MALAYSIA SMART CITY OUTLOOK 2021 - 2022

Embracing Technology Towards Enhancing Smart Cities & Communities

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Malaysian Industry-Government Group for High Technology

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MALAYSIA SMART CITY OUTLOOK 2021 - 2022

Embracing Technology
Towards Enhancing Smart Cities & Communities

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The Malaysia Smart City Outlook 2021-2022 contains information and survey outcomes that provide an overall picture of smart city developments in Malaysia benchmarking global practices. The survey results present an overview of the involvement, status, perceptions and aspirations of local authorities in respect of the smart city agenda. The data, findings, views and conclusions expressed in this publication aim to generate interest and further discussions on smart city.

The contents are an indication of the smart city journeys undertaken in the country to date, viewed from the perspectives and professional experiences of various stakeholders and thought leaders. Examples of strategies and global practices are as published by other sources. The arrangement of these different inputs in the Outlook does not reflect any order of importance or priority in relation to the subject.

While we try to keep the information and data timely and accurate, we make no guarantees. We will make every effort to correct any errors brought to our attention.

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Executive Summary

More than 60% of the world population live in cities. Today, there is an overwhelming desire globally to create substantially better urban living and working conditions. Moves towards this overarching goal integrate efficiency, liveability, economic viability and sustainability in urban developments through the adoption of technology and with wider community participation.

As the push towards smart cities gains momentum worldwide, ongoing efforts are enabling cities to be safer, more secure, resilient, inclusive and sustainable. This has been made possible by infrastructural expansion, growing digitalisation and increasing technological and digital literacy. Globally, cities are being wired-up to meet urban challenges in order to create economic competitiveness. And, with corresponding moves to narrow the digital literacy gap, this will support livelihoods and create healthier lifestyles that will ensure a sustainable future. Ultimately, smart city is about building resilient societies and economies.

Thus, embracing the sustainable management of cities, or smart city, is not a choice but an imperative for the world. Malaysia, under the auspices of the Ministry of Housing and Local Government (KPKT) launched the Smart City Framework in 2019, joining the global network of smart cities.

The Malaysia Smart City Outlook 2021-2022 (MSCO 2021-2022) under the selected theme ***"Embracing Technology Towards Enhancing Smart Cities and Communities"*** gives a comprehensive picture of the advancement in technologies that are key to the success of smart cities, highlighting initiatives that have been undertaken. It encapsulates Malaysia's smart city achievements so far within the seven components – economy, government, community, digital infrastructure, mobility, environment and living. Information sourced from KPKT reports, survey of local authorities, interviews with selected stakeholders and data on best practices extracted from global smart cities reports and blueprints, form the basis of the analysis of MSCO 2021-2022.

Correspondingly, the Outlook also identifies gaps by comparing local achievements against global practices. These gaps provide technology players and solution providers a comprehensive view of opportunities that will emerge in the smart city development. It is also hoped that they will generate further discussions for R&D, guide the way forward for cities in Malaysia to realise the targets of the Framework.

Finally, the Outlook hopes to bring forth meaningful discussions on the relationship between technology and society. It wishes to encourage new thoughts on technology as tools for empowerment and active citizenship and enrich the discourse on openness and inclusiveness in the era of digitalisation.

About MIGHT

Malaysian Industry-Government Group for High Technology

The Malaysian Industry-Government Group for High Technology (MIGHT) is a non-profit organisation under the monitoring and supervision of The Ministry of Science, Technology and Innovation (MOSTI). MIGHT serves as a think-tank which offers to build and drive platform for government and industry sector for sharing of expertise, providing strategic advice in the prospecting and promotion of industry development through strategic application of science and technology. As a partnership hub, we promote collaboration & partnership to shape technology studies, capacity building through policy interventions, and flagship programmes to encourage developments in the country.

"MIGHT IS FORMED TO PROSPECT FOR BUSINESS OPPORTUNITIES FOR MALAYSIA THROUGH STRATEGIC EXPLOITATION OF TECHNOLOGY"

Mission

To Serve The Nation In Advancing Competency In High Technology Through Partnership Towards Sustainable Development.

What We Do

- STRATEGIC ADVISORY
- INTERMEDIARY
- CONTENT DEVELOPER

MIGHT in CREATING A SUSTAINABLE ECOSYSTEM

The Sustainable City Development in Malaysia project is an integrated approach to urban planning and management in both strategic content and federal-state level linkages that is guided by evidence-based, multi-dimensional, and broadly inclusive planning process that balances economic, social and environmental resource considerations. MIGHT plays an important role in enabling innovation and partnership hubs to assist smart city stakeholders in areas of technology know-how and transfer, best practices, and innovation to shape a healthier and highly effective smart city ecosystem in Malaysia. Here at MIGHT, we promote: -

- **Social (Livable & Inclusive Cities)**

-Ensuring access to Affordable & Quality Services for Citizens-
To ensure the well-being of city and rural citizens (the 'rakyat'), in terms of equal access to social care.

- **Environment (Green & Resilient Cities)**

-Protecting natural resources and ensuring investments as well as pro-active risk reduction and management-
To ensure environmental sustainability for cities in supporting Malaysia's commitment in terms of emissions intensity.

- **Economics (Competitive Cities)**

-Fostering economic growth through the benefits of density-
To accelerate the greening of cities as engine for economic growth through investment, jobs and innovation, with ICT as the enabler.

- **Governance (Smart Cities)**

-Connected & integrated city systems for forward looking city governance-
To bridge governments, industry players and citizens through data integration and analytics into insights leading to predictive and effective city planning.

About Confexhub

confexhub®
Thought Leader Network Solutions

We are the Decision Enabler

Confexhub is a leading thought leader network solutions provider focusing on delivering Industry, Economic & Policy Studies, Global Business and Investment Matching, as well as industry intelligence to enable decision-making.

Our network of highly-qualified professionals include economists and technology experts. Through an integrated approach, we create and develop new platforms to spearhead, incubate and disseminate industry updates, thought leadership ideas and future trends in 12 key business domains. These include urban development, energy, transportation, water & sanitation, agriculture, forestry, environment & waste, healthcare, tourism, education and disruptive technology.

Our strength in research is widely acclaimed. Over the years, we have served industries, conducting economic and policy studies, global business and investment matching programmes.

Our significant contribution to the growth and development of the emerging and developing economies across the ASEAN, SAARC and EEU regions has been achieved through our renowned thought leadership platforms via ongoing conferences, exhibitions and forums.

Led by Datuk Dr. Abdul Aziz S.A. Kadir as chairman of the organisation, our team consists of qualified personnel with more than 80 years combined experience in research, FDI, trade exhibition and conference industries.

Acknowledgement

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Message from MIGHT Joint Chairmen

Datuk Ir. (Dr.) Abdul Rahim Hj. Hashim
Joint Chairman (Government)
Malaysian Industry-Government
Group for High Technology (MIGHT)

Tan Sri Datuk Dr. Ir. Ahmad Tajuddin Ali, FASc
Joint Chairman (Industry)
Malaysian Industry-Government
Group for High Technology (MIGHT)

The COVID-19 pandemic has demonstrated, albeit painfully, the challenges faced by cities the world over in maintaining demographic, economic, and ecological integrity in order to remain resilient. A robust government structures must also be in place to enable cities to be self-organising and fully realise their adaptive potential.

For a smart city to live up to its name, it is essential that all parties embrace high technologies to maximise the use of resources, minimise impact on nature and human lives and foster sustainable growth. The deployment of emerging technologies increases productivity, supports economic growth, increases educational and employment opportunities and develops smarter, safer and more efficient cities. This eventually leads to a better and more liveable environment for its citizens.

There are currently initiatives on smart cities in Malaysia through the Smart City Framework launched by KPKT in September 2019 with over 3,000 smart initiatives being implemented and over a thousand in the pipeline. For smart cities in Malaysia to be effective and successful, both the infrastructure and people must be digitally ready. In tandem with the 12th Malaysia Plan 2021-2025 which focuses on economic empowerment, environmental sustainability, and social re-engineering, both the public and private sectors are encouraged to embrace emerging technologies to ensure that Malaysia's economy remains robust and globally competitive. To this end, the Malaysian government has allocated RM1 billion in the 2021 national budget as incentive for high-technology and high-value investment.

It is with this in mind that Malaysia Smart City Outlook 2021-2022 is published. The MSCO2021-2022 aims to scale up the development and deployment of high technology among Malaysians in supporting the planning and development of smart cities. The publication provides unparalleled opportunities for industry stakeholders to showcase their strengths and market-leading innovation for the multi-faceted aspects of a thriving smart city and digital ecosystem, as well as share their visions and success stories. The insights presented in MSCO2021-2022 will also serve as a reference guide for both the public and private stakeholders in charting their smart city roadmap and implementation strategies.

MIGHT as a key driver for innovation will continue our efforts to push the smart city agenda through transfer of technology, know-how and best practices to shape a healthier and effective smart city ecosystem in Malaysia.

Its success is our collective duty and together we will make it a reality.

Message from MIGHT President & Chief Executive Officer

Datuk Dr. Mohd Yusoff Sulaiman
President & Chief Executive Officer
Malaysian Industry-Government Group for High Technology (MIGHT)

The world is experiencing rapid urbanisation as cities become magnets especially for young and highly-skilled individuals looking for lucrative jobs and higher quality of life. Ageing people who have lived in cities since they were established will also make up a significant percentage of future city dwellers. This will present cities with wide and deep economic and societal challenges including provision of utilities, mobility and healthcare; sustainability, unemployment, natural disasters and many more. It is estimated that 77 per cent of the Malaysian population currently resides in cities.

2020 / 2021 will long be remembered as the COVID-19 global pandemic years. The crisis is a wake-up call on how nations and cities of the future should prepare to respond better to those challenges mentioned before in order to minimise economic, health and societal impacts. During the crisis, Governments at all levels were pushed against the wall to decide between livelihoods and saving lives. Many businesses that support cities were halted to a standstill and cities turned into ghost towns. But despite the gloom and doom, the world is now entering a period of radical transformations in which technology has the potential to significantly raise the basic standards of living for every man, woman, and child on the planet. The application of the Fourth Industrial Revolution (4IR) technologies such as Internet of things, Artificial intelligence, data analytics, 3-D printing, blockchain and others will allow cities to develop new processes, products and services that will make cities greener, smarter and more interconnected. Cities should leverage on each other's best practices and experiences by working together in collaboration and partnership. The Malaysia Smart Cities Alliance (MSCA) is an excellent platform to do just that.

Technology by itself can only do so much. City planners and implementors should address and integrate other elements that are crucial for smart cities. At MIGHT, we developed the F.I.R.S.T. matrix that consists of five pillars or elements as a tool for strategic and wholesome development. The five pillars are Funding, Infrastructure, Regulations & Policies, Skills & Talents and Technology & Innovation. These elements should be addressed and developed through consensus and extensive consultations with the stakeholders in order to meet their needs and expectations. Cities must balance the requirements for both soft and hard infrastructures, and be resilient and agile enough to adapt to changing environments and challenges. Cities need foresight.

In view of the importance of smart cities in national development, MIGHT and its collaborators are both excited and proud to launch the inaugural edition of the Malaysia Smart City Outlook 2021/2022: Embracing Technology Towards Enhancing Smart Cities and Communities. The Outlook serves as a reference on key smart city initiatives and provides readers with a broader perspective of smart cities in Malaysia from key government and industry stakeholders. The Outlook also focuses on the technological applications relating to the seven components of smart cities through the sharing of experiences and aspirations by technology providers. It is our sincere hope that this inaugural Outlook will both guide and inspire citizens, community leaders, NGOs, businesses, academia, technologists, politicians, and public agencies to transform cities not only to be smart, sustainable and competitive, but having its soul.

On behalf of MIGHT and the Editorial Team, I would like to extend my deepest appreciation to every single individual and organisation that has directly or indirectly contributed to this inaugural Outlook. Thank you.

Message from Confexhub Group

Datuk Dr. Abdul Aziz S.A. Kadir
Chairman
Confexhub Group

Similar to many other cities around the world, Malaysian cities are experiencing greater challenges as rural-urban migration in the country is accelerating. The emergence of new technologies has made it possible for cities to tackle the many city management challenges, spur economic growth and bring more benefits to society, using new technology-based approaches.

While the Government is taking vital steps to modernise regulations and develop world-class infrastructures, universal access to high technologies and empowering talents with future skills are equally important to accelerate the smart city development.

As the government continues to encourage innovations in digital technologies and adoptions of the smart city concept to synergistically drive the Malaysian smart city agenda forward, it is recognised that effectively implementing the 2019 Malaysia Smart City Framework remains a critical challenge. One of the main issues is the lack of participation of technology players.

It is with this in mind that Confexhub is joining hands with MIGHT to publish the Malaysia Smart City Outlook 2021-2022 that specifically deliberates on the relevant technology issues in implementing the Malaysia Smart City Framework. The Outlook is conceptualised as a reference for the local government to review their technological challenges and assess their technological needs in implementing smart city initiatives. It also aims to serve as a promotional tool for the relevant high technology players to capture the immense business opportunities that are set to emerge with the implementation of smart cities in the country.

We hope this publication would bring value to all smart city stakeholders in building a sustainable and resilient Malaysia.

