 2016. The new STI Master Plan, now on the drafting table, will be without doubt, incorporate the industry 4.0 elements. For sure, the new STI Master Plan will be transformational and a game changer too. More importantly, the Plan's prescriptions should be "characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres". Nothing less, we should expect.

> **"The government welcomes suggestions on how best to facilitate more manufacturers to automate and embrace the fourth industrial revolution**

On the state of country's readiness, it is self-evident, based on its international competitiveness, as depicted by the diagram below.
The government welcomes suggestions on how best to facilitate more manufacturers to automate and embrace the fourth industrial revolution in relation to tax incentives. In the recent MITI dialogue with the Federation of Manufacturers of Malaysia (FMM), it was reported that most manufacturers are aware of the Industry 4.0 concept, but only 30 per cent have started to invest and leverage on modern technology. If Malaysia is to compare itself with countries in terms of high-tech exports, the country was ranked 11th in the world in 2014 with USD63.38billion. The top three global exporters of high-tech were China (USD558.61b), Germany (USD199.72b) and Hong Kong (USD192.72b). Our neighbour, Singapore, was ranked fifth, after USA, at USD137.37b. In this respect, Malaysia has made a remarkable progress in the high tech industries with the help of foreign direct investments (FDI). But then again some people would say that a major portion of those exports though "Made-in Malaysia," they are not actually "true Malaysian" products. Most of them are made by or for MNCs in the country. Our former Prime Minister, Tun Mahathir, was among those hard critics. However, others would argue otherwise. They contended that we should be proud of ourselves since we have shown our capabilities in making those high-tech products through our own skilled-labour force. We should

bear in mind that high-tech exports are products of high R&D intensity such as in aerospace, computers, pharmaceuticals, scientific instruments and machinery.

Admittedly, we are already entering the path of the fourth industrial revolution. However, reflecting on the recent past growth performance of the country, there is no denying that Malaysia has continued to perform below its potential since the onslaught of the Asian Financial Crisis. It failed to achieve the sterling pre-Crisis growth of over 8 per cent per annum. Post Crisis growth rate has just been averaging at 5.5 per cent annually. Arguably, as the economy matures, one would not expect it to grow faster anymore. Around 4 to 5 per cent growth will be the new norm for the country, others opined.

> **How to get the private sector to be the real engine of growth in the fourth industrial revolution?**

Nevertheless, one of the greatest challenges currently facing the country today is how to facilitate greater involvement of the private sector in driving economic growth in the age of Industry 4.0. Today we continued to witness some volatilities in world trade. Growth in world trade is predicted to be at 2.8 percent this year, lower than previous forecast of 3.9 percent by World Trade Organization (WTO). The same goes to the global banking and monetary systems which are still on the mend since 2008 Global Economic Crisis. The impact of the global crisis is felt even today and is affecting Malaysia's growth outlook and exports through the country's exposure to the world economy via trade. This is quite a worrying situation since the manufacturing sector accounts for 75 per cent of the country's exports and 30 per cent of GDP and employment. If services and other sectors are taken into account the overall impact will be much greater.

Another big challenge for the country is that it aspires to become a high income country by 2020, a matter of five years down the road. Though the private sector has been identified as the primary engine of economic growth, a key challenge remains: How to get the private sector to be the real engine of growth in the fourth industrial revolution? It's important contribution to new job creation, sustainable economic growth, creation of a new breed of entrepreneurs, and the development of a new economic landscape is beyond doubt. But the country must ensure that it is truly happening.

In the current economic uncertainties, the building blocks for the country's new industry 4.0 would initially needs to "stress more on an economy than could reduce the country's vulnerability to the global economic crisis." Within the scheme of the building blocks all angles must be covered. Ultimately, it should match perfectly with the 1Malaysia concept, a guiding principle to build a united and progressive Malaysian nation in the 21st century and beyond, as stated in the 11th Malaysia Plan. Its significance was once echoed by Prof. Edward C. Prescott, a Nobel Prize winner in economics and a member of the World Bank expert team, who was quoted to have said that "while the country was moving up, it needed the commitment of the people."

A daunting task though. Yet it's workable, if we can rally the consensus of the people with the full commitments of the private sector. If that happens, Industry 4.0 is within our reach folks!

High-technology exports (current US$)

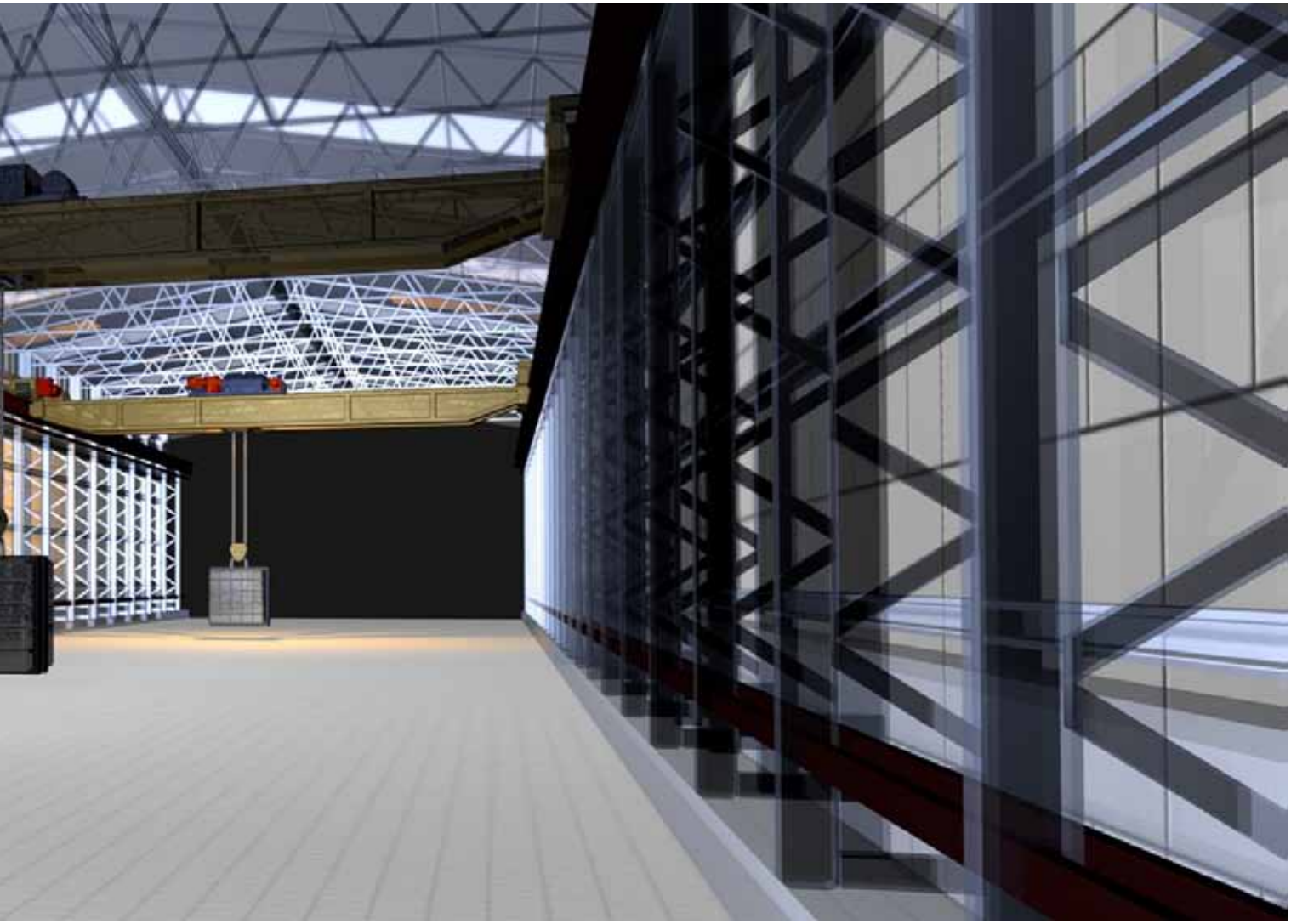
	Country	2014	2012	2011	2010
1	China	558,605,991,980	505,645,680,350	457,106,558,431	406,089,687,684
2	Germany	199,718,151,684	187,015,792,743	183,371,439,118	158,507,039,742
3	Hong Kong SAR, China	192,718,805,476	841,460,390	805,496,960	1,105,610,241
4	United States	155,640,595,588	148,330,989,468	145,638,600,147	145,932,689,277
5	Singapore	137,369,116,389	128,239,439,593	126,434,946,962	126,981,502,643
6	Korea	133,447,400,828	121,312,606,727	122,021,442,532	121,478,141,990
7	France	114,697,237,252	108,585,750,298	105,761,429,426	99,735,768,592
8	Japan	100,954,836,424	123,411,773,351	126,477,503,562	122,102,186,970
9	United Kingdom	70,652,924,421	67,786,969,582	69,611,885,161	60,172,818,879
10	Netherlands	70,308,349,003	63,963,116,660	67,147,867,601	59,509,788,717
11	**Malaysia**	**63,376,041,042**	**61,228,924,357**	**61,126,964,506**	**59,331,817,835**
12	Switzerland	55,906,710,140	50,098,542,757	50,124,292,139	42,679,710,697
13	Mexico	49,402,709,617	44,021,894,972	40,795,383,584	37,657,285,550
14	Belgium	43,698,592,018	36,503,921,134	34,680,646,884	31,948,749,412
15	Thailand	34,992,376,969	33,767,674,064	33,264,733,346	34,156,221,484
16	Canada	31,552,262,953	29,087,234,635	25,017,006,457	23,963,441,244
17	Vietnam	30,863,791,585	16,259,339,193	9,118,403,941	4,020,110,739
18	Italy	30,744,972,831	27,525,718,963	31,191,607,345	26,419,456,970
19	Philippines	23,839,225,492	20,795,049,384	12,949,169,027	16,071,867,452
20	Czech Republic	23,084,215,820	22,007,809,307	23,365,827,816	17,468,785,927

Source: World Development Indicators (WDI), July 2016

INSIGHTS

Virtual Reality Application and INDUSTRY 4.0

by **Razman Shah Rajab,** *CEO of Aerospace Malaysia Innovation Centre (AMIC)*



Virtual Reality (VR) application has been in used for quite some time but, lately, it has gained momentum due to the advancement of the technology and, most importantly, the steep drop of the price for mass consumers to own a VR equipment. A Head Mounted Display (HMD) set, together with its application, is already available through Oculus Rift, HTC Vive and Google Cardboard. Sony Project Morpheus will also be joining the fray later in 2016.

Although all these applications are meant for the gaming industry, real world application can also benefit from this advancement.

> **"The technology of Virtual Reality today will bring an entirely new experience by transporting the user to an immersive digital environment.**

For example, in the architecture industry, the majority of construction projects in Malaysia still rely on 2D drawings and mock-ups to demonstrate their ideas. A step-up would be to model all the objects in a CAD software and view everything from a computer monitor or projector. The technology of VR today will bring an entirely new experience by transporting the user to an immersive digital environment where the user will think that he/she is really facing the model and is able to interact with the digitized construction.

The most important component of a VR setup is the viewing experience. To make it immersive, a user needs to be able to see everything in 3D. The conventional 3D glasses from a cinematic experience found in the movie theatre does not equate to the Virtual Environment (VE) viewing experience. This is because in a VE, the picture projected on the screen is not only in 3D (as per the cinema experience), but the viewing frustum will be adjusted according to the intended viewer movement (limited to one viewer at a time). The objects projected on the VE screen also needs to be in 1 to 1 ratio to the actual real life size of the objects.

There are three methods

most used in a VE, which is i) HMD; ii) power wall; and iii) CAVE (Computer Aided Virtual Environment) or multiscreen projection. There are pros and cons for each method. The HMD is the cheapest, but it has the shortest duration before an average user gets 'cyber sickness'. The CAVE which consists of at least 3 screens; front, left and right screen will give maximum immersiveness but only organisations with generous budgets would be able to implement such configuration. Thus, the power wall which consists of one big screen is the usual way for organisations to carry out its VR projects. A combination of a power wall and HMD called the 'Collaboration' mode is used in certain environment. In this mode, the user with the HMD will be immersed in the VE, but observers outside the system will be able to view his working environment via the power wall display.

A decent VR system will allow navigation and manipulation of the objects using a device commonly known as a flystick. There are also trackers and markers to keep track of the user movement in the VE. In an ergonomics related project, markers are attached to strategic parts of the human body so that the VR system can keep track of the user's postures while he is performing a task.

Aerospace Malaysia Innovation Centre (AMIC) has already implemented a VR system which consists of a power wall, combined with a HMD. Six infra-red cameras are used as the tracking mechanism. A very important equipment at AMIC is the 6DOF haptic arm which is used in the VIRISTAM project to imitate the force feedback of an applied force. VIRISTAM, short for 'Virtual Reality Immersive System Training for Aerospace Manufacturing' is a project to produce validated innovative training using VR as its tools for manufacturing tasks such as the drilling of a composite panel. The haptic arm end-effector will act as a driller tool, whereas a human driller will be immersed in VE that imitates their working environment in a factory. The haptic arm will give feedback to the user performing the drilling task. This involves complex mathematical calculation to be embedded in the logics of the haptic arm. The VR system will be able to generate coordinates in the 3D space which will be used to analyse the performance of the driller. This project is currently going through the validation phase where expert drillers from the industry are testing the system, and data are being collected for qualitative and quantitative measurement of the system.

> **"A decent Virtual Reality system will allow navigation and manipulation of the objects.**

iFactory 4.0 used to demonstrate CPS to the students at the German Malaysian Institute (GMI)

Another project by AMIC which is taking full advantage of this technology is the '3D Shopfloor Virtualisation and Optimisation' project. AMIC is collaborating with one of the leading aerospace company in Malaysia in its factory expansion program. As mentioned previously, from the architectural point of view, this project would allow stakeholders to view the design as if they were inside the factory even before the actual construction begins. The approval of the design would be much faster and costly mistakes could be avoided. From the engineering point of view, the feature that would be implemented is the space optimisation calculation. The VR system would capture the coordinates and the envelope of all the equipment, furniture, and everything that would be placed in the factory. Based on the data, the system would be able to calculate the best layout for space optimisation. Additional features that would be implemented are the feasibility study of the movement in the factory i.e analysis of forklift pathway and the possibility of collision, and the simulation of natural lighting from the movement of the sun.

> **"In Industry 4.0, the concept is to have the machines interconnected via network or the internet, thus the term 'Cyber Physical System' (CPS) is used to represent the idea.**

AMIC is also jumping on the international bandwagon, and is championing to accelerate Malaysia into the Industry 4.0 revolution in the aerospace arena – as part of its Factory of the Future research theme. In July 2016, the 'Virtual Reality Online Robot' project was launched, marking it as the first project which could truly be characterized as an Industry 4.0 type project within AMIC. The objective is to create a virtual robot, so that an actual physical KUKA robot will be able to imitate the movement of the virtual robot. A typical application is in the painting task whereby an expert can perform complex painting in the virtual environment, but the actual work takes place at another site connected by the internet. The Robot Operating System (ROS) nodes would act as the interface to create seamless connection between all the machines. The physical KUKA robot would also be able to detect if there are any objects, or human workers obstructing the intended path while processing data from sensors, trackers and markers. A special algorithm would be built to recalculate the next best path to get to its position without compromising the safety rules and guidelines.
In Industry 4.0, the concept is to have the machines interconnected via network or the internet, thus the term 'Cyber Physical System' (CPS) is used to represent the idea. Data that are collected from the machines are analysed and turned into useful information for human or other machines to make timely and accurate decision to improve the process. In German Malaysian Institute (GMI), an institute of higher learning specialised in manufacturing, a project named iFactory 4.0 is used to demonstrate CPS to their students. In this project three plastic moulding machines are connected to an intelligent system. The system would collect data related to the state of the machine such as operation hours, maintenance, and down time. From this data, the system would be able to generate vital information such as 'Mean Time Between Failures' (MTBF), 'Overall Equipment Efficiency' (OEE), and produce the analysis of the root cause of machine failures. These data would be saved in the clouds, giving the management instant access to the information. The access to this information via the web is secured as users must have proper identification, authorisation and go through sufficient authentication process to ward off any potential cyberattack.

The move towards Industry 4.0 is unavoidable. AMIC, in collaboration with leading universities and other industry players will ensure that we are not left behind. The mastery of VR and other technology, as mentioned above, will be crucial in achieving that target. AMIC will continue to strive for excellence and making research, technology and innovation as the key enabler to keep Malaysia competitive in the region and technologically advanced to face new challenges in the future.

VIEWPOINTS

Digitisation of Financial Transactions:

CASHLESS SOCIETY AND BITCOIN FOR MALAYSIA

by **Mastura Ishak,** *mastura@might.org.my*

DIGITAL PAYMENTS FOR MALAYSIA

Whenever Malaysians are reminded to change our debit and credit cards into pin-enabled version before 1 January 2017, we should realise that it is a step closer towards building Malaysia as a cashless society by 2020. Under the Malaysia Financial Sector Blueprint 2011 – 2020, Malaysia is targeting to increase the number of electronic payments per capita from 44 in 2010 to 200 by 2020, which is comparable to the e-payment transactions per capita of the more developed countries. [1] In the works, the industry-wide PIN & PAY initiative will ensure that all cards transactions in Malaysia will be based on PIN only beginning 2017. [2] Towards 2020, Malaysia is looking at the mainstreaming of mobile wallet. as depicted in the graphic below. [3]

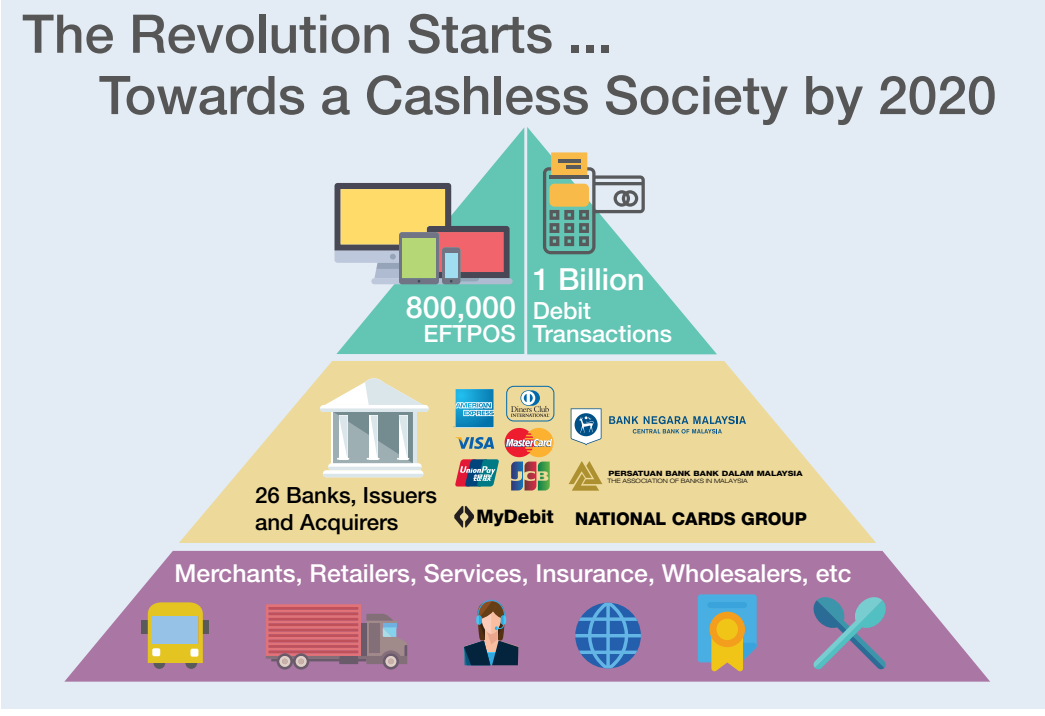


Figure 1

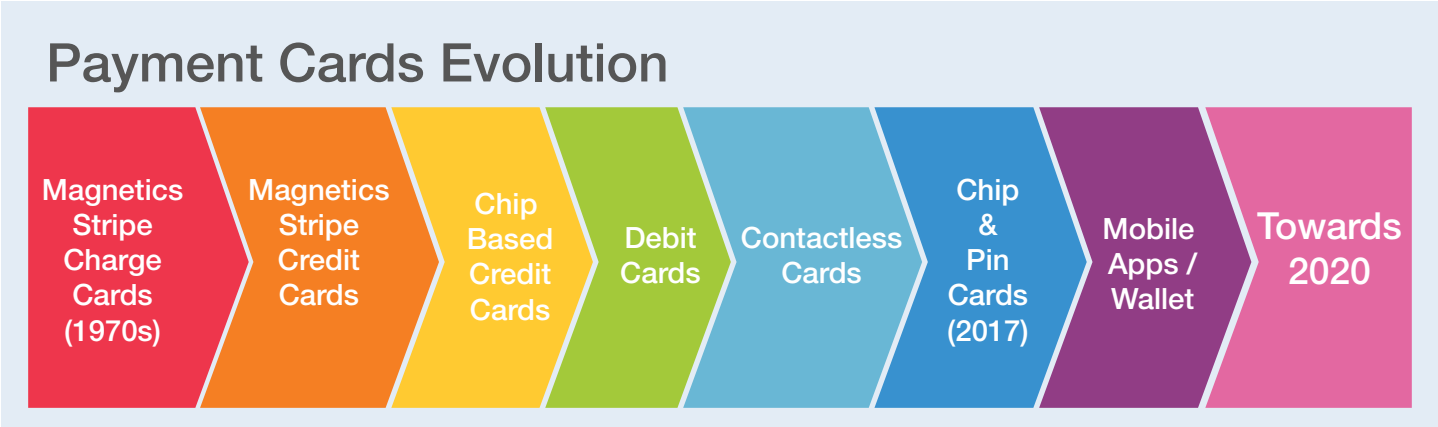


Figure 2

Essentially, cashless transaction in Malaysia is still in infancy Malaysia's southern neighbour, Singapore, registered a 61% cashless transaction in 2016, while Malaysia reported a mere 1% usage. (refer infographic below).

The huge gap has led to efforts by the banking and payment industry to introduce the electronic payments to the rakyat affecting changes to the most common payment instruments, i.e credit, charge and debit cards for biggest impact. As detailed in the data below, credit-oriented transactions dominates the Malaysian e-payment landscape, with e-money in particular, trailing at a distant. [5]

Figure 1 : E-payment targets for Malaysia 2020.
Figure 2 : Payment instruments Towards 2020
Source : Perry Ong, National Card Group

YEAR	CREDIT CARD (RM Billion)	CHARGE CARD (RM Billion)	DEBIT CARD (RM Billion)	E-MONEY* (RM Billion)
2014	105.5	8.6	14.8	5.3
2015	112.7	8.9	20.0	6.0
Q12016	29.0	2.4	5.5	1.8

Table 1: Payments by e-money in Malaysia
**In the Malaysian context, e-money include e-purse initiatives, e.g. Touch and go and MEPS cash.* [4]
Source: http://www.bnm.gov.my/payment/statistics/pdf/02_epayment.pdf

IS DIGITAL MONEY REAL MONEY?

"Money" or more precisely, fiat money as we know it, is not a store of value [3] . It is a claim upon value. Money is technology. While the role remains the same, what we're witnessing is the change of instruments.

In the long history of money, human have been changing their payment instruments by adopting technologies that provide preferred convenience & ease of transaction. Shells were superseded by coins, printing press made possible paper money that replaced coins, e-banking relegates cheques into a smaller role, and now contactless payment is already making ways to replace cash. Although contactless and mobile wallet currently sounds like the future, we should expect other changes in the future.

A FAIRLY RECENT INNOVATION

Globally, there are other changes that are taking place where digital money is concern. Unlike the above changes, it is taking place outside the "fiat money" system. It is called cryptocurrency or digital currency, and the first to bring about this change is called "Bitcoin".

Although cryptocurrency has not developed substantially in Malaysia, Bitcoin and the underlying technology of public "Blockchain" are undergoing a very dynamic phase worldwide under the banner of financial technology or "fintech". Bitcoin was introduced in 2008 by an unidentified entity named Satoshi Nakamoto. Bitcoin is an alternative electronic and mathematic -based payment system that thrives on privacy-where IDs are used in place of individual names. Users are identified through digital wallet. It is independent of any central authority – "decentralise", immutable, more or less instantly, with very low transaction fees throughout the world. Fundamentally the concept of "trust" underlines the Bitcoin technology and digital currency economy.

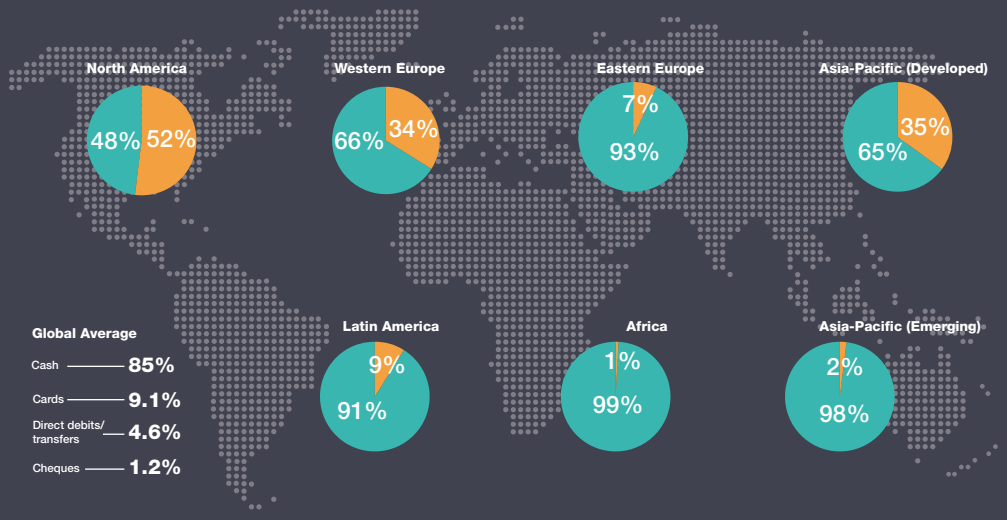
The first Bitcoin exchange, Bitcoin Market was established in 2010 and the first famous pizza transaction took place on 22 May 2010 at 10,000 bitcoin – valued then as USD25 and USD4.4million on its 2016 anniversary. The bitcoin protocol however, limits the number of bitcoin to be created by miners to 21 million, effectively closing the quantitative easing option available in the fiat monetary system. (full history at http://historyofbitcoin.org/) Bitcoin adoption is still considered in infancy. Currently, including Bitcoin which accounts for approximately 80% of cryptocurrencies transaction, there are 697 currencies trading globally. [6]

Besides playing the role of alternative currency (digital currency or crypto currency) and a means to minimise transaction costs, it has been mentioned as safe haven asset - the value increased substantially during the devaluation of Yuan and Brexit [7] . On a different front, it has also been highlighted as a way to financial inclusion

Going Cashless Around The World

Global Payments
Proportion of Cash and Non-cash Payments

Cash · Non-cash



Global Average

Cash	85%
Cards	9.1%
Direct debits/ transfers	4.6%
Cheques	1.2%

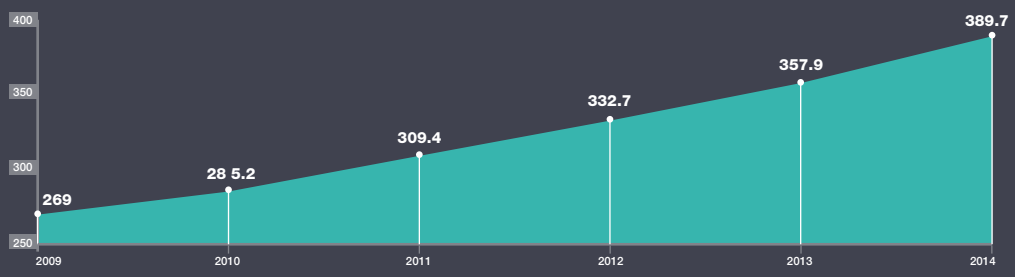
Source: McKinsey/Capgemini

Countries with the Highest Proportion of Cashless Transactions
Based on Consumer Payment Transactions

1 Advanced	
Singapore	61%
Netherlands	60%
France	59%
Sweeden	59%
Canada	57%
Belgium	56%
United Kingdom	52%
2 Tipping Point	
United States	45%
Australia	35%
Germany	33%
South Korea	29%
3 Transitioning	
Spain	16%
Brazil	15%
Japan	14%
China	10%
4 Inception	
UAE	8%
Taiwan	6%
Italy	6%
South Africa	6%
Poland	5%
Russia	4%
Mexico	4%
Greece	2%
Columbia	2%
India	2%
Kenya	2%
Thailand	2%
Malaysia	1%
Saudi Arabia	1%
Peru	1%
Egypt	1%

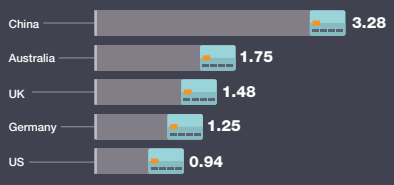
Source: Mastercard Advisers/McKinsey

Number of Cashless Transactions Worldwide (BN)

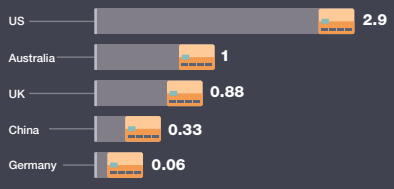


Source: Capgemini 2015

Debit Cards Per Head



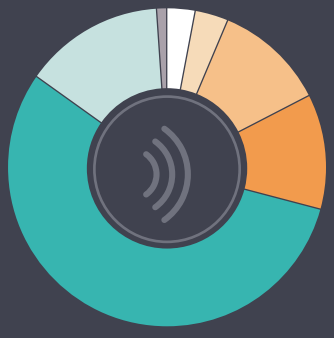
Credit Cards Per Head



Source: European Central Bank/Bank of International Settlements

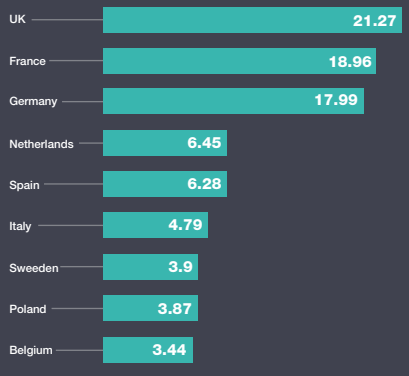
Contactless Cards Issued by Region

Africa & Middle East · Rest of Asia-Pacific · Far East & China · Latin America · Western Europe · Central & Eastern Europe · North America



Source: Juniper Research 2014

Top European Countries for Cashless Payment Transactions (£BN)



Source: European Central Bank 2015

Source: http://raconteur.net/infographics/going-cashless-around-the-world?

for the unbanked by facilitating remittance, such as the case for many overseas foreign worker (OFW) from developing countries sending money to their families. [8]

Bitcoin enables individuals and businesses which enables individuals and businesses to make direct peer-to-peer payments without using banks or other financial intermediaries. Bitcoin is therefore a channel for financial disintermediation. Much more interest have developed in the underlying blockchain technology itself, with applications being developed beyond the confines of financial ecosystem itself.