Paul Yeo
Chief Executive Officer
Confexhub Group

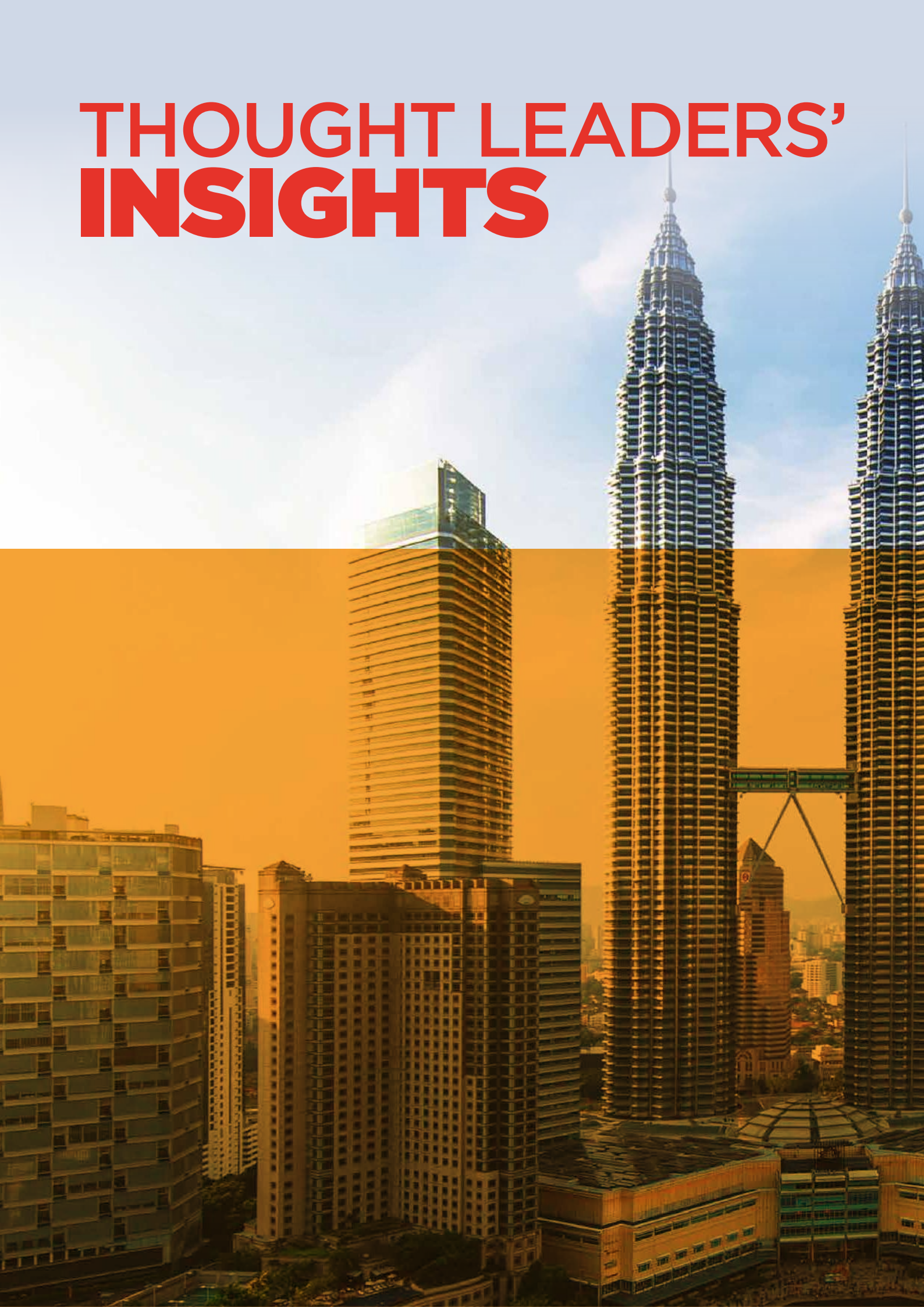
Today, there are many discussions, blueprints and guidelines on the issue of smart cities being published globally and locally. Some of these are from the perspective of policy, offering strategies of best practices that eliminate other different determinants surrounding smart city development. In order for the government to effectively provide quality services to citizens, governments need to be able to recognise their own challenges and consider different factors in implementing smart initiatives, because smart city development involves not only supportive policies, but also includes other complex elements.

In this context, it is important to look at the variety of factors that influence the development of smart cities and explore potential priorities befitting our very own desirable smart city outcomes through a comparison of the strategies.

Therefore, this publication examines the challenges that specifically impact our local smart city initiatives, reviews the progress of our current development status, analyses the pertinent factors needing focus, and lastly, recommends actionable plans and implementation mechanism that serve as a 'roadmap' for not only municipalities, but also industries and institutions. This would help to develop and implement practical and sustainable smart city solutions that would meet our local needs and challenges.

It is our hope that our readers, in particular local authorities and technology providers, will be enlightened by the opportunities presented by our national smart city initiatives; thereby start taking steps to participate and move forward on the right track. It is hoped that along the way, these can bring about fresh changes for improvements and efficacy in smart city development in the country.

THOUGHT LEADERS' **INSIGHTS**



YBhg. Datuk Zainal Abidin Bin Abu Hassan

Secretary General
Ministry of Housing & Local Government

Click or scan here to watch the **interview**

Encouraging technology adoption by municipalities
We have 154 PBTs with different levels of capacity. Our profiling helps to evaluate individual readiness and determine each PBT's priorities yearly. We train and capacity-build those new to Smart City.

State and local governments are encouraged to develop their smart city road maps and blueprints.

We use available budget to align priorities so that smart city components will be the main agenda for PBTs.

KPKT's significant Smart City milestones
Based on our data profiling, 1,912 initiatives have been implemented.

We have launched 'I-tegur', an online public complaint management system and PBT payment portal for local authorities.

We also collaborated with countries under the ambit of the Asean Smart Cities Network. For example, Dewan Bandaraya Kota Kinabalu has undertaken studies on smart new township with Korea's Ministry of Land, Infrastructure and Transport.

Supporting technology-driven solutions
During the early days of the pandemic, an e-commerce platform was launched by Majlis Perbandaran Klang. They created this themselves at low-cost. This has helped small local entrepreneurs to market and deliver their products as the platform links them to customers. So, those affected by the pandemic see their income increase by threefold. We support this kind of initiatives.

YBrs. Dr Raslan Bin Ahmad, FASc.

Senior Vice President
Malaysian Industry-Government Group for High Technology (MIGHT)

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MIGHT' s role in the Malaysian Smart City agenda
It started in 2010 when MIGHT was the Secretariat for the Global Science and Innovation Advisory Council (GSIAC). This addressed urban and rural community issues, looking at digital and bio-economy as well as human capacity-building.

Starting from the GSIAC, we began bringing in key smart city stakeholders, including industry players, technology providers and the state and local government to plan, implement and monitor aspects of sustainable cities and communities.

Strengthening the Smart City agenda
We have always ensured our partners share a common agenda to help the country transform into a smart nation.

Through the Malaysia Smart City Alliance and the Word Urban Forum in 2018, we provided a platform for smart city stakeholders to share, exchange knowledge and project solutions, involving also international players such as the Global Federation for Competitive Council and the Global Futures Group.

Challenges and opportunities
Through a series of events, we have raised awareness on the challenges and opportunities of smart city development, such as funding, infrastructure, regulatory and talent issues and technical adoption.

With UNIDO and the World Bank, we facilitated capacity-building training for local authorities to equip themselves for Smart City implementation, exploring alternative financing models to help strengthen their capacity through Public Private Partnerships.

YAB. Tuan Chow Kon Yeow

Chief Minister of Penang

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Key priorities for Penang smart city development

The manufacturing and service sectors are Penang's twin engine of growth. We are strengthening these, including agriculture and tourism, in line with the digitalisation era.

Smart city initiatives are an important part of Penang's future, as indicated in the Penang 2030 Vision. We have established a Smart Delivery Unit and want to ensure our infrastructure is ready for the next wave of digitalisation.

Significant initiatives

We launched the cashless initiative in collaboration with banking and non-banking institutions to migrate to e-payment in public markets. 1,507 merchants have given their support. Covid-19 has also accelerated the process, driving e-commerce and cashless payment beyond our imagination.

Penang's Smart City vision

As we embark on this smart city journey, we will see more efficiency. We have Smart Government and Smart Economy, because of digitalisation and IoT. This will provide opportunities for industries to upscale technologically.

Community Engagement

Stakeholders' engagement is very important. Without community participation, any smart city initiatives will not be successful, because ultimately it is for their benefit.

I think today we have 73 smart city initiatives to engage communities, to let them know how they can play a role in making smart city a success.

YAB. Datuk Seri Utama Haji Sulaiman Bin Md. Ali

Chief Minister of Melaka

Melaka's Strategic Plans for the Future

The Melakaku Maju Jaya Strategic Plan 2035 (PMSJ 2035) was launched on 1st July 2020 as a strategic, holistic and comprehensive action plan that takes Melaka towards the next 15 years.

In line with the UN Sustainable Development Goals, the Plan will be inclusive, focussing on the environment and community needs so that "No One Is Left Behind".

Eight flagships

The eight flagships driving the state's integrated development run in collaboration with the State Economic Planning Unit (UPEN) and the State Monitoring and Implementation Office (MIMO).

Strengthening Melaka's maritime activities, we aim to promote economic diversity. The establishment of the Melaka Waterfront Economic Zone (M-WEZ) has seen infrastructural developments which include Menara Telekomunikasi, a Data Centre and Melaka's Smart and Virtual City as well as the 5G Projek Perintis.

Smart Melaka & Smart Grid Technology

Digital Melaka, the fourth flagship, brings smart applications and digital content (Smart Melaka) and smart governance to the forefront of Melaka's development.

Melaka is a pioneer in smart grid technology, spearheading its high-tech city concept. The city has been selected for the smart grid demonstration project by Global Environment Facility (GEF) and the United Nations Industrial Development Organisation. This will transform Melaka into a sustainable city, with greater reduction in greenhouse emissions and increase in renewable energy, benefitting 930,000 people. We are on to a good start and will continue to improve.

YBrs. Dr. Zaidi Bin Razak

General Manager
Sarawak Multimedia Authority (SMA)

Click or scan here to watch the **interview**

Getting Sarawak into the digital era
Our starting point is investing in digital infrastructure. Without it, there is no smart city.

Our State Integrated Operations Centre, now nearing completion, will be a command centre, collating information and handling more than 100 e-government services.

We have also improved efficiency through Talikhidmat, a smart digital platform connecting citizens to the government via Artificial Intelligence and Big Data Analysis.

Technology adoption and public engagement
Smart city is about creating a new civilisation. There is always resistance to new technology but understanding people's needs is crucial.

For example, when we introduced Smart Farming to rural communities, we help people see its benefits through the Sarawak Pay online. They register for it, using the Sarawak ID. More than eight hundred thousand Sarawakians hold the Sarawak ID.

This is how we respond to citizens' needs through technology.

Digital powerhouse
We aim to be a digital power house. It means creating talents and pushing the boundaries for digital technology. Through our partnerships, we train graduates via our digital innovation hubs.

We have also created the 'open lab' concept, which provides research and testing facilities for our partners. And, as we engage with agencies, we help match needs, skills and technologies across industries.

YBhg. Datuk Ir. Khalilur Rahman Ebrahim

Executive Chairman
System Consultancy Services Sdn Bhd

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Technological priorities of smart city
Smart city is a very exciting concept. Industries play an important role in delivering its objectives.

Telecommunication infrastructures and data analysis are one of the most fundamental aspects of smart city development.

Data capability, the bandwidth of data and reliability of the data services are priorities that need to be cleared of any stumbling blocks.

We started with renewable energy, green building and now we have progressed technologically, deploying such things as Smart Grid and Artificial Intelligence.

We need an integration of these services in order to make smart city happen.

Targets and challenges
Data availability and access affect smart city development. Broadband is the third utility. Without it, we cannot deliver the data to solve problems.

A good example is traffic management in cities. This requires real time data, deploying high resolution cameras to understand traffic flow and analysing patterns. Artificial intelligence also comes into it. However, if the camera quality is not good and data is very slow, you cannot achieve this.

Smart city development requires collaboration between ministries and industries, working towards achieving the development targets. Of course things are improving. We see progress, but there is more room for improvements. Now, we are probably 3 out of 5. I'm really looking forward to 5G.

Dato' P'ng Soo Hong

Vice President of Manufacturing Operations and Managing Director
First Solar Malaysia Sdn. Bhd.

The Solar industry's role in smart city
Solar energy is the cleanest energy that produces the least carbon emissions into the environment and helps slow climate change. A smart city in which energy is generated by renewable energy also enables jobs creation and reduction of energy costs for businesses, making it possible for them to channel the cost savings to other areas. The solar industry produces innovative solutions that can be integrated into an energy management system to maximise the performance of energy generation.

Challenges & Improvements
Refocusing the energy fuel mix in the country's energy equation is needed to give importance to renewable energy. The lack of functioning institutional network on renewable energy could be overcome by encouraging joint-effort between government agencies and private institutions in order to explore the technical and commercial viability of energy generation from renewable resources. Given today's scenario whereby almost all balance of system (BOS) are imported from overseas, enabling the localisation of BOS will create more jobs in the manufacturing sector. Renewable energy projects generally face difficulty in getting financing and loan approval due to the high risk involved and also the lack of technical knowledge on the part of the financiers. However, in recent years, financial institutions are more supportive in providing loan to support green energy projects.

Awareness
There is a lack of information and awareness on the benefits of renewable energy. There are waivers and allowances made available but, not many are aware of the special incentives and huge savings that could be generated from the feed-in-tariff mechanism. There is a clear need for government agencies and more channels to improve dissemination of information to surge awareness in embracing the sustainable energy agenda.

Ong Pang Yen

Executive Officer, Chairman's Office
Sunway Berhad

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interview

Smart city from the perspective of a township developer
Sunway City KL's success as a liveable and sustainable city is based on these phrases: 'Live, learn, work, play in a safe, secure, healthy environment.' So, ours is an integrated model.

Smart city is very much technology-centric. In using technology to serve people's needs, Sunway adopts a human-centric approach. From our understanding, human-centricity is also in the Smart City Framework.

Smart Living is about creating liveable cities, improving urban safety, security and healthcare.

We have improved accessibility to medical healthcare for our community by introducing the tele-medicine service at our Sunway Medical Centre.

Urban farming for sustainable living
Our FutureX Farm aims to meet the needs of society, because people are more conscious about climate change today.

We coined the concept 'grow-ners' - grower and owners, leveraging technology to promote zero wastage.

This is critical for the success of a liveable, sustainable city.

Smart City innovations
It is very important to develop solutions for the world. Our i-lab, the innovation lab, is where young people design and develop apps that make life more convenient for the consumer.

This is the future. Smart city applications is an industry that will continue to grow.

Honourable Deborah L. Wince-Smith

President & CEO, U.S. Council on
Competitiveness, GFCC, Founding Member of MSCA

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interview

Initial thinking behind the smart city agenda in Malaysia
At the 2017 Global Innovation Summit in Kuala Lumpur, Malaysia focussed on sustainable production and how urbanisation and cities were driving this.

To start with, the thinking behind smart city was urbanisation, connectivity, cleaner energy and delivering services to citizens, and how cities are becoming test beds for transformation, embracing competitiveness, innovativeness and sustainability.

A balanced smart city development
Smart city is a continuum because that's true in many dimensions of life. We need to apply smart thinking and unleash educational potential for all.

Giving everyone access to this new world is the democratisation of innovation. We need net equality, providing affordable, secure broadband connectivity to all. But ensuring security without using authoritarian, anti-human surveillance tools is a challenge.

We have challenges and opportunities. Collaborations, doing things that will be another chapter in the human evolution are critical. And this has accelerated during this Covid-19 pandemic.

Digital access
People have access to roads, water and power. But having access to digital capability is also in the same category now.

You can't be an entrepreneur or function in the 21st century if you don't have those tools. They're really almost a human right, not a luxury anymore.

Jerry Hultin

Co-Founder
Malaysia Smart City Alliance

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interview

Malaysia's potential in smart dity development
In Malaysia, you have a government and agencies like MIGHT that are focussed on innovation. Cities are one of the places to do this.

You've already created Cyberjaya, Putrajaya and Johor Iskandar. It showed capacity to imagine where nothing exists and create something new and better.

Accelerating the smart city growth
One, it's about engaging people in the practical things that are happening so that there is a greater comfort and interest across society.

Two, there is a lot of technology now in Europe, Asia or the United States, that has many solutions to transportation, healthcare, education and housing. MIGHT has always been good at looking out to the world and seeing what else is going on.

And then..the combination of working with leaders and the people. You've got the political power, the government's leadership, you've got the corporate power of finance and wealth and you have the people, the workers. You need all three of them to see the benefits.

Ways to improve things
.. listen to people...do something economically sound and have an environmental, sustainability design included so that the outcome in twenty, thirty years is a nicer life. And climate changes are contained.

▶ Solution Provider's Insight

Becoming a Smart City

Smart City Technologies

For the past decade, becoming a smart city has been the main goals for government globally in their urbanization journey. The mission for the smart city initiative is to leverage on technologies that lead to smart outcomes – economic growth and quality of life of citizens. The key technologies that have been harnessed in smart city development include 5G, Cloud, AI and Internet of Things (IoT).

The growing number of IoT devices deployed across all parts of the city has created substantial volumes of smart data that has played an important role in the success of the smart cities. With the massive data, an essential element of a smart city is analytics. It becomes critically important that the city establishes a strong analytics backbone – a core analytics-driven architecture with edge intelligence as the foundation data framework for a smart city.

Consultative Approach for Smart Cities

The smart city analytical platform involves collecting data, analysing data and using data to drive city service improvement. The critical aspect will be the outcome-based approach, which helps cities focus efforts on tangible deliverable outcomes – achieving improved citizen satisfaction, operational efficiency, sustainability and economic growth, and to develop the necessary infrastructure and services. Data analytics provide the insight for enabling a fast and efficient decision support system for the city.

For a successful smart city implementation, it is critical for the decision maker to adopt a 'Think Big and Start with Focus' approach.

The decision maker needs to plan for an environment that can cater to government requirements. While adopting the think big approach, it is critical that the decision maker focuses on immediate use cases that are relevant to the citizens.

The other consideration for the decision maker is to plan for the evolution of the smart city – to look at moving from the enabling stage of smart cities, into connecting the agencies across the smart cities and ultimately extending to co-partnership with business and citizen for co-innovation activities.

SAS Technologies for Smart Cities

Through the power of advanced IoT analytics with embedded AI and machine learning capabilities, SAS enables cities to deliver essential services, security and social protection. SAS drives value across the smart cities' analytics life cycle by mining and analysing IoT data where it lives – edge devices, in the fog or in the cloud.

With SAS IoT enablement technologies, cities are equipped to understand what city- and citizen-generated data mean in the context of city goals, make better-informed, accurate and timely decisions for enhanced citizen engagement, deliver service responsiveness, and ensure operational excellence.

Intel Smart City framework

Intel sees a world where a Smart City is enabled to combine, analyze, and share disparate data sets—captured by connected people, smart devices, the end-to-end data infrastructure and city services—and uses the information to create value for city leaders, planners, and citizens alike.

By using technology to produce data-driven insights, city leaders can advance their initiatives, and urban planners can improve the efficiency of city operations, increase security, foster economic growth, and enhance a city's ability to respond to unplanned events. Modern information and communications technology enable people to easily access city services and information anytime and anywhere in the city, allowing for better citizen participation and improving two-way communication between citizens and their governments.

Potential Use Cases for Smart Cities

SAS and Intel solutions for Smart Cities can help enhance delivery of public services and improve engagement with citizens – from managing congestion during peak hours, to optimising energy systems in a building, to ensuring public safety and more.

With the proper vision and support along with a flexible analytical framework that can expand over time governments can establish a strong foundation for both short and longterm smart city initiatives.

Smart Transportation

Transportation Services include a wide range of public transit and traffic management services such as traffic management, intelligent transportation system planning and more.

Buildings and Energy

Building and energy systems optimise the demand and supply of a city's energy infrastructure. Solutions in this service area monitor a variety of systems from the edge. They provide data to applications and analytics tools to automate, monitor and control energy consumption.

Public Safety and Security

Cities provide citizens with essential public safety and security services to ensure responsive police, fire and emergency medical teams. The solution includes security monitoring and crisis management.

Healthcare

Disease Management, Healthcare asset optimisation and more.

Solving Flooding at Cary Town with IoT Analytics

Stormwater, which runs off impervious surfaces like roads,parking lots, sidewalks and buildings, is a key initiative for the Cary town, USA. Traditionally, Cary's response to flooding was manual and reactive. The Town of Cary, which is viewed as a leader in innovative city solutions, have been using smart technology and data to optimise city operations and improve the quality of life.

The first steps for the collaboration is to have data from various systems unified in one place for a holistic view. The partnership decided to build on the cloud-first strategy, which enables folks in the field to have timely information. Besides, the cloud approach allows architectural changes quickly and easily.

The Stormwater Division, relies on **SAS Analytics for IoT** on SAS Viya to manage the data received at the edge. The data received includes data from solar-powered, cellular-enabled sensors that measures water height and depth, current flow and rainfall. Data from the sensors is uploaded to the cloud and combined with weather data. The team can then analyse the data and share information with other departments, such as Public Works, Public Safety and Information Technology.

Using the sensors, **Azure Maps Weather forecast data** and **SAS Event Stream Processing**, the town expects to increase situational awareness of rising stream levels, better predict where flooding might occur, deliver advanced warnings and improve emergency response through automation.

With **predictive analytics**, the Town of Cary can go beyond learning what happened before – and why – to discovering insights that will help it better prepare for future flooding events. Staff members can use data, statistical algorithms and **machine learning** techniques to identify the likelihood of future outcomes based on the data, and send out alerts in advance.

Additionally, **SAS Visual Analytics** provides the town with an interactive dashboard, reports, business intelligence and analytics – combining traditional data with location data for analysis in a geographical context. Users who are out in the field have the ability to access the stormwater IoT dashboard from a mobile device. The information they need is at their fingertips, even when they're not in the office.

With reliable data streaming in, the Town of Cary can take steps to better predict the actual impacts of flooding. As various amounts of rain fall in different locations, the town can see the timing in which houses, businesses, roads and other structures will be affected. Modeling can help staff better prepare and plan a course of action.

SAS Institute

Intel Corporation

Find out how SAS and Intel can help you build a smart city, step by step. Scan the QR code below.

Learn more about SAS

Learn more about Intel

▶ **Digital Infrastructure Provider's Insight**

Fast Tracking Malaysia's Smart Cities with Advanced Technologies in 2021

Industry experts are in accord that the emergence of the Covid-19 pandemic has delivered many sharp lessons including the urgent need to fast track smart city initiatives.

Indeed, this Outlook 2021 special edition presents a mountain of insights that pushes the smart city concept firmly from the 'nice to have' to the 'must implement today' for Malaysia.

As the beating heart of a smart city is smart data, we will focus on some essential perspectives to accelerate smart city developments. The current crisis highlights, among others:

- Two challenges that must be transformed immediately into opportunities - and centre on the flow and handling of data; and
- The vital need to build cohesive connections between advanced technologies, relevant culture change, and administration processes in order to heighten Malaysia's economic empowerment, environmental sustainability, and social re-engineering to meet the demands of the 4th Industrial Revolution era.

As envisaged by Malaysia's Smart City Framework under the 12th Malaysia Plan 2021-2025, digital transformation is a vital catalyst to potentise Malaysia's recovery efforts and enhance the quality and safety of life in a rapidly shifting world.

Immediate Steps

Today, governments around the world are playing catch up because most citizens are ahead of the digital curve. Malaysians are pioneer internet users as borne out by many regional and global studies.

Carried during the pandemic, MCMC's Internet User Survey 2020 recently reconfirmed the uptick in Malaysia's use of the internet, which is driven significantly by daily usage of mobile apps to carry out life tasks, such as parking (multiple parking apps including KL's JomParking, E Smart Park, Flexi Park, etc), checking in for errands during the pandemic (MySejahtera), banking & digital payments (e.g.TouchnGo), work, social interaction, and eCommerce in all its forms. Today, 88.7% of the population are internet users with smartphones reaching near-saturation usage level at 98.7% in 2020.

Currently, many apps overlap to carry out common tasks, which is reflected in another major challenge - a stumbling block facing both public and private sectors globally.

Data silos are collections of information often accessible by only one group, which grossly hampers sharing and decision-making. Though centralisation is difficult due to concerns such as privacy, data sovereignty, and data existing in varying states of quality, a move to data lakes would help to start addressing this block – providing informed data and insights for better decision making.

The pandemic has prioritised unlocking digital potential especially arising from the phenomenal growth of devices (the Internet of Things, IoT) in our personal and business lives that are online, connected, and capable of collecting and sharing data, ubiquitously called the new oil and regarded as a key asset in today's world.

Technology Imperatives

Smart cities, also known as SCC or Smart and Connected Communities, can provide essential infrastructural support for the deployment of advanced analytics and connected solutions.

Digital technologies that help to collect, process and act on real time data include essential jigsaw pieces such as IoT and Artificial Intelligence (AI), all of which ride on cloud computing - a platform that has proven to be a lifeline during the current crisis, enabling us to connect through videoconferencing apps and remote access systems.

5G technology presents another avenue of hyper connectivity especially in areas previously difficult to serve. And the future holds capacity building for autonomous vehicles and the 'next normal'.

At the beginning of 2020, the world saw a series of public-private collaborations in Malaysia with the sanction of the government included demonstrations of large-scale use cases.

A confluence of technologies demonstrated by real-time projects placed in parts of the island archipelago of Langkawi could easily be viewed from the TM ONE 5G Command Centre (5GCC) built on an open, sharing model to enable full collaboration into the future.

The use of AI smart cameras, community alert buttons, geolocation apps, My Smart City mobile app, smart helmets and other solutions - powered by real-time data analytics - demonstrated multiple use cases spanning smart city, smart tourism, smart traffic smart agriculture, as well as crime prevention and citizen safety.

Build a Seamless Future

Smart city technology is enhancing safety, reducing costs, building resiliency, providing innovative new services, and generally improving living conditions, as evidenced by analysts such as McKinsey Global Institute projects which show that moving to the smart city concept is reducing fatalities by 8–10 percent, accelerating emergency response times by 20–35 percent, saving average commutes by 15–20 percent, lowering disease burden by 8–15 percent, and cutting greenhouse gas emissions by 10–15 percent, among other positive outcomes.

With the aim of becoming a Vibrant City by 2030, Majlis Perbandaran Subang Jaya (MPSJ) is another Malaysian example of smart city initiative to enrich community life by utilising advanced technologies to deliver smart services to people in SS15 Subang Jaya.

Some would say that investment needed to develop a smart city would be hefty. On the contrary, a smart city is a city that intuitively adapts and responds to the needs of its Rakyat. The needs of the Rakyat come first as technology is merely the enabler to address that need. Its is not paramount that everything within the city be made smart, for the smart city technology to be sustainable, emphasis should be made on strategic touchpoints of everyday life. Sustainability of a smart city anchors on needs and inclusion of surrounding stakeholders.