BITCOIN IN MALAYSIA

Bitcoin enables individuals and businesses to make direct peer-to -peer transactions in minutes and like other digital transactions are not limited by geographical boundaries. It is not surprising that the ease of use have elevated the bitcoin transaction in China, whereby the Chinese Bitcoin exchanges now account for over 90 percent of global Bitcoin trading activity and approximately half of all global Bitcoin mining activity. [9] The transaction into Bitcoin monitoring is available at http://fiatleak.com/ What this means for Malaysia is the increasing impact on the Malaysian SMES trading with Chinese traders with the preferred option to trade in Bitcoin. This effect has been noted by Malaysia's first Bitcoin exchange, Bitx which transact in Ringgit (https://www.bitx.co/in/my/en/). [10] With China's position as Malaysia's biggest trading partner, Bitcoin transaction has the potential to help expand the bilateral trade between the two countries by facilitating the remittance, particularly for SMEs. Bitcoin transactions in Malaysia is increasing, with an average value of RM 14 million per month, compared to an average of RM100,000 per month in 2015. [11] The rise in value may not solely due to the rise in volume, as the value of Bitcoin price was lower as of December 2015 at USD428.61 compared to the current value of USD576.59 (August 20th 2016) [12], a percentage is also attributed to price increase per unit. What's definite is that there is an increase in interest and value for Malaysians to know and to start contemplating on the using an alternative digital currencies as a way of exchanging value.
In finance this is called keeping one's eggs in multiple baskets.

> **"Money is also technology. It means the role of both fiat money and digital currencies remains the same, and what we're witnessing is the change of instruments.**

WHAT'S NEXT

Besides Fiat currencies, digital non-fiat currencies, comes the "Utility Settlement Coin" (USC) developed by a consortium of banks led by UBS of Switzerland. It is a digital cash equivalent of each of the major fiat currencies backed by central banks rather than a decentralized new digital currency such as bitcoin. The USC would be convertible at parity with a bank deposit in the corresponding currency, making it fully backed by cash assets at a central bank. [13]
The Bitcoin and the underlying blockchain technology has opened up a new thinking and pathway about the way people CAN do their financial transaction. It is up to us to find out the better option by opening up to the new ways.

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3. Payment Cards in Malaysia : Redefining the Way to Pay, Mr. Perry Ong Chairman, National Cards Group (NCG) Payment System Forum and Exhibition 2014 Sasana Kijang, Kuala Lumpur 27 November 2014
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THE BASIC LANGUAGE OF BITCOIN

https://bitcoin.org/en/vocabulary

Address

A Bitcoin address is similar to a physical address or an email. It is the only information you need to provide for someone to pay you with Bitcoin. An important difference, however, is that each address should only be used for a single transaction.

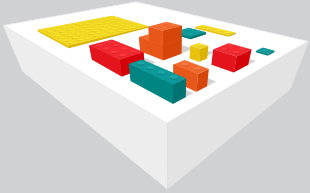
Bit

Bit is a common unit used to designate a sub-unit of a bitcoin - 1,000,000 bits is equal to 1 bitcoin (BTC or ฿). This unit is usually more convenient for pricing tips, goods and services.

Bitcoin

Bitcoin - with capitalization, is used when describing the concept of Bitcoin, or the entire network itself. e.g. “I was learning about the Bitcoin protocol today.” bitcoin - without capitalization, is used to describe bitcoins as a unit of account. e.g. “I sent ten bitcoins today.”; it is also often abbreviated BTC or XBT. Bitcoins can be divided into smaller parts (the smallest divisible amount is one hundred millionth of a bitcoin and is called a ‘Satoshi’, after the founder of bitcoin).

Block



A block is a record in the block chain that contains and confirms many waiting transactions. Roughly every 10 minutes, on average, a new block including transactions is appended to the block chain through mining.

Block Chain

The block chain is a public record of Bitcoin transactions in chronological order. The block chain is shared between all Bitcoin users. It is used to verify the permanence of Bitcoin transactions and to prevent double spending.

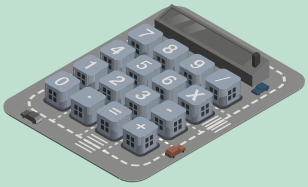
BTC

BTC is a common unit used to designate one bitcoin (฿).

Confirmation

Confirmation means that a transaction has been processed by the network and is highly unlikely to be reversed. Transactions receive a confirmation when they are included in a block and for each subsequent block. Even a single confirmation can be considered secure for low value transactions, although for larger amounts like 1000 US$, it makes sense to wait for 6 confirmations or more. Each confirmation exponentially decreases the risk of a reversed transaction.

Cryptography

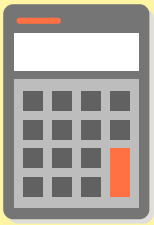


Cryptography is the branch of mathematics that lets us create mathematical proofs that provide high levels of security. Online commerce and banking already uses cryptography. In the case of Bitcoin, cryptography is used to make it impossible for anybody to spend funds from another user’s wallet or to corrupt the block chain. It can also be used to encrypt a wallet, so that it cannot be used without a password.

Double Spend

If a malicious user tries to spend their bitcoins to two different recipients at the same time, this is double spending. Bitcoin mining and the block chain are there to create a consensus on the network about which of the two transactions will confirm and be considered valid.

Hash Rate

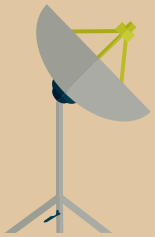


The hash rate is the measuring unit of the processing power of the Bitcoin network. The Bitcoin network must make intensive mathematical operations for security purposes. When the network reached a hash rate of 10 Th/s, it meant it could make 10 trillion calculations per second.

Mining

Bitcoin mining is the process of making computer hardware do mathematical calculations for the Bitcoin network to confirm transactions and increase security. As a reward for their services, Bitcoin miners can collect transaction fees for the transactions they confirm, along with newly created bitcoins. Mining is a specialized and competitive market where the rewards are divided up according to how much calculation is done. Not all Bitcoin users do Bitcoin mining, and it is not an easy way to make money.

P2P



Peer-to-peer refers to systems that work like an organized collective by allowing each individual to interact directly with the others. In the case of Bitcoin, the network is built in such a way that each user is broadcasting the transactions of other users. And, crucially, no bank is required as a third party.

Private Key

A private key is a secret piece of data that proves your right to spend bitcoins from a specific wallet through a cryptographic signature. Your private key(s) are stored in your computer if you use a software wallet; they are stored on some remote servers if you use a web wallet. Private keys must never be revealed as they allow you to spend bitcoins for their respective Bitcoin wallet.

Signature

A cryptographic signature is a mathematical mechanism that allows someone to prove ownership. In the case of Bitcoin, a Bitcoin wallet and its private key(s) are linked by some mathematical magic. When your Bitcoin software signs a transaction with the appropriate private key, the whole network can see that the signature matches the bitcoins being spent. However, there is no way for the world to guess your private key to steal your hard-earned bitcoins.

Wallet

A Bitcoin wallet is loosely the equivalent of a physical wallet on the Bitcoin network. The wallet actually contains your private key(s) which allow you to spend the bitcoins allocated to it in the block chain. Each Bitcoin wallet can show you the total balance of all bitcoins it controls and lets you pay a specific amount to a specific person, just like a real wallet. This is different to credit cards where you are charged by the merchant.

VIEWPOINTS

Assistance Technology: A question of trust

by **myForesight® Analytics**

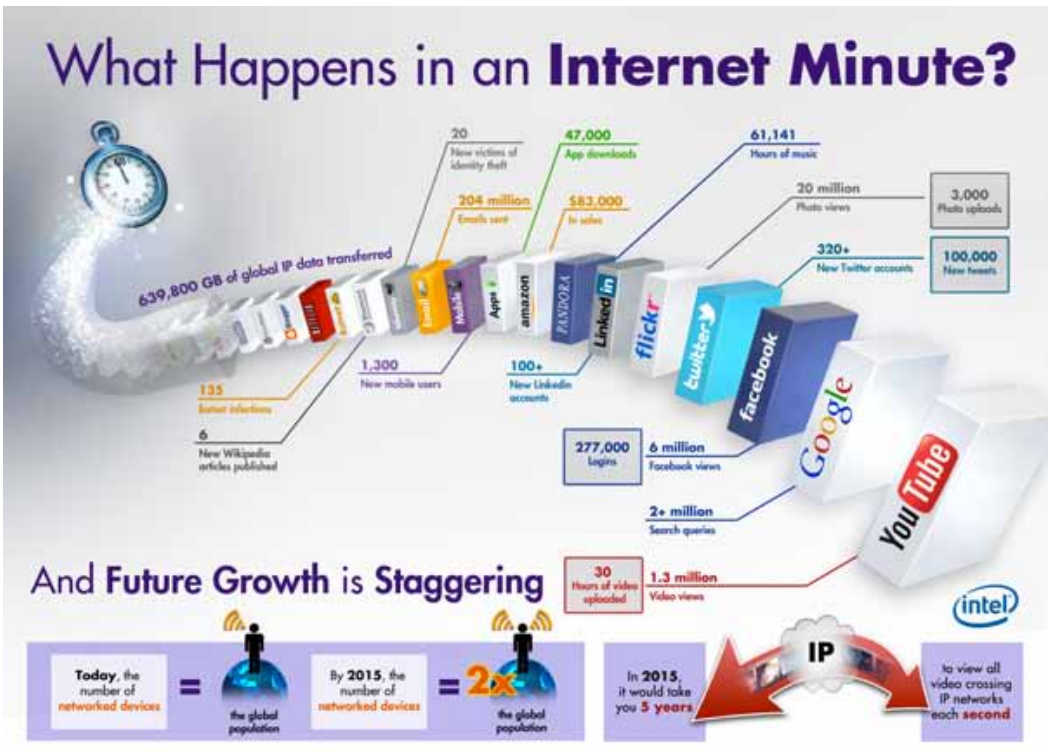
Assistance remains a primary goal of many modern technologies as consumers continue to seek out ways to manage and organize daily tasks. 'Assistance technologies' aim to augment, enhance, or improve the natural cognitive and physical abilities of humans in an attempt to simplify everyday tasks.

The advancements of 'assistance technologies' can possibly contribute towards increasing quality of life and and enhance safety. However, there are issues of trust as most of these technologies are internet connected and requires a collection of personal data and, in some cases, necessitate physical reliance on machines. Trust is not only in machines, but also in the companies that produce the technology and the institutions that monitor their standards. In short, the future of 'assistance technologies' hinges not only upon scientific advances, but also on the relationship between humans and emerging technologies.

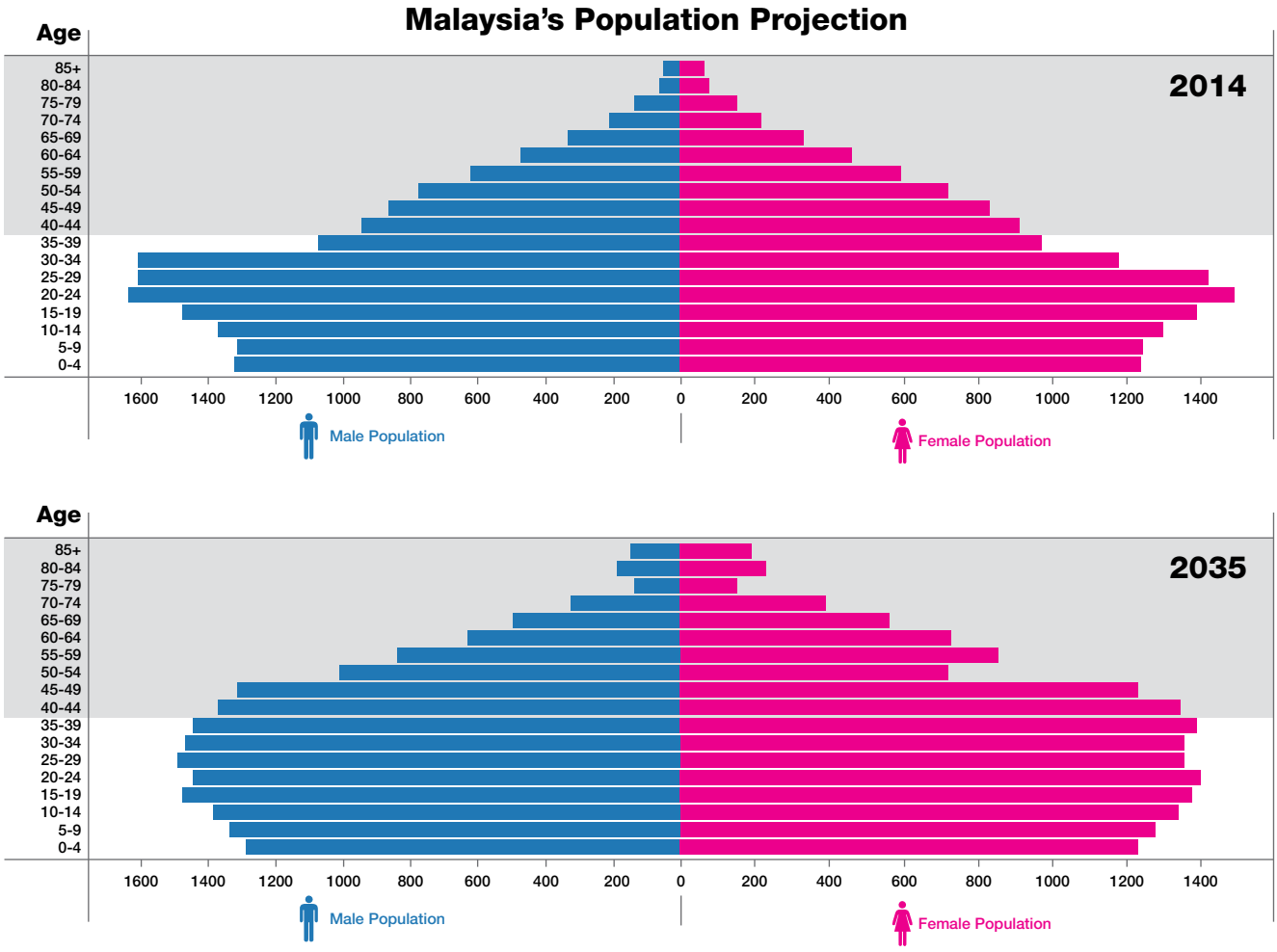
DRIVERS

1. Increased expectations of personal devices. By 2020 it is estimated that the Internet will reach in excess of 5 billion users worldwide. With the advancement of internet of things, various types of portable devices will be introduced and connected to the internet, for various purposes – from assisting daily routines to improve productivity As a result, the ability to simply connect to the Internet is no longer enough for consumers. Rising consumer expectations are driving the technology industry toward providing tools that are more powerful, adaptive, and versatile.