Power of Partnerships

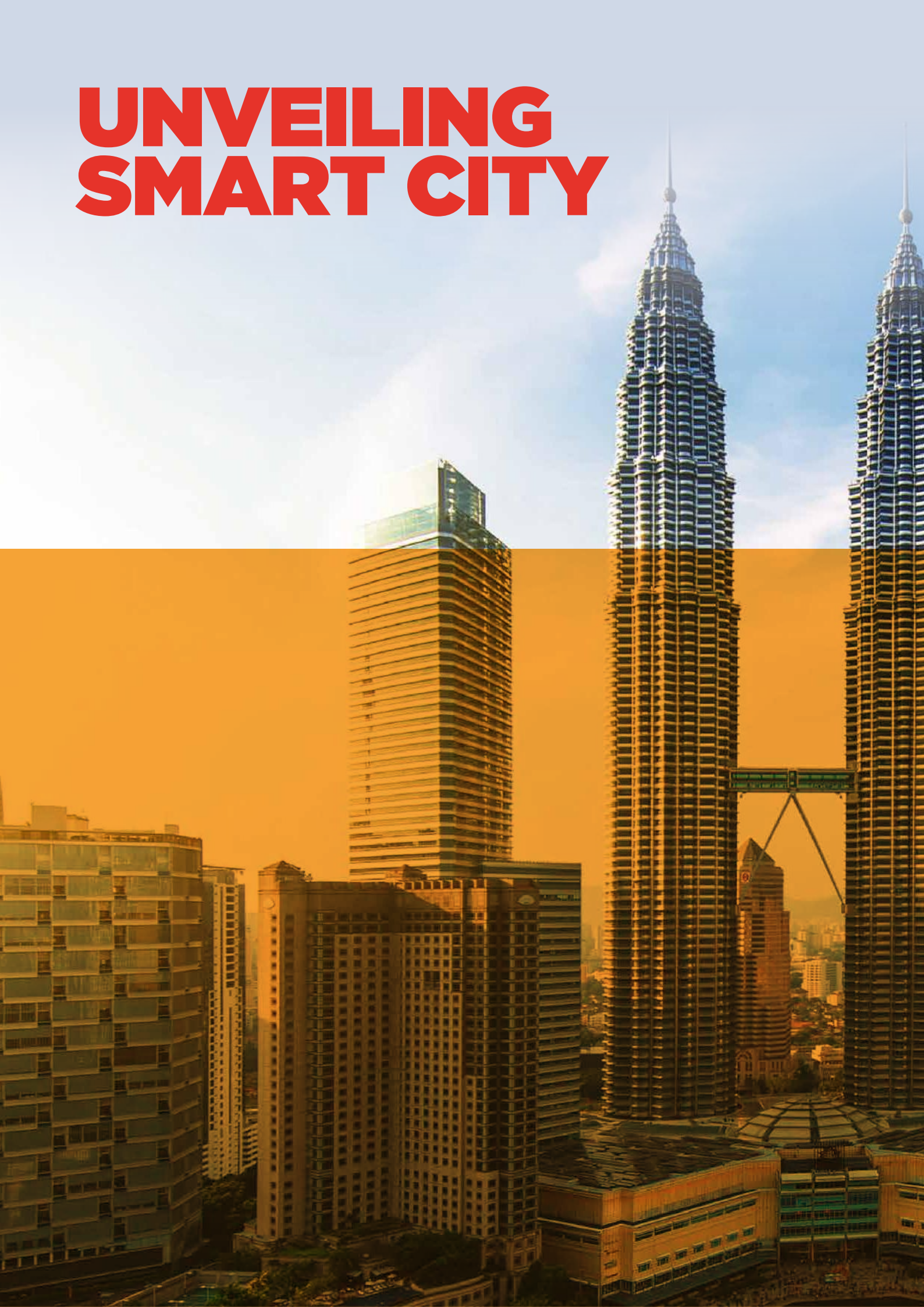
Given the prevailing high failure rate of projects - a PwC/Gallup study of more 10,640 projects found only 2.5% of companies met their original goals while failed IT projects cost the US$150 to 150B in lost revenue and productivity in the US - we must not forget that for every step of a project demands an integrated holistic approach.

The glue that connects and holds together transformational drivers - such as strategic vision, planning, communication, culture change, digital technologies - is the right array of talent and expertise in a highly collaborative partnership - often referred to as professional services.

In 2021, Malaysia's public authorities are now ideally placed to refresh and fast track smart city initiatives with digital technologies to upscale service levels, citizen well-being, and especially important at this time – to forge the space for sustainable growth and development.

The growing population and urbanisation trend require local authorities to rethink how they serve the citizens. Everyone from the private to the public sector and ordinary people, has a role to play. Digital technologies such as cloud, Internet of Things (IoT) and Artificial Intelligence (AI) are the backbones for cities nationwide to implement solutions that make a city smart. Real time data collected from millions of devices and sensors can be computed and analysed at ultra fast speed to generate valuable insights. These insights can in turn be used to formulate policies and action plans to improve the citizen's quality of lives.

UNVEILING SMART CITY



Unveiling Smart City

Definition of Smart City

A smart city is one which uses digital technology to empower the economy and creates a harmonious living environment for its citizens. It does this by deploying sensor-driven data collection and powerful analytics to synchronise a range of services in the interests of improved performance, cost-effectiveness and minimal environmental impact. Making data-driven decisions through efficient people-authority data sharing is a key success factor of a smart city.

The Benefits of Smart City

The economy, government and people are the main beneficiaries of smart city, primed to derive the most benefits from its development and implementation.

As cities grapple with ever-increasing costs of delivering efficient services to their citizens, the effective deployment of digital technologies would significantly improve performance, reduce costs and minimise environmental impact. This would result in improved liveability and workability standards for communities.

The combination of efficient mobility, effective resources management, together with a reliable digital infrastructure and the positive attitude of communities and the society at large, would further enhance city living.

The ultimate goal is to make city economies progressive and sustainable.

Where We Are on the Global Smart City Index

Figure 1-1 shows that Kuala Lumpur ranked 54 on the Global Smart City Index 2020 which ranks cities based on economic and technological data. Kuala Lumpur is the second city after Singapore among all major ASEAN cities in this ranking.

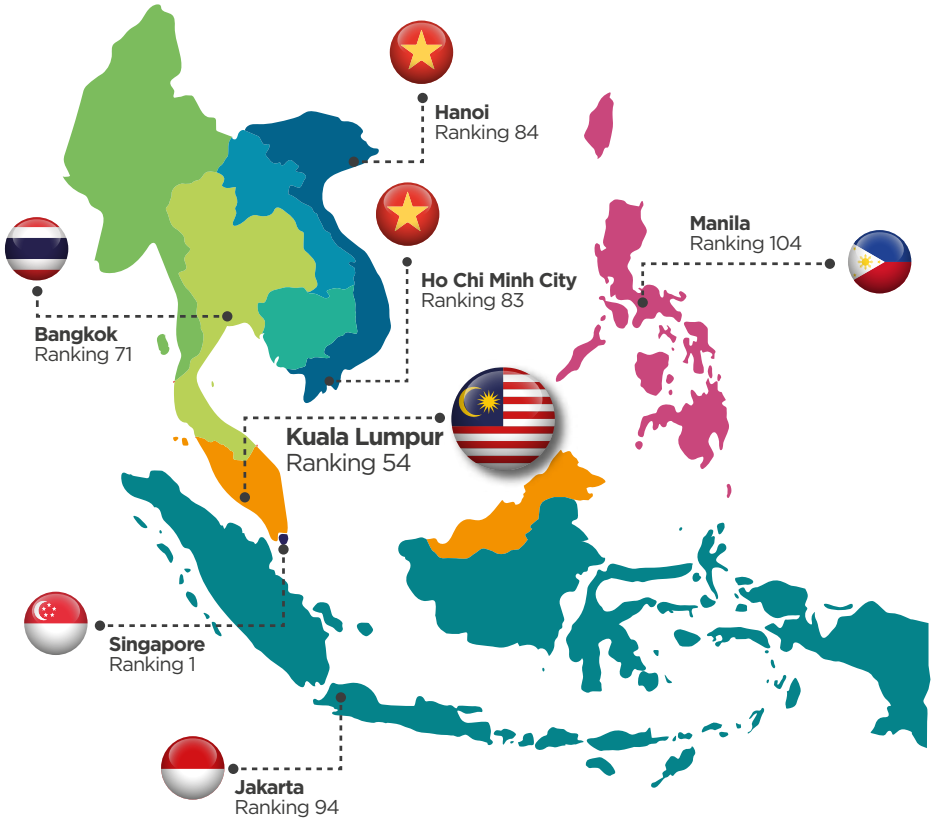


Figure 1-1: ASEAN Cities in Global Smart City Index 2020
Source: IMD Global Smart City Index 2020

As indicated in Figure 1-2, Kuala Lumpur's city performance improved from rating CCC in 2019 to rating B in 2020. All city ratings in this index range from AAA to D, with AAA representing the highest grade and D as the lowest rating.

City	Smart City Rank 2020	Change	Smart City Rating 2020	Smart City Rank 2019	Smart City Rating 2019
Singapore	1	— (0)	AAA	1	AAA
Taipei City	8	▼ (-1)	A	7	A
Hong Kong	32	▲ (+5)	BBB	37	BBB
Busan	46	▲ (+4)	BB	50	BB
Seoul	47	— (0)	BB	47	BB
Kuala Lumpur	**54**	**▲ (+16)**	**B**	**70**	**CCC**
Zhuhai	62	▼ (-22)	CCC	40	BB
Tianjin	63	▼ (-22)	CCC	41	BB
Chongqing	64	▼ (-22)	CCC	42	BB
Hangzhou	65	▼ (-21)	CCC	44	BB
Nanjing	66	▼ (-11)	CCC	55	B
Shenzhen	67	▼ (-24)	CCC	43	BB
Guangzhou	68	▼ (-11)	CCC	57	B
Chengdu	69	▼ (-11)	CCC	58	B
Bangkok	71	▲ (+4)	CCC	75	CCC
Tokyo	79	▼ (-17)	CCC	62	B
Osaka	80	▼ (-17)	CCC	63	B
Shanghai	81	▼ (-22)	CC	59	B
Beijing	82	▼ (-22)	CC	60	B
Ho Chi Minh City	83	▼ (-18)	CC	65	CCC
Hanoi	84	▼ (-18)	CC	66	CCC
Hyderabad	85	▼ (-18)	CC	67	CCC
New Delhi	86	▼ (-18)	CC	68	CCC
Mumbai	93	▼ (-15)	C	78	CC
Jakarta	94	▼ (-13)	C	81	CC
Bengaluru	95	▼ (-16)	C	79	CC
Manila	104	▼ (-10)	D	94	C

Figure 1-2: Kuala Lumpur's City Performance Index in Global Smart City Index 2020
Source: IMD Global Smart City Index 2020

Malaysia's Smart Cities Initiatives

There are 26 pilot smart cities in the ASEAN Smart City Network (ASCN) and four of the 26 cities are in Malaysia, namely, Kuala Lumpur, Kota Kinabalu, Kuching and Iskandar Malaysia. Other smart cities in Malaysia are as illustrated in Figure 1-3.

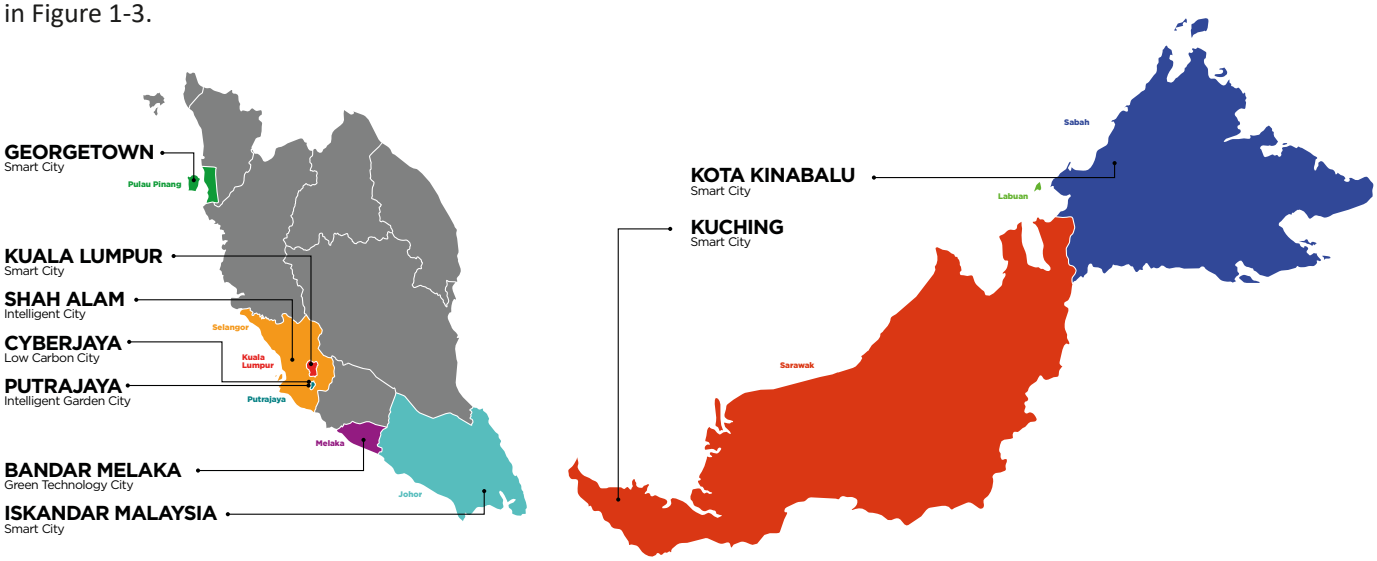


Figure 1-3: Malaysia's Smart Cities Initiatives
Source: MIGHT Analytics

Malaysia Smart City Industry Ecosystem

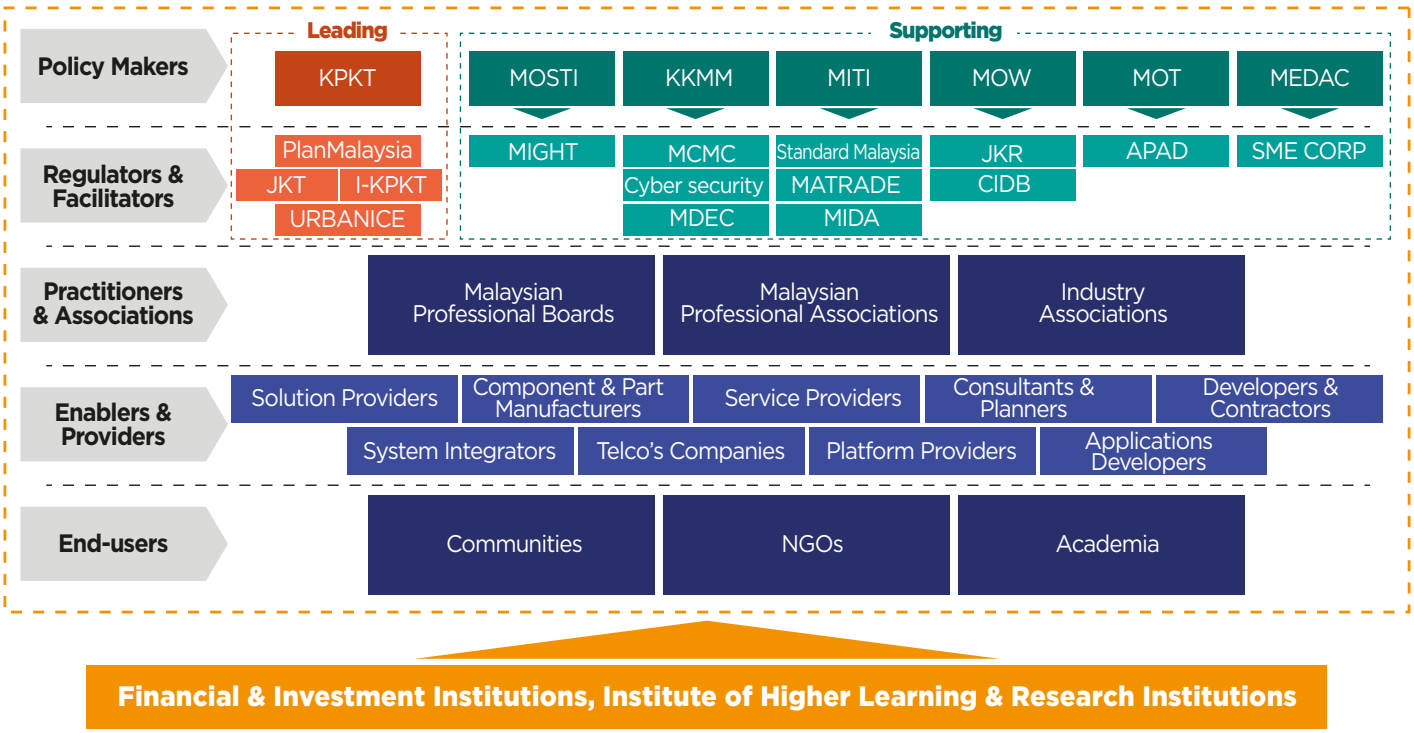


Figure 1-4: Malaysia Smart City Industry Ecosystem
Source: MIGHT Analytics

A vibrant and sustainable city is an ecosystem which comprises people, organisations and businesses, policies, laws and processes integrated together to create the desired outcomes.

Figure 1-4 shows that the Malaysia smart city industry ecosystem is made up of multiple "capability layers". No one capability is more important than the other. Each capability plays a different role in the smart city. These different capabilities must integrate and coordinate with each other in order to carry out a common mission.

POLICY MAKERS
The policy makers formulate policy, set directions, visions and aspiration to drive the smart city agenda. The lead Ministry, KPKT, is tasked with overseeing the implementation of smart cities in the country.

REGULATORS AND FACILITATORS
The regulators and facilitators are the supporting bodies that provide regulatory support, consultancy and standards for the implementation of smart cities; spearheading, implementing, monitoring and measuring the development of smart cities in the country.

PRACTITIONERS & ASSOCIATIONS
Professional and industry associations are the active advocators for the city as an innovation hub for new businesses, supporting professionals to apply and implement the principles of smart city and stimulate innovative solutions.

ENABLERS & PROVIDERS
The enablers and providers build the ecosystem by gathering working partners, collectively delivering new creative solutions and creating the environment to develop and grow new businesses and smart solutions for smart city.

END-USERS
The ultimate end-users and beneficiaries in the ecosystem are naturally the communities, the relevant NGOs and also the academia.

FINANCIAL & INVESTMENT INSTITUTIONS AND HIGHER LEARNING & RESEARCH INSTITUTIONS
Underpinning the success of the smart city are financial & investment institutions, higher learning centres and R&D institutes. This is because funding and skilled human resources are the two key success factors of the smart city agenda.

Malaysia's Smart Cities Frameworks and Blueprints

The development of smart cities are guided by frameworks and blueprints (Figure 1-5) developed at the national, state and local authority level to ensure that Malaysia's smart cities are developed in a planned, integrated and holistic manner.

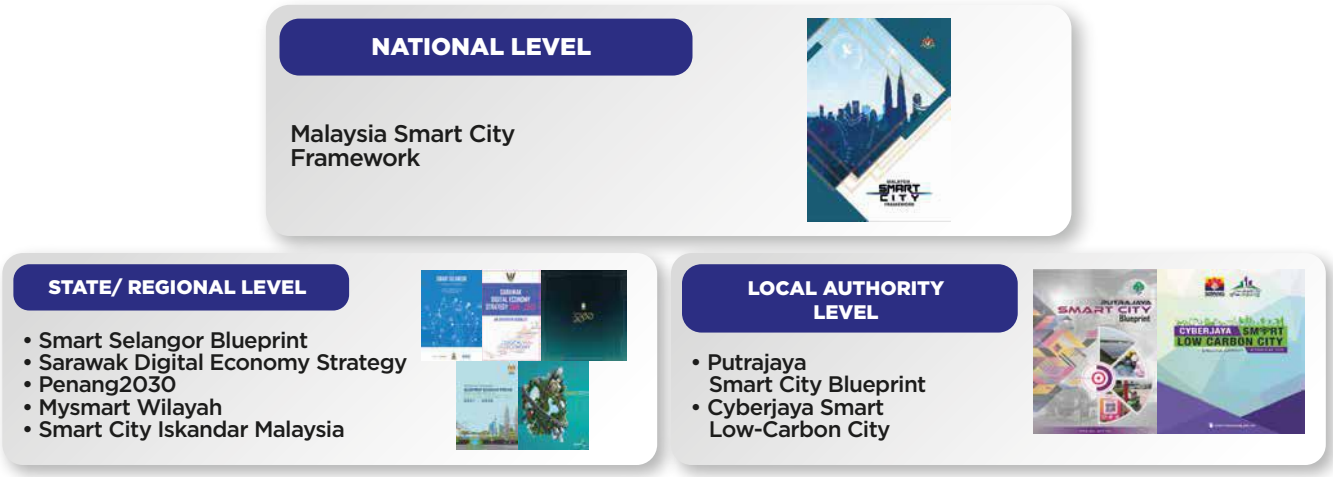


Figure 1-5: Malaysia's Smart Cities Frameworks and Blueprints

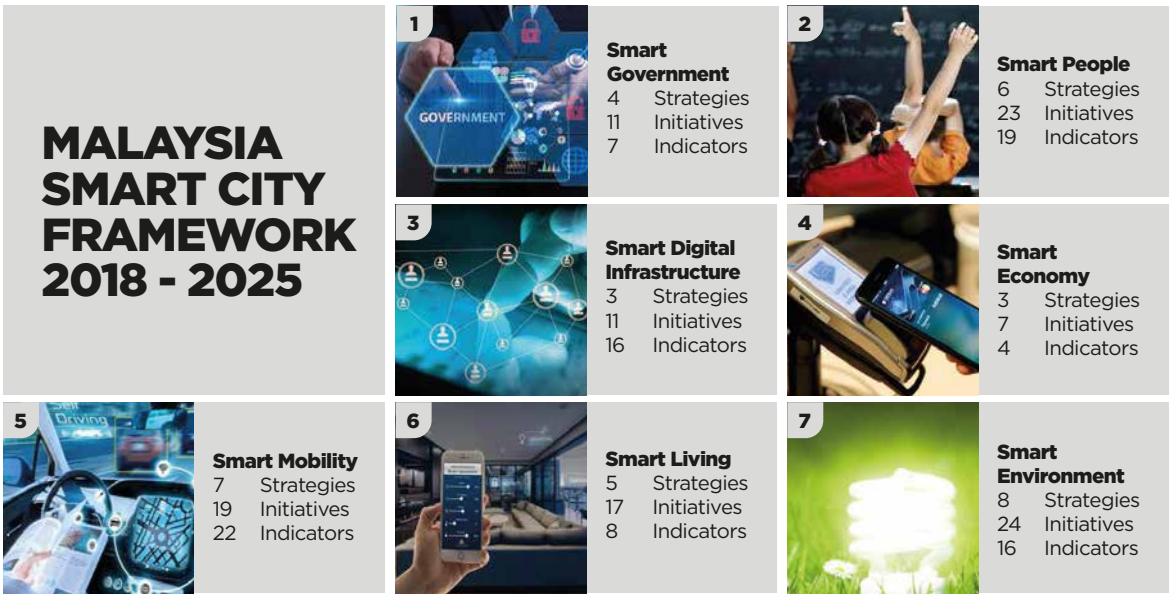
Malaysia Smart City Framework 2018-2025

The KPKT Malaysia Smart City Framework has outlined seven key components of smart cities. These are smart government, smart people, smart economy, smart environment, smart living, smart mobility and smart digital infrastructure. Together, the components combine to synergistically drive the smart city targets and aspirations.

The Framework has outlined the relevant policies, strategies and initiatives for the seven components. It has also proposed the indicators to measure the performance of the initiatives. These have been benchmarked against international practices in managing the components. The Framework concludes with the governance arrangement, communication plan and proposed pilot projects for smart city in Malaysia.

MIGHT, as a key driver for high technology and public-private partnership (PPP) in Malaysia, has contributed to the drafting of this Framework, advising on smart cities' technological requirements and potential collaboration format between the public and private sectors.

The Framework was officially launched by the Prime Minister of Malaysia and the Minister of Housing and Local Government at the renowned Cities 4.0 Conference and Exhibition 2019. The event showcased potential collaborative work and was recognised by the Prime Minister as the first ever public-private partnership project of the year.



Malaysia's Smart Cities Driving Factors

As articulated in the Malaysia Smart City Framework launched in September 2019 by KPKT, the need to develop smart city in Malaysia is motivated by a number of factors (Figure 1-6), including rapid urbanisation, Malaysia's commitment to global agendas and the rising global trend of disruptive technologies adoption. The national drive towards digitalisation and digital economy, and the need to attract more foreign investments are also contributing to the growth of smart cities in Malaysia.

Figure 1-6: Malaysia's Smart Cities Driving Factors

Malaysia Smart City Outlook 2021 - 2022

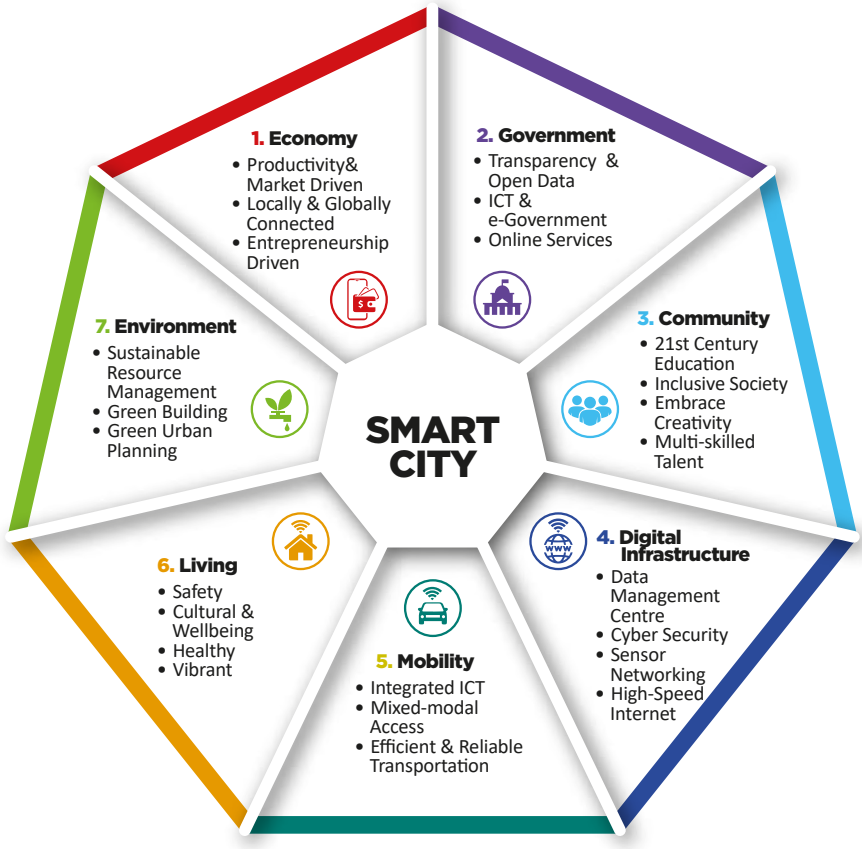


Figure 1-7: Smart City Components

The Malaysia Smart City Outlook 2021-2022 (MSCO 2021-2022) reports on the progress of the nation's smart city agenda to date. The implementation of the seven components of smart city (Figure 1-7) is benchmarked against the global best practices. Through the benchmarking exercise, the Outlook provides suggestions on the way forward in order to realise the smart city aspirations.