2. An aging population. Due to advances in medicine and healthier lifestyles, the average lifespan is increasing worldwide. As lifespans increase, demand for technologies that extend quality of life by improving vision, hearing, dexterity, and cognitive skills will grow stronger. As Malaysia will be an ageing nation by 2035 and 15 per cent of the population are classified as



Source: INTEL



Source: Data Visualisation, Department of Statistic, Malaysia

senior citizens, the government has taken steps in its preparation to face the challenges of an ageing nation, including ensuring adequate health care services, financials as well as infrastructure that are senior-citizen friendly.

3. Advances in artificial intelligence may soon allow machines to perform many tasks and roles currently conducted by humans. It has been projected that in the next 20 years up to 50% of today's jobs could be computerized. Machines are adjusted either to assist or to replace human workers in certain roles aiming to improve productivity, and safety. Improved artificial intelligence. Advances in artificial intelligence may soon allow machines to perform many tasks and roles currently conducted by humans. It has been projected that in the next 20 years, up to 50% of today's jobs could be computerized. Machines are adjusted either to assist or to replace human workers in certain roles, aiming to improve productivity, and safety.

4. Improved machine-to-machine communication. The Internet of Things (IoT)—an interconnected web of machines that are able to seamlessly communicate with each other—is becoming a reality. Movement toward the IoT will allow wireless devices to provide a greater level of information to end users and help further integration of technology into everyday life.

> **As a result, some products and services that employ 'assistance technology' may initially be met with skepticism and concern, especially from the older consumers. The Millennials, who grew up as 'digital natives', have a higher level of tolerance and comfort in integrating technology into their lives.**

LAYERS OF TRUST

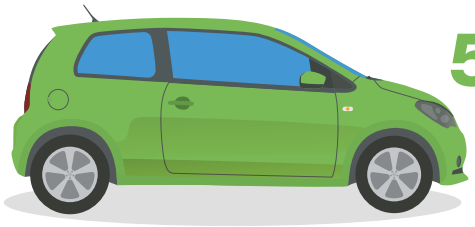
'Assistance technologies' rely upon a partnership between technology and users, which include seamless information sharing and undoubted trust. However, 'trust' in the technology industry is a multifaceted issue. It is not limited to trust in the capabilities of a machine, but also trust in the producer of the product and their ability to keep user data private and secure.

Trust in technologies that augment human abilities.

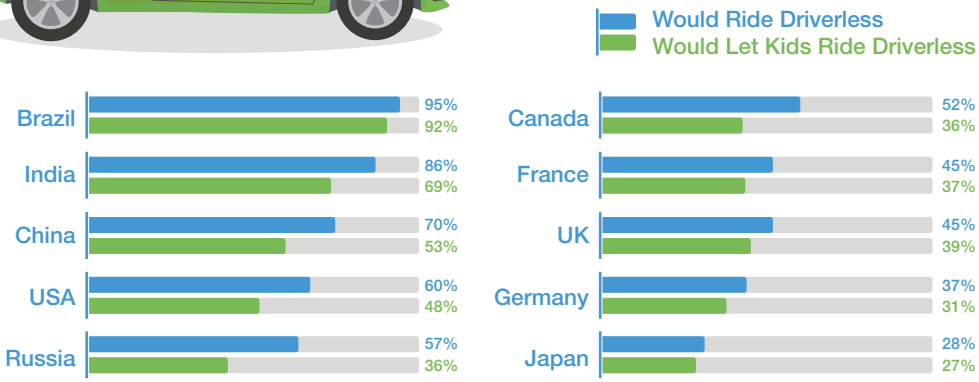
Trust issue towards machines capable of performing certain tasks may differ in certain scenarios. For example, recently 'assistance technology' has received a lot of attention in the

VIEWPOINTS

Consumers Desire More Automated Automobiles
Consumers Trust Driverless Cars



57% of consumers, globally, trust driverless cars - even more so in emerging markets



Source: Cisco Systems, 2013

Among drivers who **WANT SEMI-AUTONOMOUS FEATURES** on their next vehicle, their primary motivation is:

safety

convenience

redusing stress

wanting the latest technology

Source: NewsRoomAAA.com

Among drivers who **DO NOT WANT SEMI-AUTONOMOUS FEATURES** on their next vehicle, cite the following reasons:

trusting their driving skills more than the technology

feel the technology is too new and unproven

not wanting to pay extra for it

do not know enough about the technology

find it annoying

automotive industry as major companies continue to make strides toward incorporating or improving autonomous and semi-autonomous capabilities in vehicles. Despite the success of these technologies, only 57% of global consumers trust driverless cars. But, at the same time, consumers welcome integration of Advanced Driver Assistance Systems for their vehicles which include automatic emergency braking, parking assist, and sensors that help drivers stay in their lane.

Trust in technology companies.

A 2015 Endleman survey conducted across 27 countries suggested that consumers trust the technology sector more than any other business segment. In fact, despite the finding that consumers in the majority of countries surveyed reported an under-50% trust level in businesses in general, the study ranked trust in companies that produce technology at 78%. This research suggested that consumers may be more willing to trust the claims and products of technology companies. However, recent high profile security breaches and controversial data sharing with governments and corporate entities threaten to lower trust in the tech industry, unless greater strides are made to safeguard personal data.

Trust in data security.

To enable 'assistance technologies' to be further integrated into users' daily life, users would have to share greater amount of personal data with machines and tech companies. However, consumers worldwide are becoming increasingly concerned about data security. In fact, 84% of wireless users globally report concern for the security of their personal information. These concerns are far from unwarranted as 71% of corporations reported that they

were victim of cyber-attacks in 2014.

WHAT'S NEXT?

While the current rate of technological advancement is increasing, trust in new technologies is often slow to build. As a result, some products and services that employ 'assistance technology' may initially be met with skepticism and concern, especially from the older consumers. The Millennials, who grew up as 'digital natives', have a higher level of tolerance and comfort in integrating technology into their lives. Thus, in addressing different adaptation from different age groups, companies producing 'assistance technologies' may wish to help consumers draw connections to how their products are actually improvements upon devices of the past. For example, assisted braking could be framed not as a way of removing the human element from driving, but rather as advancement comparable to existing technologies aimed at reducing car accidents such as anti-lock and emergency braking.

Assistive technology for physical and mental enhancement will likely increase as populations continue to age and their natural physical and mental abilities begin to wane. Despite accelerating demand for technologies that can improve mental or physical performance, the challenges are for technology producer to deliver not only on the promise of enhanced user abilities, but also on the security of personal data. Rather than focusing on what a machine can do for a consumer, it may be more beneficial to frame a technology's capabilities in terms of what it can help users do themselves.

In a recent study, a robot was used to direct individuals to a fire escape during a mock fire drill. This study found that 85% of people were willing to follow the machine even when it visibly broke down or led them in the wrong direction. This suggests that in a stressful situation people may be much more willing to trust a technology if its purpose is clear and it appears to have been designed to meet a specific task. With this in mind, companies that develop assistance technologies should consider both form and function during the design process. Technologies that appear to be designed to perform a clearly delineated task may garner trust more quickly than those whose function is not immediately clear.

> **"As Malaysia will be an ageing nation by 2035 and 15 per cent of the population are classified as senior citizens, the government has taken steps in its preparation to face the challenges of an ageing nation, including ensuring adequate health care services, financials as well as infrastructure that are senior-citizen friendly.**

The future of manufacturing may be impacted by the integration of assistive technology. Advancement in Artificial Intelligence, Virtual Reality, and autonomous robotics may soon allow machines to fill roles that are currently difficult or dangerous for humans. For example, in construction and manufacturing industries, such 'assistance technologies' as self-driving vehicles and robotic workers may be able to reduce workplace injuries while also improving efficiency. Meanwhile, heads-up displays could be used to improve worker productivity by virtually projecting information to a user in a hands-free environment.

Governments have also been exploring the use of robots as tools for search and rescue as well as for firefighting. Advances in these areas may not only provide for increased safety and heightened efficiency, but also demonstrate the trustworthiness of autonomous and semi-autonomous technologies to the general public.

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VIEWPOINTS

INDUSTRIAL REVOLUTION 4.0 – TACKLING IT BY ITS HORN

by **Hashim Ishak,** *hashim@might.org.my*

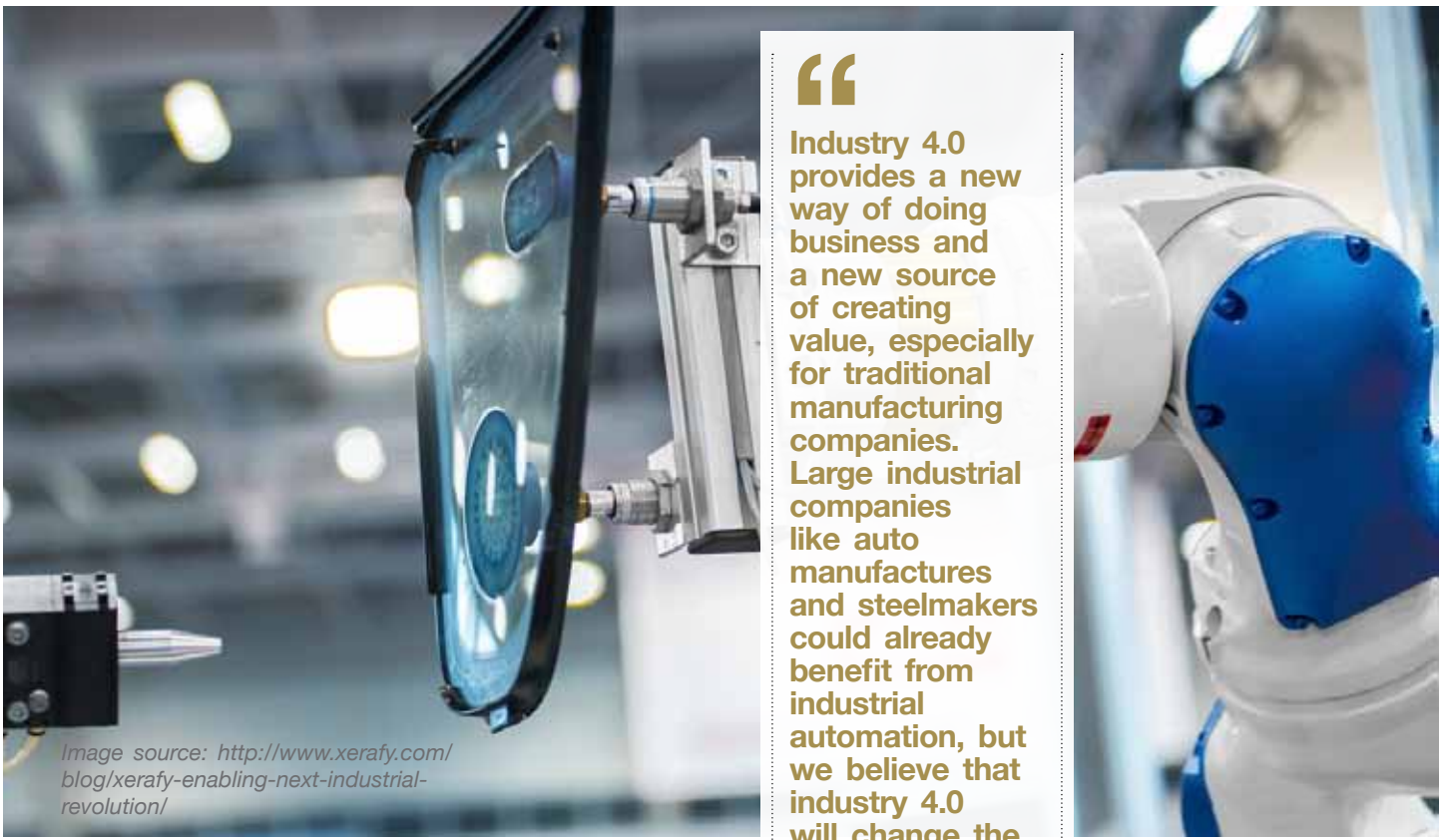


Image source: http://www.xerafy.com/blog/xerafy-enabling-next-industrial-revolution/

> **"Industry 4.0 provides a new way of doing business and a new source of creating value, especially for traditional manufacturing companies. Large industrial companies like auto manufactures and steelmakers could already benefit from industrial automation, but we believe that industry 4.0 will change the manufacturing process and resources allocation of small to medium-sized manufacturers significantly.**

The odyssey of discovering science and technology for life betterment had always been a cognitive passion of man. Man never stops creating tools that changed the way he lives and his prescribed environment. When the wave of the third industrial revolution of the internet era hit his shore, man realized he had to extend his prescribed environment into a borderless world to stay afloat. Computing power doubled every 18 months (Moore's Law) to accommodate the internet boom. Legacy applications needed to be re-coded, ubiquity and mobility of devices set in, and network infrastructure needed to be upgraded into super data highways with wireless last-miles connectivity. Killer applications reshaped the way we interact and integrate. Internet has changed our life, our commerce, our socio-political agenda and the demographic of the population

of the world at large. But, more importantly, the internet changes the world economics.
Now we are at the advent of another industrial revolution – 'The Industrial Revolution 4.0' or 4IR. The underpinning key drivers for this phenomenal revolution is the 'Big Data', the collection of voluminous data with varieties of information it carries to be mined and analyzed at high velocity, harnessing cloud computing with quantum power, re-structuring the social demographic patterns of the population and creating learning machines to induce the integration and networking between the cyber spheres and the physical world.