New and emerging technology trends are highlighted within each component, providing new directions and recommendations on driving smart city in Malaysia.

At the same time, solution providers are informed of the many economic opportunities ahead. The Outlook also provides further motivation to city authorities to embrace technologies into urban planning and operation, whilst attracting the relevant technology players to participate, especially those companies pursuing expansion in the fast-growing market and digital economy.

The Outlook hopes to demonstrate to the government, industry and communities that smart cities promise a new source of economic growth for the country, while at the same time, supporting the nation's sustainability commitment.

SMART ECONOMY 01

Strengthening Market Dominance
through Disruptive and High Technologies

Introduction

What Is Smart Economy?

Smart economy is defined as a favourable environment for economic growth, overcoming economic challenges, creating new jobs as well as establishing new & productive technology businesses which are regionally attractive, competitive and innovative. Smart Economy embraces entrepreneurships with market flexibility that respond to and intergrate global needs and demands.

Focus Areas

- Creation of the 'green technology' by developing 'green companies'
- Promotion of distributed renewable energy producer
- Implementation of the digital economy
- Encouraging the development of automation, robotics, instrumentation and sensors technologies.
- Establishment of innovation clusters and cooperation to promote innovative products and services.

Characteristics

- Developing individuals who are talented, multi-skills, and flexible
- Business processes that are innovative, productive and efficient
- Investing in digital infrastructure to fuel sustainable economic growth
- Considering the welfare of community and incorporating good practices in managing resources and waste

Figure 2-1: Smart Economy Attributes

Where We Are Now

Smart Economy in Malaysia At A Glance

The realisation of Smart Economy requires nationwide willingness to adopt digital technologies, particularly in cities now being designed to take on board the smart transformation. There have been positive indicators pointing towards progress on this front, as the country's digital economy expanded to RM267.7 billion in 2018, contributing 18.5% to the national economy.

Smart Economy is seen from two main perspectives:

- Improving productivity through the strengthening of human capital, enhancing the quality of the workforce to meet future demands of the industry and the overall environment of smart city.
- Strengthening technology applications and digitalisation in core business functions, enhancing such instruments as e-payment usage, and establishing technology labs and collective platforms

As illustrated below, the government has set several priorities to support the growth of smart economy in Malaysia. These include improving productivity, creating high-value jobs and encouraging innovations in businesses and entrepreneurship.

Figure 2-2: Priority Areas for Smart Economy Development in Malaysia

As illustrated in Figure 2-3, as high as 70% of the local authorities see cashless and e-payment solutions as the core technologies to implement their smart economy initiatives to support Malaysia's move towards digital economy.

Figure 2-3, Source: MIGHT Analytics

Malaysia's Initiatives in Supporting the Smart Economy

As illustrated below, as the government gears up towards digital transformation, it has been increasingly developing the digital economy as the engine propelling the growth of smart cities. MDEC has played a significant role in empowering technology providers to access markets and improve their visibility. In addition, companies, especially SMEs, are also being supported in the move towards digitalisation. These have resulted in a number of initiatives including, infrastructural upgrades, training and upskilling as well as the provision of grants for the seamless adoption of digital technologies to facilitate the development of the smart economy.

National Fiberisation & Connectivity Plan (NFCP) 2019-2023

Formulated to improve broadband quality and coverage, reduce broadband prices and provide Internet access across all spectrums of society.

To extend digital infrastructures to remote areas, capitalising on private-public partnerships.

RM21.6 billion will be deployed to leverage various technologies ranging from 5G to satellite broadband connectivity.

DESA Project - Promote Digital Literacy

To help rural SMEs find markets for their goods through e-commerce and has featured over 2000 rural SME entrepreneurs.

To reconnect and revitalise the rural communities, to scale up the digital uptake throughout the country, ensuring economic inclusion for rural communities along the way.

E-Wallets

To date, there is a total of 53 e-wallets in the country, occupying 19% of Malaysia's fintech space.

Bank Negara Malaysia (BNM) has established a blueprint emphasising their aim to increase the number of per capita e-payment transactions from 44 to 200 transactions.

The government recently announced an allocation of RM750 million to promote the adoption of e-wallets in Malaysia under the PENJANA recovery plan to revitalise the economy

The 'Malaysia Tech Entrepreneur Programme' Initiative (MTEP)

To attract tech talent and techno-entrepreneurs from all over the world to set up their startup companies and expand their businesses to the ASEAN region. The MTEP pass is used as a platform to bring foreign talents to Malaysia and grow their businesses.

Digital Hub Malaysia

A physical location that offers high-speed broadband facilities and a holistic ecosystem that includes start-up development programmes, talent development programmes, opportunities and supervision on business financing including facilities and lifestyle, specifically for start-ups.

Industry4WRD

The Industry4WRD: National Policy on Industry 4.0 was launched on 31 October 2018 to drive digital transformation of the manufacturing and related service sectors in Malaysia.

MDEC - Global Acceleration and Innovation Network (GAIN) Programme

Implemented to help Malaysian technology firms grow, both regionally and globally, through four pillars namely, market access, capital risks, technology refresh and visibility.

Digital Transformation Acceleration Programme (DTAP)

Provides a structured approach to digital transformation for Malaysian companies by leveraging the expertise of digital transformation laboratories to help businesses adopt new digital technologies.

The National Registration Department (JPN)

Biometric Registration System

To implement a biometric registration system for all official identifying documents in an attempt to boost national security.

A host of biometric tools and software introduced by private companies, such as 5G Biometric workforce management systems with face biometrics and touchless technologies

SME Digitalisation Grant Scheme
Penjana Smart Automation Grant
SME Business Digitalisation Grant
Smart Digital Transformation Acceleration Programme

The SME Digitalisation Grant Scheme and the Penjana Smart Automation Grant - to help SMEs and mid-tier companies to kickstart their digital adoption journey and increase their digital capabilities, supporting businesses in growing projects that embrace technology in their operations.

The SME Business Digitalisation Grant implemented in partnership with MDEC and Bank Simpanan Nasional provides grants to encourage SMEs to adopt and utilise digital applications. By November 2020, a total of 5,634 applications were received, with 5,087 being approved to receive a total of RM14.6 million matching grants.

The Smart Digital Transformation Acceleration Programme has helped companies to reach their digital goals and transformation journey supported by Digital Transformation Labs.

As seen above, Smart Economy initiatives have also benefited consumers and small business communities as the government encourages the use of such apps as e-wallets and provides start-up and talent programmes for new and emerging entrepreneurs. Supporting individuals and communities to be more digitally literate and helping companies struggling with issues of financing and are still grappling with accessing technology, help Malaysia make inroads into the smart economy. These initiatives are also very much in tandem with the development of the Industry 4.0, aimed at driving digital transformation.

Global Practices

Globally, advanced technological initiatives adopted to improve economic competitiveness cover a range of industrial and agricultural sectors. Automation and e-commerce are some of the significant digital initiatives already taken up by Malaysia and further examples are given here as new ideas for adoption in the country.

Manufacturing 5.0

Automated / unmanned factories

Monitor production processes remotely and control robots for greater precision in design and development and ongoing product refinement.

Produce increasingly knowledge-intensive products with big data analytics.

Agriculture 4.0

Deployment of agritech to monitor crops and animals, and soil/environmental quality.

Routine processes and agricultural equipment are managed through automated systems and mobile applications.

Logistics 4.0

Use of GPS for tracking both vehicles and cargo across continents.

Vehicle telemetry helps maximise fuel efficiency, ensure efficient use of the transport network and support fleet maintenance activities.

Online Retail

Utilisation of e-commerce and e-payment platforms to receive bookings and fulfil customers' shopping needs.

Deployment of artificial intelligence to track customer behaviour to offer more customised services.

Digital Financial Services

Inclusion of non-traditional payment service providers, enabling customers to manage their finances, conduct transactions and access new products online.

Track indices, manage investment portfolios and enable high-frequency trading.

Electronic Broadcasting & Media

Delivery of content digitally, while enabling the participation of news sources, expand user participation in media through user-generated content and social networking.

Enhance collection and usage of data on viewing habits and preferences of customers, to provide more targeted offerings.

Digital Healthcare

Remote diagnosis to enhance system efficiencies and patient experience through electronic health records.

Allows opportunities for advertising of drugs and other treatments.

Online Education

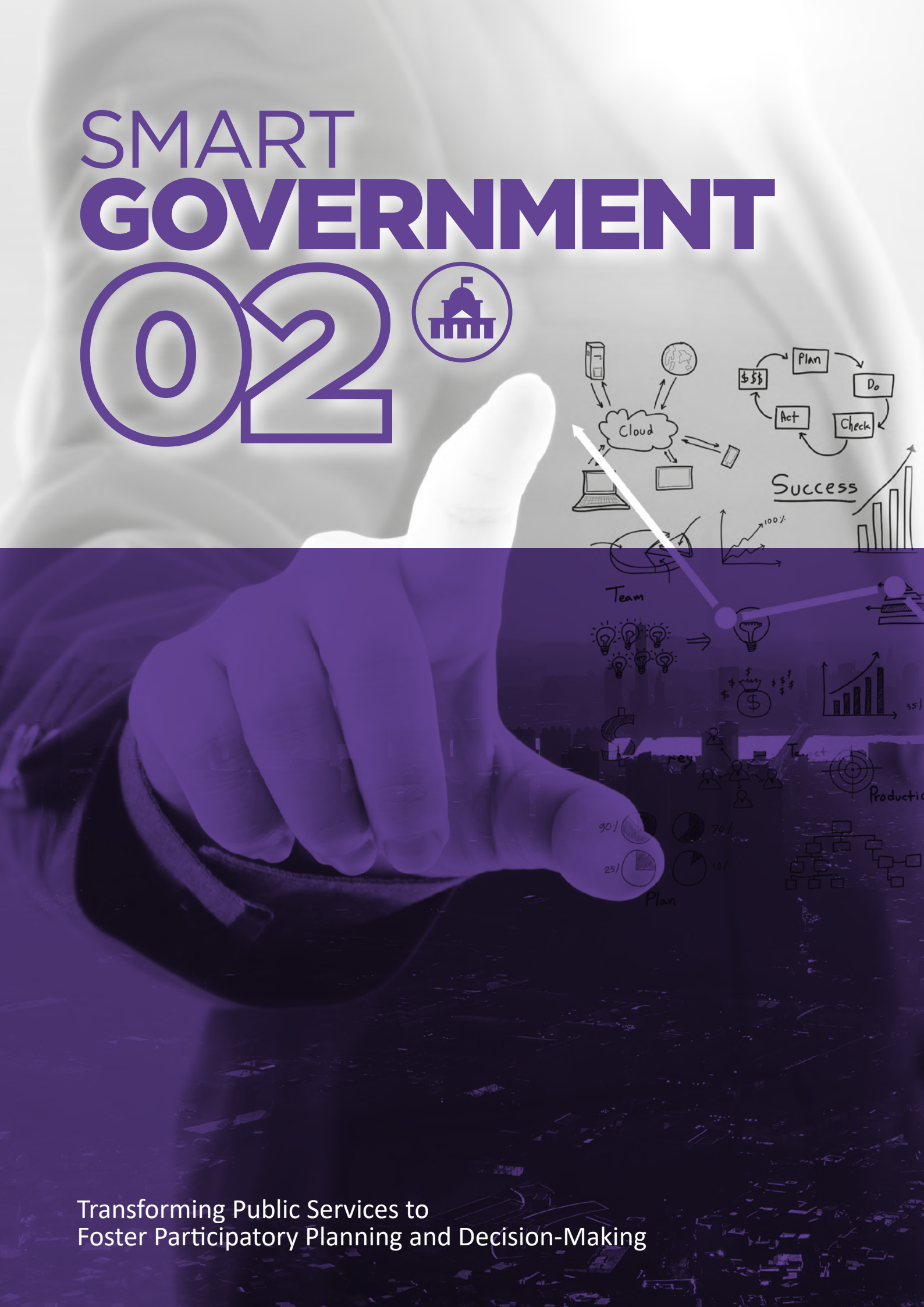
Courses are conducted remotely through video conferencing, streaming and online collaboration portals.

Smart Supply Chain

Deployment of blockchain for traceability.

Cloud based supply chain offers flexibility, scalability and a global reach with minimal operating and maintenance cost.

SMART GOVERNMENT 02



Transforming Public Services to
Foster Participatory Planning and Decision-Making

Introduction

What Is Smart Government?

Smart Government is defined as the adoption into a city, operations and administration that improve efficiency and performance in the provision of services to citizens.

The Importance of Smart Government

- Creating a conducive ecosystem for the other components to function.
- Set up strategies and partnerships to shape the future of becoming a smart city.
- Preparing good governance in the interest of the citizens.

A Smart City is the result of the efforts of many stakeholders working together in partnerships to push the desired agenda. Smart cities require a government that is able to effectively perform several key roles. To be most effective, city governments must make calculated choices on the different roles through which it effectively engages city challenges.

Smart government adopts disruptive technologies to improve its services to the community through data sharing and seamless online services. As shown in Figure 3-1, the key strategic technologies that form the fundamental of smart government are:

- Open-data platform for information sharing
- Analytics solutions that translate data into useful information for better planning
- Government resource planning systems that improve efficiency and productivity
- Advanced e-government services solutions that offers services on consolidate platform
- Digital citizenship for transparency and ease of communication

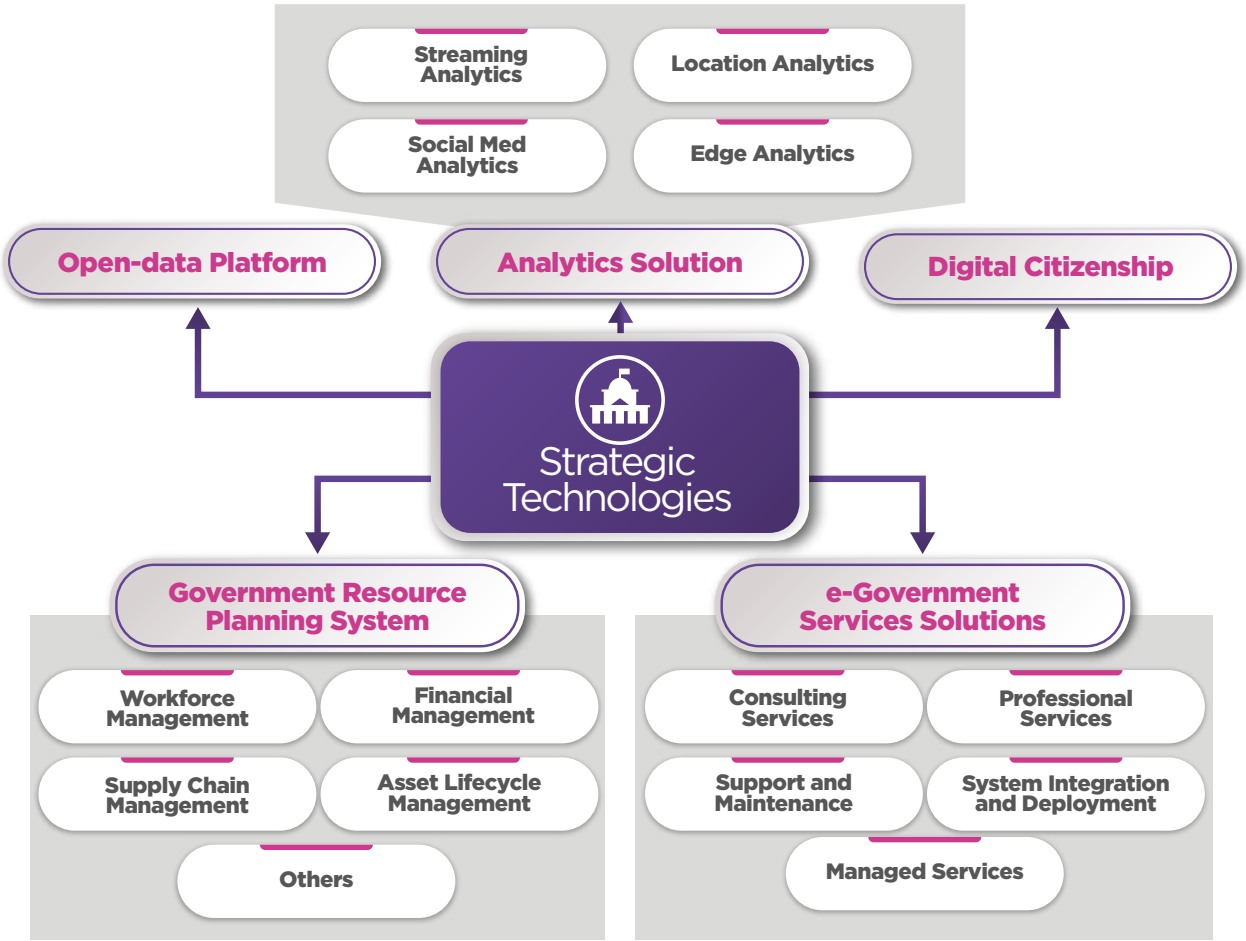


Figure 3-1: Strategic Technologies to Implement Smart Government

Where We Are Now

Smart Government in Malaysia At A Glance

Putting the 'smart' in the city is an enormous task which demands the stewardship of a progressive government, one that is responsive to the rigours of adopting and delivering smart systems, policies and initiatives. Smart city development relies on smart governance and administration that come with a 'digital mindset' which facilitates improvements in communication, planning and decision-making processes.

In recent years, these transformative moves have come to shape Malaysia's evolving Smart Government which has remained technologically committed from the word go, steadfastly journeying through the digital landscapes.

As illustrated in Figure 3-2, smart government initiatives ranked the top priority among local government in Malaysia smart city initiatives, with a total of 63.9% of the local authorities having implemented a number of initiatives and 54.5% having projects in the pipeline.

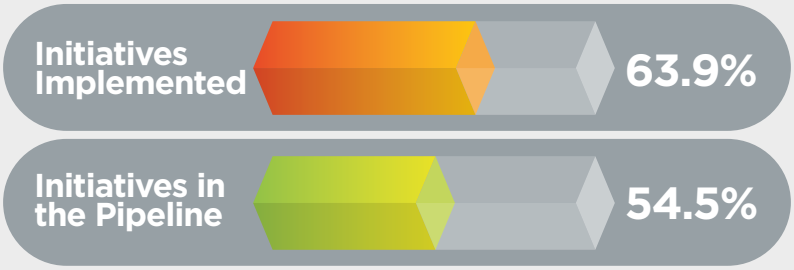


Figure 3-2, Source: MIGHT Analytics

As listed below, the government has made it its priority to ensure better information sharing within the public sector, between the government and the people and improve their online offerings to better serve citizens. Upgrading the quality of digital online services to the public has been fundamental in the development of smart cities.

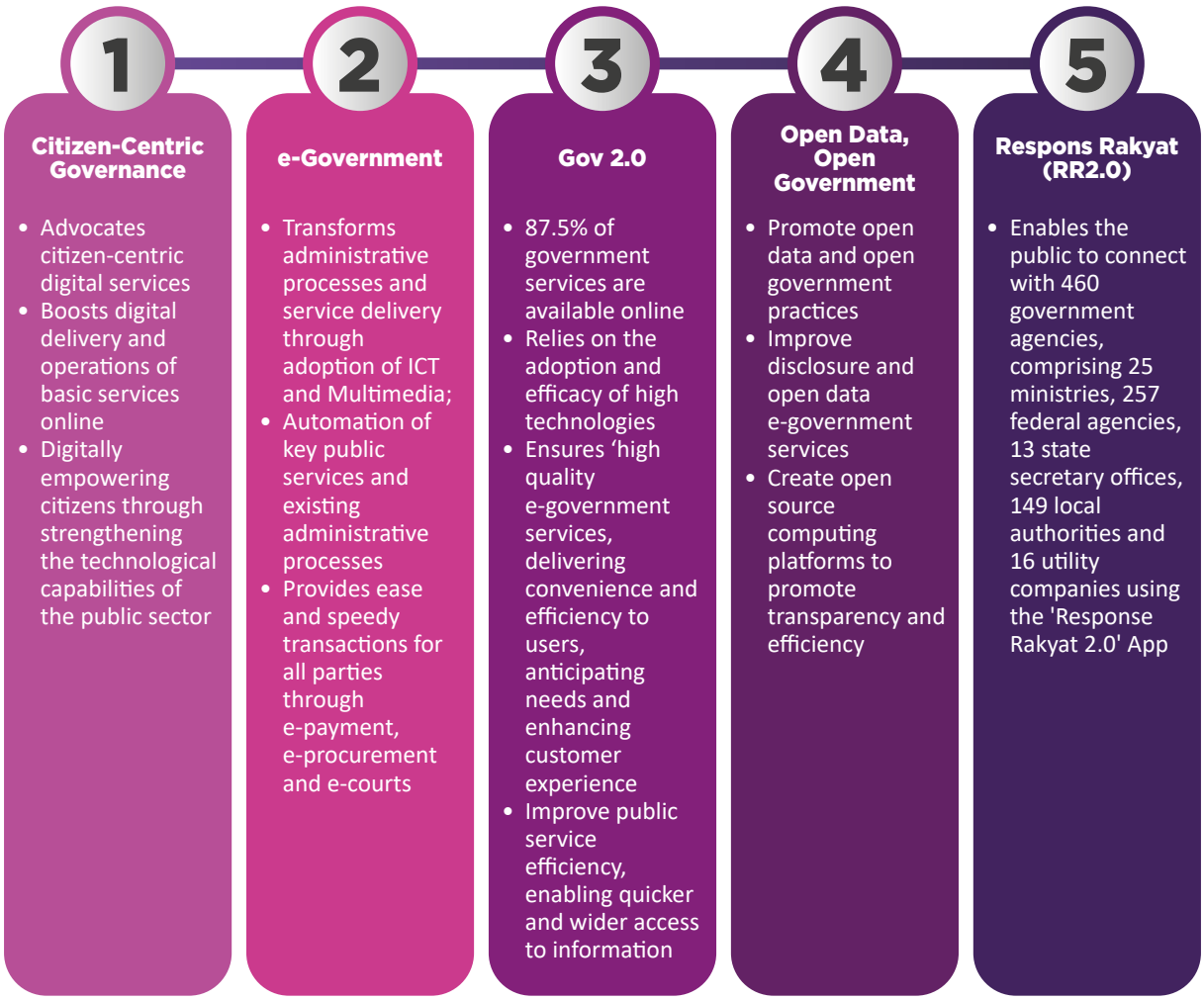
Figure 3-3: Priority Areas of Development for Smart Government in Malaysia

As illustrated in Figure 3-4, 68.9% of the Malaysian local authorities placed open data platform as their top priority, followed by e-services, data analytics and cybersecurity.

Figure 3-4, Source: MIGHT Analytics

Malaysia's Initiatives in Smart Government

As indicated in the diagram below, Malaysia's move towards smart governance started off with the government developing a more citizen-centric approach, initially embarking on an open data journey in 2014. Today, Smart Government has evolved to provide much-improved connectivity that radically changes the way services are being delivered. The introduction of e-governance and the ongoing technological upgrade of administrative systems and key public services have provided more opportunities for the public to connect with the government. It has also resulted in speedier transactions.



The National Policy on Industry 4.0 (IR 4.0) has resulted in the high adoption of technologies in Malaysia's Smart Government. As demonstrated above, initiatives aimed at facilitating and simplifying access for engagement between the public sector, businesses and citizens, have been put in place to ensure that the benefits delivered by digital processes built within the Smart Government are immense. Increasingly, e-government services are being used by Malaysian internet users, paving the way towards creating wider digital participation and smart communities. Accordingly, the government also continues to work towards narrowing the digital gap, boosting digital delivery across the country and promoting digital literacy through IT training programmes.

The involvement of the private sectors including Fusionex, Sunway Berhad and TMOne, just to name a few, has also strengthed the smart government initiatives in Malaysia.

Where We Are Heading

Developed countries have been creating their infrastructure on the basis of smart governance and sustainable development for more than a decade now. The developing world is not far behind either. As cities are developed on the basis of the smart city model, governments across all regions are using e-governance to strengthen democracy, citizen participation and public welfare. The aim of smart or e-governance is to make the system more transparent and citizens more informed. Government information will no longer be a repository of a few public officials or servants but is accessible by all sections of society.

Government-To-Citizen (G2C) Smart Transactions

- Opens the door for a transparent and secure method to provide citizens with public services in cities.
- Simplifies the access for engagement between local authorities and citizens on issues regarding taxes, licences and documentation.
- Provides digital, transparent and personalised experience using blockchain, smart contracts, smart communications, data encryption, and other technology advancements for the government.
- Leverages blockchain technology and smart contracts to create digital marketplaces for citizens to self-serve and manage government-granted entitlements like permits, licences, and vouchers, as well as streamline the operation of patent registrations and distributed exchange platforms.

Civic Engagement Platform

- Allows sharing of ideas and suggestions between citizens and the government regarding upcoming and potential projects in cities.
- Digital communication methods help authorities reach a wider and more diverse group of smart citizens.
- Connects local governments with their citizens to make collaborative decisions. Software features include city-led discussions, debates, real-time tracking, identifying their most active members, crowdsourcing ideas and enabling multi-level administration.

Addressing Citizen Grievances

- Using smartphone applications, citizens now have the opportunity to report public service issues, while providing evidence in the form of photos or other media files.
- These applications activate the device's GPS location for efficient routing of the required staff and management of the reported issues in one platform.
- A cloud-based civic assistance software allows citizens to report issues using a mobile application, a social media agent or through Short Messaging Services (SMS).
- Grievances are visualised on a map for both citizens as well as for operators.
- Use of Artificial Intelligence to manage the most commonly reported non-emergency requests.
- Detects duplicate incidents and automatically prioritises requests based on various factors such as the location, the scope of grievance and the availability of staff.