When the 4IR arrives, a country's present state of industrial technology and demographic patterns will together determine how successfully it adapts[1].
The determinants to benchmark the readiness of a country to embrace the 4IR are currently being adapted from the rankings of the World Economic Forum Global Competitiveness Report.

The determinants for industrial technology and demographic patterns for 4IR are looking at these five main pillars:

1. Labour structure flexibility (labour market efficiency)
2. Skill and competency level (Labour output from higher education and training)
3. Adaptive skills (Innovativeness)
4. Infrastructure suitability (Technology readiness)
5. Legal protection (Intellectual Property Rights)

The 4IR is not new. It compounds on existing economic fundamentals of industrialization and its infrastructure. ICT is just an enabler. The differentiating factor for 4IR would be its impacts of rapid disruptive business models on the current economics.

The new emerging disruptive business models:

Even though we have all the enablers to make industry 4.0 feasible such as connectivity technology, affordable IoT hardware, standardized communication protocol, collecting meaningful data and analyzing for implications are still the biggest challenges to driving the impact from industry 4.0.

Taejin Kim, EVP and head of New Business Development Team, Kolon Corporation

Data, computational power, and connectivity

Big data/open data
Significantly reduced cost of computation, storage, and sensors

Internet of Things/M2M
Reduced cost of small-scale hardware and connectivity (e.g., through LPWA networks)

Cloud technology
Centralization of data and virtualization of storage

Analytics and intelligence

Digitization and automation of knowledge work
Breakthrough advances in artificial intelligenc and machine learning

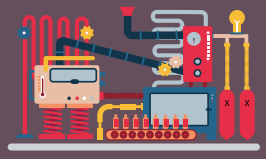
Advance analytics
Improved algorithms and largely improved availability of data

Human-machine interaction

Touch interfaces and next-level GUIs
Quick proliferation via consumer devices

Virtual and augmented reality
Breakthrough of optical head-mounted displays (e.e., Google Glass)

Digital-to-physical conversion



Additive manufacturing (i.e., 3D printing)
Expanding range of materials, rapidly declining prices for printers, increased precision/quality

Advanced robotics (e.g., human-robot collaboration)
Advances in artificial intelligence, machine, vision, M2M communication, and cheaper actuators

Energy storage and harvesting
Increasingly cost-effective options for storing energy and innovative ways of harvesting energy

SOURCE : McKinsey

[1] WEF UBS Whitepaper on Industrial Revolution 4.0, 2016

How do we fare today?

	Labour structures flexible?	Skill level high?	Education allos adaptive skills?	Infrascructure suitable?	Legal protections?	Overall impact	Developed (DM), emerging market (EM) or frontier market (FM)?
Switzerland	1	4	1	4.0	6.75	3.4	DM
Singapore	2	1	9	3.5	9.00	4.9	DM
Netherlands	17	3	8	6.5	12.50	9.4	DM
Finland	26	2	2	19.0	1.25	10.1	DM
United States	4	6	4	14.0	23.00	10.2	DM
United Kingdom	5	18	12	6.0	10.00	10.2	DM
Hong Kong	3	13	27	4.5	10.00	11.5	DM
Norway	9	7	13	19.0	11.50	11.9	DM
Denmark	10	9	10	15.5	17.75	12.5	DM
New Zealand	6	10	24	21.5	6.25	13.6	DM
Sweden	20	12	7	12.0	19.75	14.2	DM
Japan	21	21	5	12.0	18.00	15.4	DM
Germany	28	17	6	9.5	18.75	15.9	DM
Ireland	13	15	21	19.0	11.50	15.9	DM
Canada	7	19	22	16.0	20.50	16.9	DM
Taiwan	22	14	11	20.0	31.25	19.7	EM
Australia	36	8	23	18.5	17.75	20.7	DM
Austria	40	16	17	19.5	17.25	22.0	DM
Belgium	54	5	16	17.5	21.5	22.8	DM
France	51	25	18	12.0	31.00	27.4	DM
Israel	45	28	3	26.0	38.50	28.1	DM
Malaysia	19	36	20	35.5	34.50	29.0	EM
Portugal	66	26	28	24.5	32.25	35.4	DM
Czech Republic	47	29	35	35.0	44.75	38.2	EM
South Korea	83	23	19	20.0	62.25	41.5	EM
Chile	63	33	50	42.0	39.25	45.5	EM
Spain	92	30	37	17.5	61.25	47.6	DM
China	37	68	31	56.5	64.25	51.4	EM
Kazakhstan	18	60	72	59.5	68.25	55.6	FM
Poland	81	31	64	48.5	58.00	56.5	EM
Russia	50	38	68	47.5	114.00	63.5	EM
Thailand	67	56	57	51.0	88.00	63.8	EM
Italy	126	45	32	31.5	87.75	64.5	DM
Hungary	77	57	51	48.0	90.25	64.7	EM
South Africa	107	83	38	59.0	42.75	66.0	EM
Greece	116	43	77	35.0	67.00	67.6	EM
Philippines	82	63	48	79.0	78.00	70.0	EM
Indonesia	115	65	360	73.5	70.25	70.8	EM
Turkey	127	55	60	58.5	77.75	75.7	EM
Colombia	86	70	76	77.0	102.75	82.4	EM
India	103	90	42	100.5	81.50	83.4	EM
Mexico	114	86	59	66.0	100.00	85.0	EM
Brazil	122	93	84	64.0	97.75	92.2	EM
Peru	64	82	116	88.5	113.25	92.8	EM
Argentina	139	39	93	78.0	125.75	95.0	FM

Adapted relative rankings from World Economic Forum Global Competitiveness Report, using Fourth Industrial Revolution categories

The ranking of Malaysia by the World Economic Forum (WEF) in January 2016 for her readiness to embrace the challenges of 4IR are relatively low in the areas of infrastructure readiness and legal protection.

4 Labor market flexibility takes the ranking for the seventh WEF pillar "Labor market efficiency." Skills level uses the fifth pillar "Higher education and training." The question as to whether education allows adaptive skills takes the ranking for the twelfth pillar, "Innovation," as innovation can be thought of as a benchmark of the output of adaptive skills. Infrastructure suitable is an average of the rankings in the ninth and second pillars "Technological readiness" and "Infrastructure." Legal protections is an average of the rankings for "property rights" (1.01), "intellectual property protection" (1.02), "judicial independence" (1.06) and "ethical behaviour of firms" (1.17) – this last category being included as trade in intellectual property necessitates a degree of confidence in the honor of one's trading partners. Market description in the last column is based upon MSCI country classification methodology.

Source: WEF UBS White Paper 2016

The emerging disruptive technologies driving the new business models challenge us with these concerns:

1. Capital investment for labour substitution; i.e. Artificial Intelligence (AI), robotics and extreme automation, IoT etc. A negative notion of 4IR will replace human workforce in selected jobs.

2. The inherent requirement of the infrastructure for extreme integration; human-human, human-machine, machine-machine network to bridge the techno-sphere with the natural world to cross the connectivity and integration chasm. Hence, the "Cyber Physical System (CPS)". The cost of scrapping the sunk costs of existing infrastructure may ossify the economic activities[2]. E.g. can a driverless car be fully deployed on the current road systems?

3. Robustness of the legal systems to address intelligent property rights in the Cyber-physical spheres. Stringent legal framework to address these concerns would encourage manufacturing on-shoring back to the country of origins.

4. In expanding the horizontal integration, digital trust is key as in the case of 'blockchain' applications which track the authenticity of products across the supply chain via shared digital ledger. Breakdown in digital trust and cybersecurity opens up avenues for data theft,

[2] et al

Image source: http://stbsolutions.nl/4th-industrial-revolution

industrial espionage and attacks by hackers.

The paradox of 4IR is that we have to ride the waves with the rest of the world that embrace it. Lagging behind will impede our opportunities to reap the benefits offered by 4IR. 'Pull' demand will be very incremental; therefore there is a need to rapidly shift to 'push' technology and ready to take the bull by its horn to harness economic growth from 4IR.

In today's state of affair, taking the bull by its horn is not an easy task. We must face up to the following challenges[3]:

1. **Unclear economic benefits:** 4IR is still in its rudimentary elements incurring rapid changes to the business models. Investors are still skeptical as what happened to the 'dot.com' boom in the 1990's for them to start jumping into the 4IR bandwagon.

2. **Excessive investment:** Companies which are affected by the rapid disruptive business models of 4IR will have to invest heavily to do catching up with the rest.

> **"The 'Industry 4.0 train' is leaving the station- companies must decide when the best moment for them hop on is.**

3. **Insufficient qualifications and skills of the employees:** The nation needs to address the gap created by the polarization of workers between highly-skilled, middle-skilled and low-skilled. 4IR would require re-skilling of the low and middle-skilled workforce. The output from higher education and training centers will have to be revisited to cater for the 4IR workforce requirements.

4. **Lack of standards, regulation and forms of certification:** This is the key in the horizontal integration to streamline the supply chain.

5. **Unclear legal framework concerning usage of external data:** The questions of IP ownership should be clearly defined and governed across the value chain.

6. **Low maturity level of required technology:** Proliferation of advanced S&T product development needs to be heightened in R&D for 4IR deployment.

7. **Unresolved questions concerning data security:** How secure is our broadband network in supporting cloud computing and big data collection?

8. **Lack of support by the stakeholders, especially the Government:** Is the digital transformation roadmap already in place?

9. **Too slow expansion of basic infrastructure:** Can our broadband bandwidth cater for smart applications that harness big data analytics?

All things considered, are we ready to play as:
Leaders? Acting quickly while taking risks in order to benefit from digitization early on; or

Adapters? Learning from the initial experience of the pioneers; or

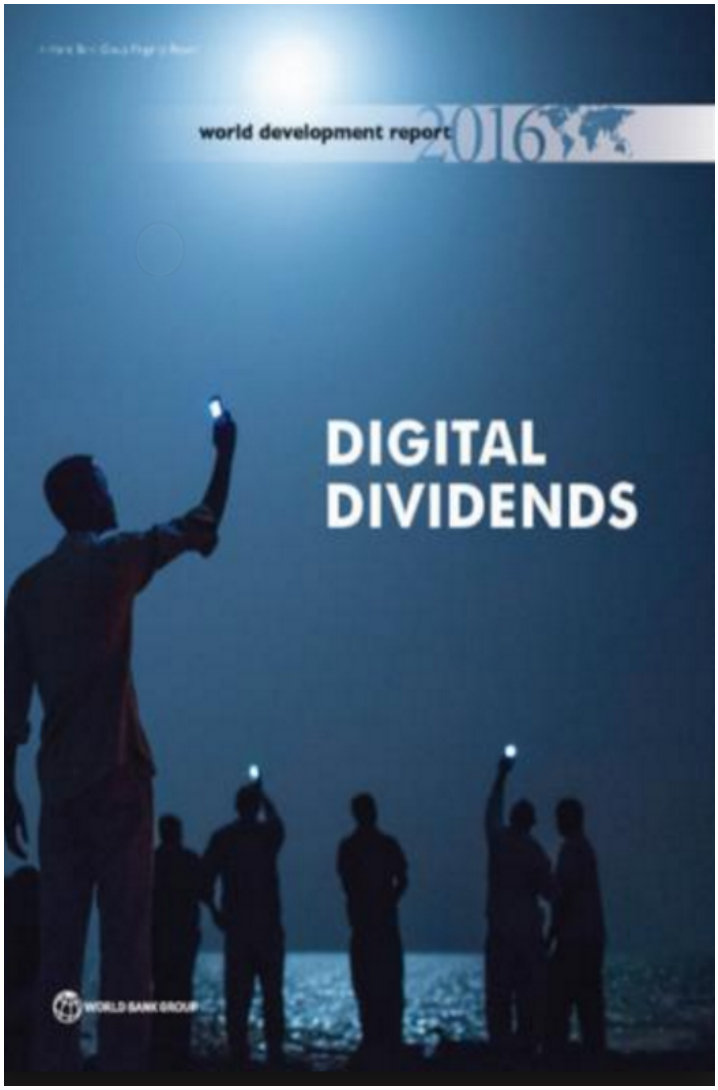
Waiters? Waiting for the broad implementation of 4IR solutions to be fully tested.

Any which way we position ourselves, we now have very little choice but to make ourselves ready to tackle 4IR bull by its horn. 4IR is already here.

[3] PWC: Industry 4.0-Opportunities and Challenges of Industrial Internet

MYFORESIGHT INTERCONNECT

myForesight Book Club



World Development Report 2016: Digital Dividends

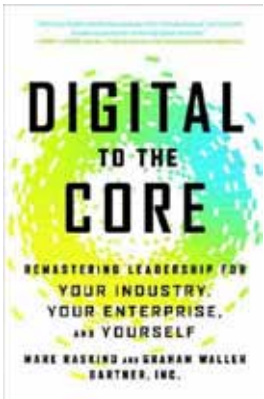
ISBN-10 : 978-1464806711
ISBN-13 : 1464806713
Author : World Bank Group
Publisher : World Bank Publications

Digital technologies are spreading rapidly, but digital dividends--the broader benefits of faster growth, more jobs, and better services--are not. If more than 40 percent of adults in East Africa pay their utility bills using a mobile phone, why can't others around the world do the same? If 8 million entrepreneurs in China--one third of them women--can use an e-commerce platform to export goods to 120 countries, why can't entrepreneurs elsewhere achieve the same global reach? And if India can provide unique digital identification to 1 billion people in five years, and thereby reduce corruption by billions of dollars, why can't other countries replicate its success? Indeed, what's holding back countries from realizing the profound and transformational effects that digital technologies are supposed to deliver?

Two main reasons. First, nearly 60 percent of the world's population are still offline and can't participate in the digital economy in any meaningful way. Second, and more important, the benefits of digital technologies can be offset by growing risks. Startups can disrupt incumbents, but not when vested interests and regulatory uncertainty obstruct competition and the entry of new firms. Employment opportunities may be greater, but not when the labor market is polarized. The internet can be a platform for universal empowerment, but not when it becomes a tool for state control and elite capture.

The World Development Report 2016 shows that while the digital revolution has forged ahead, its 'analog complements'--the regulations that promote entry and competition, the skills that enable workers to access and then leverage the new economy, and the institutions that are accountable to citizens--have not kept pace. And when these analog complements to digital investments are absent, the development impact can be disappointing.

What, then, should countries do? They should formulate digital development strategies that are much broader than current information and communication technology (ICT) strategies. They should create a policy and institutional environment for technology that fosters the greatest benefits. In short, they need to build a strong analog foundation to deliver digital dividends to everyone, everywhere.



Digital to the Core: Remastering Leadership for Your Industry, Your Enterprise, and Yourself

ISBN-10 : 1629560731
ISBN-13 : 978-1629560731
Author : Mark Raskino and Graham Waller
Publisher : Routledge

There is no simple strategic method for dealing with the multidimensional nature of digital change. Even the sharpest leaders can become disoriented as change builds on change, leaving almost nothing certain. Yet to stand still is to fail. Enterprises and leaders must re-master themselves to succeed. Leaders must identify the key macro forces, then lead their organizations at three distinct levels: industry, enterprise, and self. By doing this they cannot only survive but clean up. Digital to the Core makes the case that all business leaders must understand the impact the digital revolution will continue to play in their industries, companies, and leadership style and practices. Drawing on interviews with over 30 top C-level executives in some of the world's most powerful companies and government organizations, including GE, Ford, Tory Burch, Babolat, McDonalds, Publicis and UK Government Digital Service, this book delivers practical insights from those on the front lines of major digital upheaval. The authors incorporate Gartner's annual CIO and CEO global survey research and also apply the deep knowledge and qualitative insights they have acquired as practitioners, management researchers, and advisors over decades in the business. Above all else, Raskino and Waller want companies and their top leaders to understand the full impact of digital change and integrate it at the core of their businesses.

Foresight for Science, Technology and Innovation (Science, Technology and Innovation Studies)

ISBN-10 : 3319325728
ISBN-13 : 978-3319325729
Author : Ian Miles, Ozcan Saritas, and Alexander Sokolov
Publisher : Springer

Decision-makers at all levels are being confronted with novel complexities and uncertainties and face long-term challenges which require foresight about long-term future prospects, assumptions, and strategies. This book explores how foresight studies can be systematically undertaken and used in this context. It explicates why and how methods like horizon scanning, scenario planning, and roadmapping should be applied when dealing with high levels of uncertainty. The scope of the book moves beyond "narrow" technology foresight, towards addressing systemic interrelations between social, technological, economic, environmental, and political systems. Applications of foresight tools to such fields as energy, cities, health, transportation, education, and sustainability are considered as well as enabling technologies including nano-, bio-, and information technologies and cognitive sciences. The approaches will be illustrated with specific actual cases.

MYFORESIGHT INTERCONNECT

24 HAPPENINGS

ISKANDAR REGIONAL DEVELOPMENT AUTHORITY (IRDA) TRAINING

MIGHT, Cyberjaya

31st May – 1st June 2016

Iskandar Regional Development Authority (IRDA) acknowledged the importance of Foresight and forward looking plan, hence a knowledge enrichment session with myForesight® was held for their officers in their efforts to inculcate these skills into their working culture. The coaching session on Foresight: Concept, Tools & Methodologies was convened since March 2015. The series continues with the exploration on the real case study on the Community Displacement in Iskandar.

This is a parallel initiative to mainstream Foresight beyond Federal Government agencies through a focal point such as economic regional development authority, Collaboration with IRDA is seen as a catalyst to disseminate awareness on foresight and its applications to the Johor State Government planning machineries.

ENVISIONING MALAYSIA 2050 WORKSHOP SERIES

Academy Science Malaysia

Envisioning Malaysia 2050 is a complementary initiative to Academy of Sciences of Malaysia's (ASM) Flagship Programme Mega Science Agenda 2050. This initiative led by ASM brings together various national think-tanks known as Malaysian Foresight Alliance. myForesight® via MIGHT plays a key role in this alliance by contributing its expertise in advising overall foresight framework & methodology. The main objectives of this initiatives among others are as follows:

i To envision what Malaysia would be like in 2050;
ii To identify key drivers in achieving this vision 2050;
iii To identify emerging technologies required to realise the desired scenario in 2050

The Foresight Malaysia 2050 Report will outline broad policy direction with regards to the development of Science & Technology with forecasts on emerging technologies in the field of biotechnology, nanotechnology, neurotechnology, green technology and digital technology.

The project is expected to complete in December 2016 and to be presented to cabinet by Minister of MOSTI.

4TH KOREA ASEAN ENGINEERING FORUM – FOR BETTER TOMORROW

Seoul, KOREA

27th – 29th July 2016

4TH ASEAN Korea Engineering Forum is jointly organized by AAET and NAEK (National Academy Engineering of Korea) with the aim to foster relationships between ASEAN and South Korea in engineering, technology and industry development. myForesight® shared insights on the high-tech cooperation between Korea and Malaysia.

myForesight® involvement in this forum allows sharing of issues, knowledge and experience in technological and industrial development, and addressing current and future technological cooperation and sustainable development in the ASEAN region.

LECTURE SERIES – GLOBAL MEGATRENDS: DISRUPTIVE TECHNOLOGIES

Menara Ministry of International Trade and Industry (MITI), Kuala Lumpur

28th July 2016

myForesight® conducted a lecture to young public officials in MITI to share its perspective about the future megatrends that will have an impact on trade, industry and investment. The presentation highlighted on several general megatrends that is globally recognised and further narrowed into disruptive technologies that will have a direct or indirect impact to the public officials in MITI.

This lecture was a pre-cursor and preparatory session that served as a basis for dialogue between YB Minister, Dato' Seri Mustapa Mohamed and young public officials of MITI.

A PEEK INTO THE FUTURE: INSIGHT INTO THE NEXT 10 YEARS

Universiti Teknologi PETRONAS (UTP), Seri Iskandar, Perak

5th March 2016

UTP is currently reviewing its research and innovation focus as part of its ongoing initiatives in supporting the university aspiration towards global prominence. Therefore, a Research Experts' Panel Workshop was conducted by UTP to chart the direction of its Mission Oriented Research (MOR) for the next five years. myForesight® provided a scene setting presentation titled "A Peek into the Future – Insight into The Next 10 years". The presentation gave an overview of Malaysia's National R&D framework and priority areas as well as providing insights into global trends and areas of R&D.

Subsequently, a new blueprint is created where the existing nine (9) MORs will be restructured into four (4) Institutes that will expand the breadth of R&D across the complete value chain from Fundamentals to Applications within the realms of Knowledge, Industry and Society.

7TH INTERNATIONAL CONFERENCE ON FORESIGHT

Tokyo, JAPAN

2nd – 4th March 2016

UTP is currently reviewing its research and innovation focus as part of its ongoing initiatives in supporting the university aspiration towards global prominence. Therefore, a Research Experts' Panel Workshop was conducted by UTP to chart the direction of its Mission Oriented Research (MOR) for the next five years. myForesight® provided a scene setting presentation titled "A Peek into the Future – Insight into The Next 10 years". The presentation gave an overview of Malaysia's National R&D framework and priority areas as well as providing insights into global trends and areas of R&D.

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Available in
1st Quarter 2017

In simple terms, Industry 4.0 is where the continuous converging of technologies on multiple digital platforms especially the Internet of Things (IoT) are giving rise to more human interfaced and machine learning devices. Whilst fraught with uncertainties, it also contain numerous opportunities, that are able to rapidly create new sources of growth and at the same time extinguish conventional ones.

Correspondingly, MIGHT in line with its forward planning is publishing its Malaysian Strategic Technology Outlook 2017/2018 early next year. The report would centre on meeting the challenges of Industry 4.0. It would likewise contain articles from the local industry players both domestic and foreign-based; describing and sharing their respective initiatives in meeting those universal challenges.

Some of the entities featured are:

Historically, the first thought of sewage treatment dates back to the end of 18th Century when septic tanks were introduced in the West. During the second half of the nineteenth century sewage treatment methods developed rapidly to meet the needs of basic sanitation. Today, modern and sophisticated treatment technologies are continuously developed and provided further for the purpose of protection of environmental quality in a cost efficient manner.

It is timely that sewage treatment leaps frog and shift to another height, vis-à-vis the objective and intent of treating of sewage to discharge environmentally acceptable waste material should now change to treating to produce feedstock and by-products that could be used to catalyse downstream processing to produce value added materials which have economic benefits. In the future, it is inevitable that sewage treatment could be a lucrative business if only the stakeholders could appreciate the inherent potential in this industry.

INDAH WATER KONSORTIUM SDN BHD describes the paradigm shift from traditional basic treatment to potential resource recovery utilizing the 'Green Technology'

The implementation of various strategies in STEM education is important to cultivate students' interest in STEM related field and will increase their participation in STEM subjects at the upper secondary level and their interest to pursue STEM related career. This will help to create STEM literate society and provide enough qualified STEM graduates to meet the demand from the industry.

THE MINISTRY OF EDUCATION through the ROAD-MAP FOR STEM EDUCATION as the strategies in enhancing students' interest towards STEM subjects.

Institut Kemahiran MARA (IKM) has been in operation for over than five decades with a focus on producing technology experts, competents and skilled workers as well as successful technopreneurs in line with the national requirements. At present, there are 13 IKM campuses that cater students at certificate level throughout the country, while programs that focus on high technology is driven by 11 campuses of Kolej Kemahiran Tinggi MARA (KKTM) mainly based in the Peninsular Malaysia.

IKM and KKTM are now moving progressively, aligned with the current technological change, over the period of time. There are various areas of specialization which cover 12 cluster of studies including automotive, built environment, biomedical engineering, biotechnology, civil, electrical, electronic, art and design, oil and gas, advanced material processing, manufacturing and mechanical services under the technical and vocational institutions of MARA.

These efforts are seen as imperatives in supporting MARA's effort in developing effective and skillful TVET human capital.

MAJLIS AMANAH RAKYAT on TVET INITIATIVES TOWARDS INDUSTRY 4.0 CHALLENGES.

The growing role of robotics, artificial intelligence, 3D printing, neuro-technology and information technology (IT) are cutting across all sectors. With each advance, technologies emerge and converge, leading to new paradigm shifts in industries – opening new opportunities for novel combinations across physical, digital, mechanical and biological systems.

One of these technology investments that Malaysia has made is in Graphene. Graphene is the world's first 2D material which has unique features such as ultra-light and extremely tough. Graphene comprises of carbon atoms in honey comb lattice structures which makes it stronger than steel and it is also extremely flexible. It has superior electrical conductivity and heat resistance.

Malaysia is MOVING TOWARDS A HIGH VALUE ECONOMIC ECOSYSTEM WITH GRAPHENE from AGENSI INOVASI MALAYSIA perspective.

In a manufacturing facility not too far away, an employee checks his phone to see what lies ahead in his working day. He greets his colleagues who are shifting a load of titanium blades that weigh a tonne into position. They work without straining themselves, thanks to the exoskeleton suits they are wearing. Nearby another group of colleagues use an argon gas furnace fitted with sensors that automatically control heat, time and speed, to inflate the blades. They then use robots to scan the surface of the blade to spot variations. The tools can communicate, informing workers immediately if their tasks are being done correctly. They also record each process, feeding the information back to a central system for analysis. The entire facility is informed of the quantity and type of blades needed to be manufactured at any given time, which helps the facility director and operations managers make quick and accurate decisions on site or remotely.

MALAYSIA ROLLS – ROYCE INTERNATIONAL LIMITED brings the factory of the future

Within the generation value chain, renewables and distributed generation are disrupting conventional power plant business. Advancements such as smart grids and IoT technologies will look to improve power grid efficiencies, while on-site automation together with analytics-enabled decision making are enhancing customer satisfaction and triggering new business models. In short, utilities are becoming digital utilities.

We believe that this era of end-to-end digitization and the integration of the digital ecosystem will not just result in efficiency gains that will benefit the end customers but also the creation of new options that will further empower those customers. It is because of this believe that we, at TNB, have begun our transformation journey to ensure that our customers will have the most to gain as we move into this new era. Doing so is clearly in line with our core value of always putting our customers' interest first.

EMPOWERING CUSTOMERS AS A DIGITAL UTILITY from the power industry perspective, TENAGA NASIONAL BERHAD

Industry 4.0 has unlimited potential for global high technology manufacturing companies such as BAE Systems. For example, 3D printing could dramatically shorten the delivery times for aircraft parts thus reducing required the stock inventory and associated cost for industry and customers.

BAE Systems first embraced this approach in 2014 when the company began producing 3D printed fighter jet components on site at a Royal Air Force base delivering significant cost savings to the Royal Air Force. As the technology catches up, these new advances could optimize and shorten the supply chain reducing lead time and storage costs for spare components.

Exciting future technologies BAE SYSTEMS is exploring

Drop us an email:

1. We welcome your views about the publication.
2. If you want a copy sent to you, share your name & organisation's mailing address.

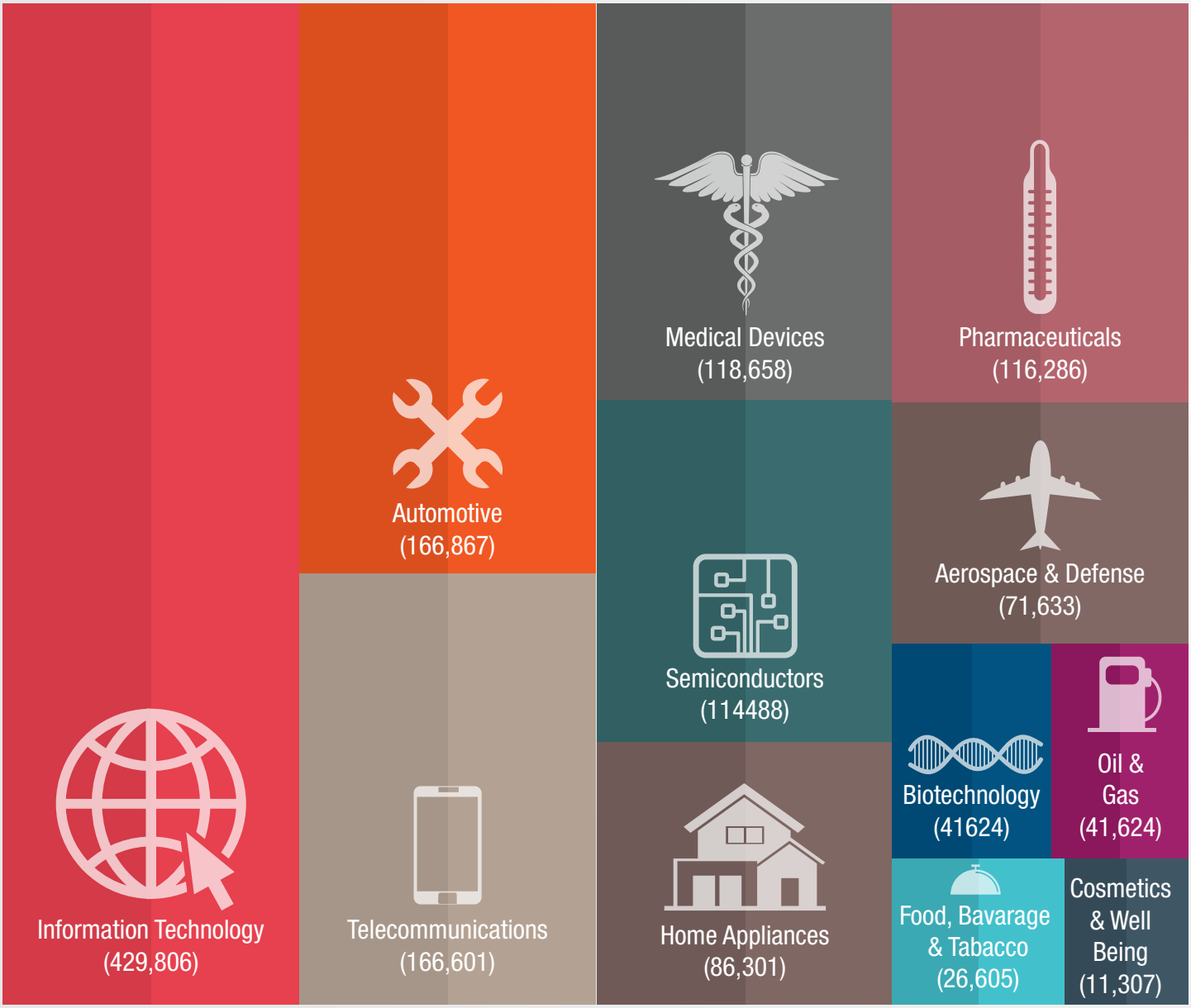
hto@might.org.my

Patent: Malaysia 12 Sectors vs the world

Innovation is a driver of economic success and growth of a country, through patents, inventions landscape of the country can be identified and help to understand the Country's R&D priorities, funds ands resources allocation. Thomson & Reuters in their '2016 State of Innovation' report, used the term **Collabovation** to represent the elegant convergence of collaboration, innovation, cultivation, cross-pollination and calibration, swirled into the powerful process of bringing inventions to life with strategic partners and suppliers.

Global inventions for **12 sectors** in 2015 shows the top 3 sectors with highest patents filed are information **technology, automotive and telecommunication.**

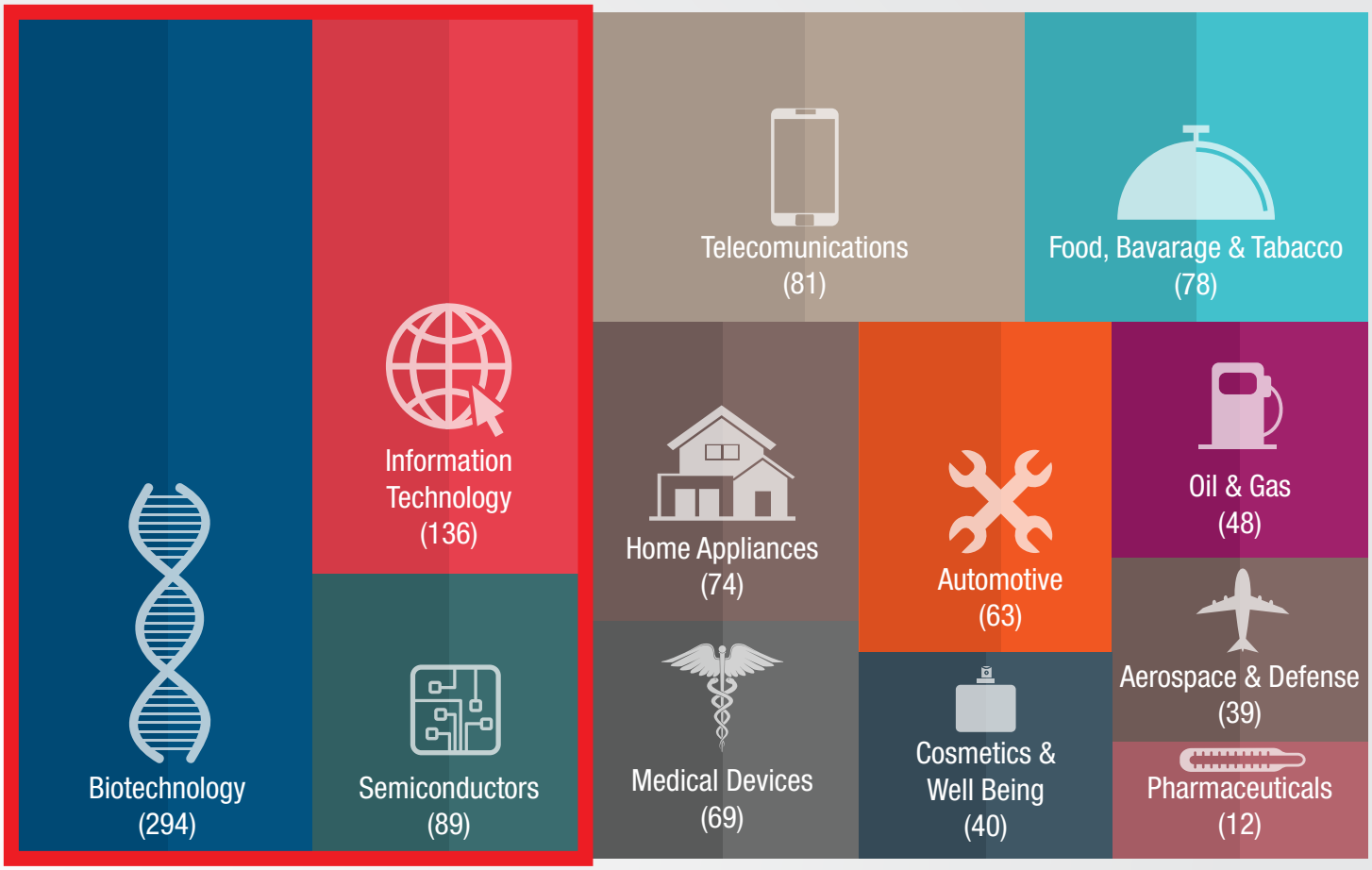
Global Inventions Overview (2015)



Source: SIFT analytics, Thomson Reuters IP& Science, MyIPO database & WIPO database

Overall view of Malaysia inventions has indicated Biotechnology, Information technology and Semiconductor are the top 3 sectors with highest patent filed.

Malaysia Inventions Overview (2000-Present (2015)



Source: SIFT analytics, Thomson Reuters IP& Science, MyIPO database & WIPO database

Malaysia Subsectors Invention

A look across to the top three main field of research (FOR) in Malaysia for there years 2010 to 2012 shows that the output for the field of research (FOR) have set the landscape for Malaysia Inventions.

The three top Subsectors invention for Malaysia are Computing, General biotechnology and Data transmission which are from sector **Information technology, Biotechnology** and **Telecommunications,** respectively. This indicate the development of the subsectors are supported by these main FOR.

Three Main Fields of Research (FOR)

2010	2011	2012
Information, Computer and Communication Technology	Information, Computer and Communication Technology	Engineering and Technology
Engineering and Technology	Engineering and Technology	Natural Sciences
Biotechnology	Natural Sciences	Information, Computer and Communication Technology

Source: SIFT analytics, Thomson Reuters IP& Science, MyIPO database & WIPO database, http://mastic.mosti.gov.my/

Patents - Malaysia vs the world

Comparison of Malaysia inventions with Top 10 Global Innovators

Aerospace & Defense

Company	avv
United Technologies Corp, US	716
State Grid Corp of China	715
Airbus Operations, France	620
Jiangxi Hongdu Aviation, China	617
Boeing, US	531
General Electric, US	424
LG, S Korea	392
Siemens, Germany	387
Toyota, Japan	360
Hyundai, S Korea	334
Malaysia (2000-present)	**39 inventions**

Aerospace & Defense — Advanced Materials — 15

Automotive

Company	Inventions (2015)
Toyota, Japan	4214
Hyundai, S Korea	4214
Bosch, Germany	2390
Denso, Japan	2169
Honda, Japan	2039
Ford, US	1837
Daimler, Germany	1575
GM, US	1435
Beiqi Foton, China	1223
Nissan, Japan	1188
Malaysia (2000-present)	**63 inventions**

Automotive — Safety — 19

Biotechnology

Company	Inventions (2015)
DuPont, US	407
University of Jiangnan, China	287
Monsanto, US	229
Roche, Switzerland	203
University of Zhejiang, China	200
Rural Dev. Administration, S Korea	191
University of California, US	184
CNRS, France	166
Lanzhou Veterinary Inst, China	165
INSERM, France	160
Malaysia (2000-present)	**294 inventions**

Biotechnology — General Biotechnology — 65

Cosmetic & Well Being

Company	Inventions (2015)
LG Household & Healthcare, S Korea	315
L'Oreal, France	314
Kao, Japan	214
Henkel, Germany	154
P&G, US	144
AmorePacific, S Korea	125
Aesthetic Beijing Technology Co, China	87
Unilever, Netherlands/UK	75
Beiersdorf, Germany	73
Kose, Japan	70
Malaysia (2000-present)	**40 inventions**

Cosmetic & Well Being — Skin — 23

Food, Beverage & Tobacco

Company	Inventions (2015)
China Tobacco Hubei Ind Corp, China	1122
Qingdao Xiuxian Foods Co. , China	165
Philip Morris, US	121
University of Guangxi, China	118
Inst Agro Food S&T Chinese, China	114
University of Jiangnan, China	114
University of Zhejiang Ocean, China	104
Hefei Bulaochuanqi Health S&T, China	87
Wuhu Hongyang Food, China	72
Anhui Xianzhiyuan, China	69
Malaysia (2000-present)	**78 inventions**

Food, Beverage & Tobacco — Sugar & starch — 43

Home Appliances

Company	Inventions (2015)
Midea Group, China	5427
Zhuhai Gree Electric appliances, China	1995
Haier Group, China	1315
Panasonic, Japan	949
Mitsubishi Electric, Japan	948
Samsung, S Korea	736
BSH Hausgerate, Germany	697
LG, S Korea	690
Hitachi Kucho System, Japan	460
Daikin Kogyo, Japan	446
Malaysia (2000-present)	**74 inventions**

Home appliance — Heating/ air conditioning — 46

Information Technology

Company	Inventions (2015)
State Grid Corp China	7479
Canon, Japan	6370
Samsung, S Korea	5792
IBM, US	4205
Ricoh, Japan	3539
Google, US	3164
Huawei, China	2799
Lenovo,China	2798
LG, S Korea	2521
Tencent Tech. Shenzhen, China	2418
Malaysia (2000-present)	**136 inventions**

Information Technology — Computing — 87

Medical Devices

Company	Inventions (2015)
Olympus Optical, Japan	4214
Siemens, Germany	4214
Toshiba, Japan	2390
Fourth Military Medical Uni, China	2169
Samsung, S Korea	2039
Terumo, Japan	1837
Philips, Netherlands	1575
Canon, Japan	1435
Medtronic, US	1223
Covidien, US	1188
Malaysia (2000-present)	**63 inventions**

Medical devices — Diagnosis, surgery — 32

Oil & Gas

Company	Inventions (2015)
Sinopec, China	1991
Petrochina, China	1982
Halliburton, US	940
China National Offshore oil, China	455
Schlumberger, US	378
Baker Hughes, US	288
PRAD research & development, US	272
Uni. of China Petroleum, China	239
Toyota, Japan	219
Tatneft Stock, Russia	189
Malaysia (2000-present)	**48 inventions**

Oil & Gas — Exploring, Drilling, Production — 17

Pharmaceuticals

Company	Inventions (2015)
Roche, Switzerland	351
University of Jiangnan, China	320
University of Zhejiang, China	271
LG household & healthcare, S Korea	270
Foshan Saiweisi Pharma Techn, China	266
University of California, US	235
Sanofi, France	232
Univ. of Shanghai Jiangtong, China	225
CNRS, France	223
University of Guangxi, China	209
Malaysia (2000-present)	**12 inventions**

Pharmaceuticals — Organics — 6

Semiconductors

Company	Inventions (2015)
Semiconductors	4144
BOE Technology Group, China	2900
LG, S Korea	2884
Shenzen China Star Opto E Tech, China	1701
Toshiba, Japan	1521
Toshiba, Japan	1424
Semiconductor Mfg. Shanghai, China	1405
IBM, US	969
IBM, US	873
IBM, US	872
Malaysia (2000-present)	**89 inventions**

Semiconductors — Discrete Devices — 42

Telecommunications

Company	Inventions (2015)
Samsung, S Korea	4132
Huawei, China	3496
LG, S Korea	2795
State Grid Crop China	2585
ZTE Corp, China	1960
Qualcomm, US	1841
Ericsson, Sweden	1424
Sony, Japan	1129
NTT, Japan	1129
Fujitsu, Japan	1087
Malaysia (2000-present)	**81 inventions**

Telecommunications — Exploring, Drilling, Production — 57

Digital age and social media has become the most effective way for people with huge followings to assert their influence. Through various social platforms - Twitter, Instagram, Facebook, Youtube etc., a number of individuals have acquired thousands of followers who watch, listen to and cling on to their every word.

Here are the top 20 Most Influential Malaysian in Social Media.

20 Most Influential Malaysian in Social Media (based on number of followers):

1. Lisa Surihani
2. Dato' Sri Haji Mohammad Najib bin Tun Haji Abdul Razak
3. Zizan Razak
4. Aaron Aziz
5. Shaheizy Sam Samad
6. Awal Ashaari
7. Yana Samsudin
8. Yuna
9. Fizo Omar
10. Liyana Jasmay
11. Scha Alyahya
12. Tun Dr. Mahathir bin Mohamad
13. Aznil Hj Nawawi
14. Hafiz Hamidun
15. Neelofa
16. Dato' Siti Nurhaliza
17. Izara Aishah
18. Dato' Dr. Haji Mohd Fadzilah Kamsah
19. Anwar Ibrahim
20. Khairy Jamaluddin

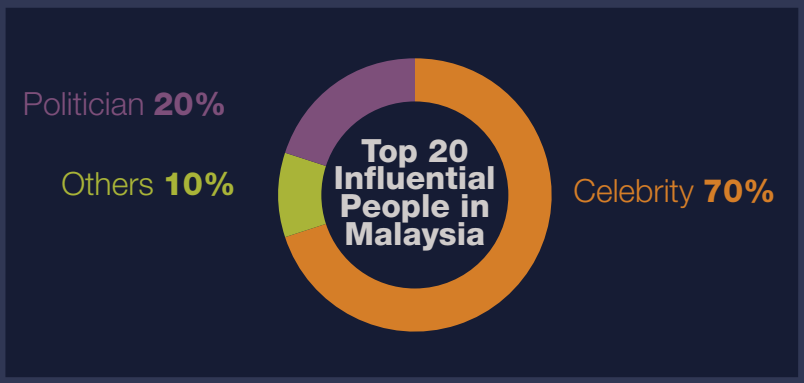
Criteria:

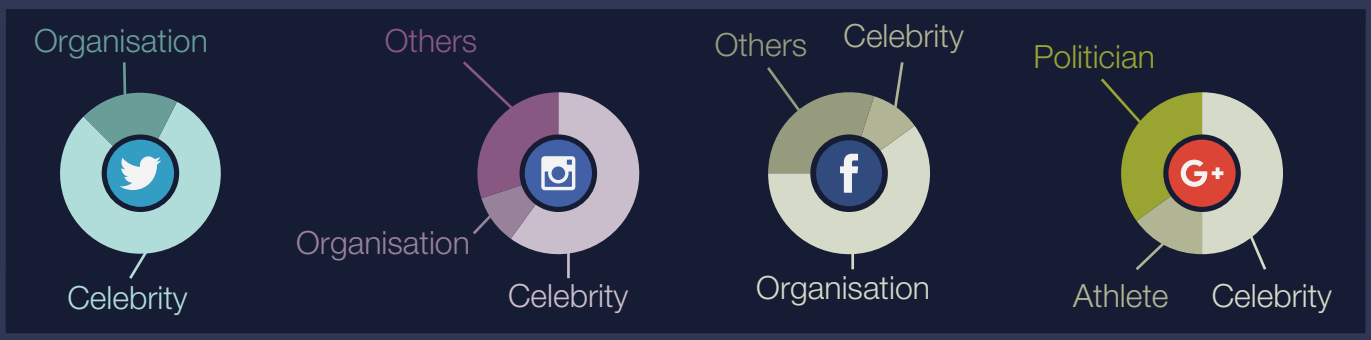
- Twitter
- Instagram
- Facebook
- Google Trending Search
- News Hits

Daily Active Users **1090 Million**

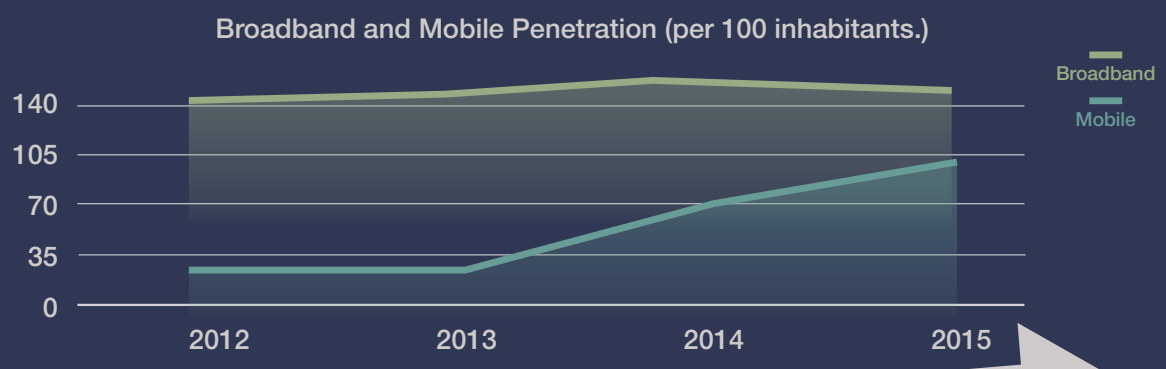
Daily Active Users **136 Million**

Daily Active Users **300 Million**



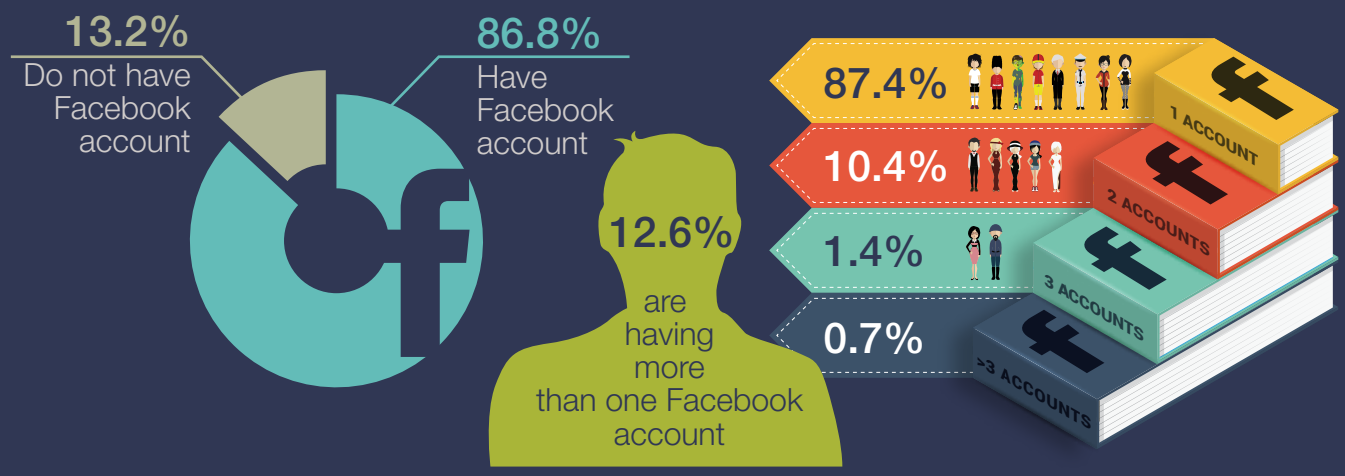


Internet & mobile penetration increased significantly from year 2012 to 2015.



The popular activities among Malaysian Internet users incline towards social networking and entertainment.

Percentage distribution of Facebook user and number of account owned by a user

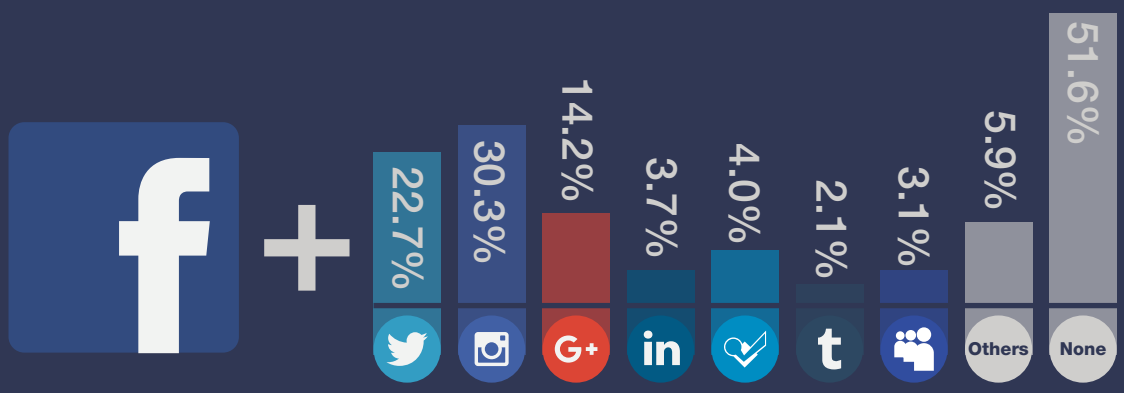


Source : http://www.skmm.gov.my/

Percentage distribution of Facebook user by alternative social media

48.4%

of Facebook user have an alternative social media account



TVET - A GAME CHANGER?

"We stand on the brink of technological revolution that will fundamentally alter the way we live, work and relate to one another. In it's scale, scope and complexity, the transformation will be unlike anything humankind has experienced before.

Klaus Schwab
Founder & Executive Chairman, World Economic Forum

THE FOURTH INDUSTRIAL REVOLUTION

1.0

Based on mechanical production driven by water & steam power.

2.0

Based on mass production enabled by electrical energy.

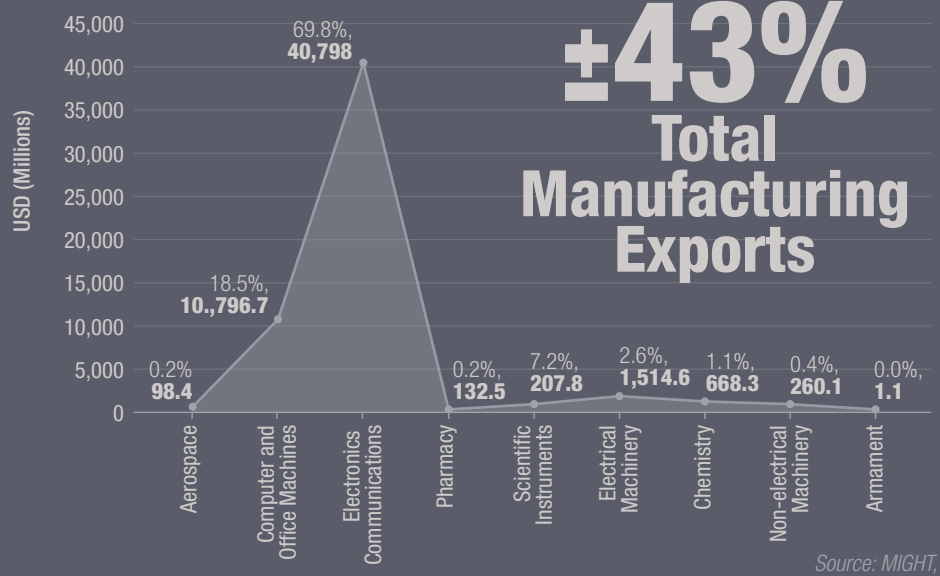
3.0

Based on the use of computer & electronics to further enhance automation.

4.0

Based on the use of cyber physical systems.

MALAYSIA HIGH-TECH EXPORTS 2015



±43%
Total Manufacturing Exports

Source: MIGHT, DOSM

IS OUR SECTOR READY?

Automation and robotics

Automation is increasingly applied across all sectors
Automotive and electronics are the largest consumers of robots
In ASEAN, robots sales increased for Indonesia, Malaysia, Singapore and Vietnam in 2014

Additive manufacturing (AM) or 3D printing

Global market grew 29% between 2012-13

Internet of Things

Connected devices embedded with sensors to grow from 10 billion today to 30 billion devices by 2020

IS THE FUTURE WORKFORCE READY?

Skills most important:

Technical knowledge **40%**

Teamwork and communications **33%**

Skills most difficult to find:

Strategic thinking and problem solving **32%**

Technical knowledge **27%**

Innovation **25%**

Creativity **25%**

When automation occurs, it is often "human centric"

The technology aids workers rather than replaces them

Collaborative robots, or "cobots" perform more repetitive and difficult to perform tasks

Human workers have advantages in terms of adaptability and perception

Robots are replacing lower-skilled jobs

The industry needs new types of higher-skilled workers who are difficult to find

Increased need for engineers with specialized knowledge on automation and robotic programming

Increased demand for workers with STEM backgrounds

Only one third felt technology would increase their total employment by 2025

Around 22% thought technology would reduce number of people employed

Source: International Labour Organization (2016)

Robotics automation: replacing simple tasks

Foxconn: replaced 60,000 workers with robots in one factory

But poor execution of automation can be costly

Robots today are not suffciently flexible to accaount for short products development cycles and product lifepans

The IoT: presents a major growth opportunity for the entire sector

Demand for sensors, connectivity and memory to increase

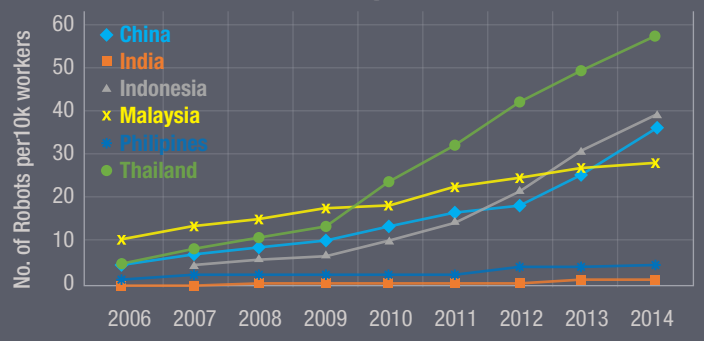
The IoT may increase semiconductor global revenue by 3-4%

3D printing: currently limited but likely to expand

3D printed circuits projected to be available in market by 2018

3D production of simple electronic parts will appear first

Robotic Density in the Manufacturing Sector



Source: International Labour Organization, International Federation of Robotics, MIGHT

An exclusive preview of the inspiring and unique homes of ELMINA VALLEY Phase 4.

The latest 278 units of 2-storey link homes feature distinctive designs that maximise comfort living: vent blocks and louvres that allow free flow of air and sunshine, and fair face bricks and deep overhangs that provide a comfortable internal temperature around the homes.

These 22' x 75' 2-storey link homes are also designed for multigenerational living, nestled in an expanse of green spaces and multiple community parks with the following features:

- **Column-less car porch for unobstructed space.**
- **Nearby multiple parks for relaxing strolls; carefree green spaces for more vigorous activities.**
- **En-suite bathrooms in all bedrooms for added privacy and convenience.**
- **Lifetime homes that facilitate multigenerational living.**

This is how life should be.

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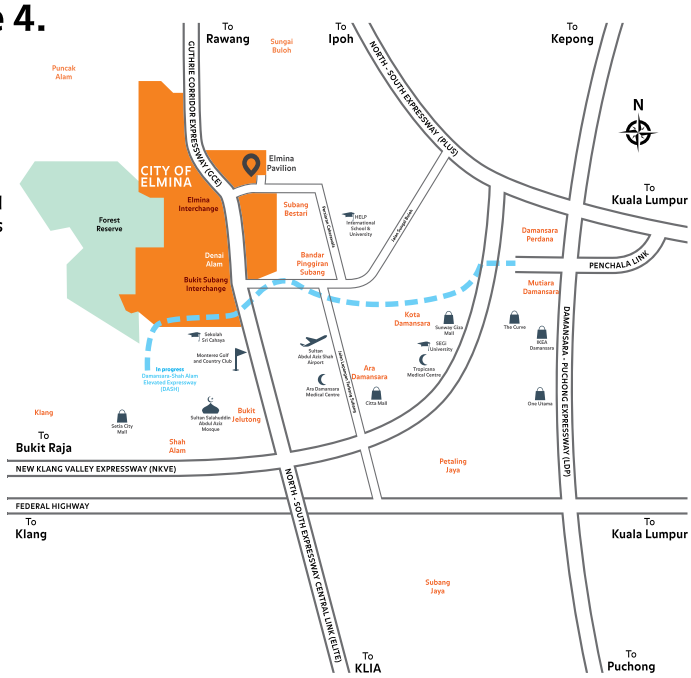
(including public holidays)



Klang *29km* — **Bukit Jelutong** *10km* — **City of Elmina** — **Ara Damansara** *16km* — **Subang Jaya** *20km*

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Phase EV4B: No of units: 149 | Type: 2 Storey Terrace House | Expected Date of Completion: November 2018 | Land: Free from Encumbrances | Tenure of Land: Freehold | Developer's License No: 13017-16/09-2018/0760 (L) | Validity: 30/09/2016 – 29/09/2018 | Advertising & Sales Permit No: 13017-16/09-2018/0760 (P) | Validity: 30/09/2016 – 29/09/2018 | Appropriate Authority which Approves the Building Plans: Majlis Bandaraya Shah Alam | Reference No: MBSA/BGN/BB/600-1(PS)/SEK.U15/0196-2015 | Developed by: Sime Darby Elmina Development Sdn. Bhd. (Co. No. 283265-U), 10th Floor, Block G, No. 2 Jalan PJU 1A/7A, Ara Damansara, 47301 Petaling Jaya, Selangor | Selling Price: RM 788,888 (min) – RM 1,755,888 (max) | 7% Bumiputera Discount (Quota applies)

MAP THE FUTURE

As a strategic policymaker or stakeholder, you can help map out a desired future for Malaysia

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We look forward to hearing from you.

myForesight team