IoT For City Infrastructure Management

- Several data sources, such as ticket sales of public transport systems, tax data, police reports, and sensors on roads and buildings which are continuously collected for further analysis.
- Internet of things city infrastructure platforms work to reveal patterns of interaction between citizens and infrastructure for further smart management, for example, in handling lesser-used city spaces or by creating traffic management or energy consumption policies.
- IoT platform will transform raw data from smart city sensors and controllers into real-time streaming API, utilising edge computing with a "store-then-analyse" architecture to ensure high-speed and improved efficiency in data management for making important decisions regarding the city.

Online Voting System

- Shifting to online voting platforms allows for expanding the voter base while getting citizens more involved in decision-making processes regarding any new policies.
- Web and mobile voting applications provide intuitive interfaces with projects descriptions, details, and instructions.
- Increase voter turnout as citizens can cast votes from the convenience of their home or office.
- Blockchain-enabled voting technology will significantly cut the chance of manipulating the results for any vote and ensures that all votes are cast anonymously to ensure voter privacy.

Global Practices

Worldwide, governments are embracing new and emerging technologies to improve administration, governance and public service delivery. Shenzhen, Seoul, Jakarta and Copenhagen are among some of the progressive cities that have established a wide-range of integrative technologies to offer seamless online services and promote efficiency and transparency. These examples provide some innovative ideas for adoption in Malaysia's Smart Government.

Shenzhen

Central Command Centre
An integrative data source from across all municipalities in real time. As the heart of the smart city nervous system, it receives real-time data on public traffic, emergency management and public security and displays it on the 'Smart City Brain' for fast and informed decisions. The data enables proper planning and construction of essential services, understanding causes and effects through Big Data analysis of urban statistics.

Seoul

Open Data Plaza
A website for citizens to use public data to enhance public interest, efficiency, and transparency. The website provides more than 2,600 types of services and 1,500 datasets from 10 different fields that include traffic flow, air quality, and city management. The site is linked to over one hundred mobile applications.

Jakarta

Smart City Portal
A website that provides data and information to the public to meet the governance-transparency goal by concentrating and integrating all data in one place. This is a big data hub that integrates information from the citizens i.e., feedback application and social networks as well as government services such as transportation, healthcare, water distribution, and other services. The site utilises Information and Communication Technology (ICT) to identify, understand and control various resources in the city more effectively and efficiently. This is to maximises public services, providing solutions as well as supporting sustainable development.

Copenhagen

Digital IDs - NemID
To interact with the government, banks and private sector across a wide range of services.

Digital Post
A government-provided digital letter box that enables better communication between public agencies, involving the state and citizens.

City Data Exchange
A private-public collaboration for sharing a broad range of data between all users in a city. A shared data hub to foster innovation and inspire new thinking and stimulate business activities.

Open Data DK
An association that makes government data open and available for citizens and businesses to improve transparency in public administration. It contains information on infrastructure, traffic, cultural events and much more.

As Malaysia's Smart Governments move towards expanding its e-government and related online services, there are a number of state-of-the-art initiatives than can improve the quality of public service further. A central command centre, receiving and analysing real-time data on anything from traffic to security management could provide solutions for cities struggling with congestion and rising crime, making them more attractive to live and work in.

▶ Article

Smart City Rating Implementation

By PLANMalaysia

Introduction

KPKT has launched **Malaysia Smart City Framework** to provide guidance and reference for local authorities, state governments, ministries, departments, industry players, academics and other interested parties to participate in the planning and building of smart cities which are holistic and in line with current developments. The framework has been prepared based on the recognition and realisation of the growing importance of implementing and building smart cities in Malaysia. The Government of Malaysia believes that smart cities provide the optimal approach in future proofing the planning, building and management of cities to provide sustainable solutions to the many urban challenges including improving the efficient delivery of city services, reducing environmental pollution, and easing traffic congestion. These aim to improve the quality of life of city communities. The document has been prepared to also fulfil the national and global agenda of meeting the objectives of the Sustainable Development Goals (SDGs), as well as making sure Malaysia is always in line with the global trends in urban development.

The smart city framework document has also emphasised the need to develop and implement the **Standards for Smart City** with the objective to establish **indicators for the ranking of smart cities.** The indicators would form a yard stick to measure and determine the level of smart city implementation in the future so that they are in line with global ranking standards. KPKT, through PLANMalaysia, is collaborating with Standard Malaysia to develop **Malaysian Standard for Smart City Indicators** in referring to the international document, ISO 37122 (Sustainable Cities and Communities- Smart City Indicators) as the benchmark for the smart city ranking exercise in line with the objectives of the Malaysia Smart City Framework.

Process to Implement Malaysian Standard for Smart City Indicators for Smart City Rating

The Smart City Indicators will be adopted by the local governments to evaluate the implementation of smart cities, set measurable targets and monitor progress towards their goals in achieving a smart city. The indicators specified in the standard are to be reported annually.

Smart City Indicators

The Draft of Standard for Smart City Indicators are based on the document ISO 37122 Sustainable Cities and Communities – Indicators for Smart Cities which includes 80 indicators under 19 'City Indicators'. Table 1.0 below shows the list of city indicators and the total indicators.

TABLE 1.0 List of CITY INDICATORS

	Sectors	Number of Indicators
CITY INDICATORS	Economy	4
	Education	3
	Energy	10
	Environment and Climate Change	3
	Finance	2
	Governance	4
	Wastewater	5
	Water	4
	Solid Waste	6
	Health	3
	Housing	2
	Population and Social Conditions	4
	Recreation	1
	Safety	1
	Sport and Culture	4
	Telecommunication	3
	Transportation	14
	Urban Local Agriculture & Food Security	3
	Urban Planning	4
Total		80

Consequent to many sessions of meetings and discussions, the indicators under the smart city standard are classified into three categories; indicators with total adoption, indicators that require modification and indicators that are not applicable/ can be considered in the future. The indicators are also classified according to their readiness for use in Malaysia. Table 2.0 shows the classification for the smart city indicators.

TABLE 2.0 CLASSIFICATION OF SMART CITY INDICATORS

CLASSIFICATION	TOTAL
Indikator yang diterima pakai sepenuhnya (indicators for total adoption);	9
Indikator yang memerlukan pindaan (indicators that require modification)	44
Indikator yang tidak bersesuaian / dilaksanakan di masa hadapan (indicators that are not applicable that can be considered in the future)	27
	80

Future Directions for Smart City Indicators

The Standard for Smart City Indicators is still under development and is expected to be finalised by the end of 2021 through Technical Committee TC/D/29 under Standards Malaysia. PLANMalaysia is appointed as the chairman of The Technical Committee Meeting TC/D/29 - Sustainable Cities and Communities which the first meeting was held on 8 October 2020 under the secretariat of Standard Malaysia. The establishment of this Technical Committee TC/D/29 is in line with the roles and functions of ISO/TC 268 Sustainable Cities and Communities at the international level. Following through, PLANMalaysia has proposed to set up a working group and was approved by the Technical Committee TC/D/29 registered as WG/D/29-1 to study the smart city indicators.

SMART COMMUNITY 03

Integration of Next-Generation Technologies and
Advanced Social Systems for Digitally and Technologically Literate Communities

Introduction

What Is Smart Community?

Smart Community is defined as connected citizens who embrace and deploy technology to enable economic growth, social inclusion and environmental sustainability.

Characteristics of Smart Community

- Maintains a healthy, flexible, and resilient lifestyle.
- Prepares the citizens with multicultural perspective, developing upskills and trained individuals.
- Citizen Readiness for 21st century education.
- Maintains high graduate Enrolment Ratio.
- Willingness towards the adoption of lifelong learning and e-learning models.

A technologically-enabled city will thrive only if its communities are 'smart'. This applies to the ability of everyday citizens to engage with enabling technologies and shape the vision for digital transformation in cities.

Figure 4-1 shows the relationship between smart communities and smart cities. A smart community should have a lifelong zeal to learn, and there should be social and ethnic plurality. Open-mindedness is another quality of a smart community, as is having the flexibility to adapt to changes in the environment, as well as the creativity to contribute to the economy.

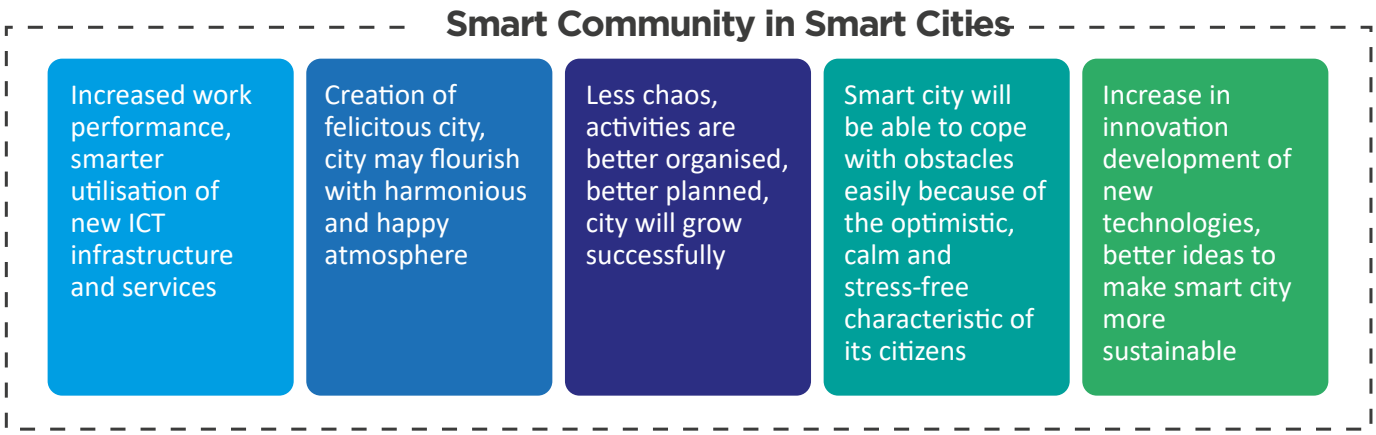


Figure 4-1: Smart Communities in Smart Cities

Where We Are Now

Smart Community in Malaysia At A Glance

Malaysians are already embracing technology, albeit much of it at a personal consumption level. According to the Department of Statistics Malaysia 2018, 81.2% of individuals in the country use the internet compared to a global average of 73.6% across 82 reporting countries. In IMD's World Digital Competitiveness 2019 ranking which studies 51 criteria across 63 countries, Malaysia ranked 26th. This indicates that Malaysia outperforms the global average in terms of internet usage and digital competitiveness.

As far as the Smart City Framework goes, one important aspect is the drive towards "enhancing the quality of human capital to meet future demands and overall environment in smart city". This translates to improving standards of education, providing upskilling and reskilling opportunities through training programmes and putting high technology on the agenda of higher education. The Framework points out that the percentage of skilled and talented human capital in Malaysia is relatively low at 27% compared to advanced countries, alluding to the fact that the road to smart communities is a long one and that change must come sooner rather than later.

The Malaysian government has laid out priorities for the development of smart community as illustrated in Figure 4-2, which integrate current thinking around the development of smart citizens from the perspectives of human capital, gender equality, social inclusion and community empowerment.

Figure 4-2: Priority Areas of Development for Smart Community in Malaysia

A report on the Future of Talent in Malaysia 2035 Human Resources Development Fund (HRDF) and Charted Institute of Personnel and Development, (CIPD); 2019 focuses on a "holistic approach" to human capital development, whilst also revealing a level of "unpreparedness for Industry 4.0; the inadequacies of the state education system and acute skills shortages across the economy."

The report points to a number of human capital fundamentals which Malaysia could focus on, including skills investment, especially in technology as well as education reform. The latter is proposed in Strategy 3 of the Smart People component of Malaysia Smart City Framework 2019, detailing planned initiatives to review subjects such as science, technology, engineering and mathematics (STEM), promoting innovation, ICT and strengthening technical and vocational education and training in the education system (TVET).

Developing a new and more relevant policy in implementing TVET's agenda in line with industry needs is part of the Ministry of Human Resources' 2019 plan. The budget of RM5.9 billion allocation via the 2020 Budget to place TVET in the mainstream in the country, is set to the get the country ready to meet the demands of IR 4.0. The Education Ministry's Education Blueprint (Higher Education) has indicated that there will be an increase in demand for an additional 1.3 million Technical and Vocational Education and Training (TVET) workers by 2020 in the 12 National Key Economic Areas identified under the government's Economic Transformation Programme.

The scope for TVET development to fulfil the country's aspiration of developing its human capital and encouraging industry players to support this goal is promising, as public-private partnerships are seen to be capable of rising to the challenge of creating smart communities for the country's socio-economic growth.

Where We Are Heading

The success of any smart city initiatives would depend, to a great extent, on the preparedness and willingness of the population. Public buy-in is important in any implementation programmes of the Malaysia Smart City Framework. People must have the right mindset and attitude in order to make a success of the smart city aspirations. Building smart communities is therefore a critical agenda of the smart city.

As shown in the diagram below, the three key strategies in building smart community are transforming the way citizens interact through smart forms of education and utilisation of solutions in creating an inclusive and accessible environment.

Smart Community Strategies

Global Practices

Increasingly, many cities worldwide are empowering citizens through improving the potential for better, more inclusive educational and employment opportunities and facilitating digital literacy and adoption. Hong Kong, Sydney, Taipei and Amsterdam have been picked for this chapter to demonstrate their respective holistic approach to Smart Community development, each embracing technology as well as enabling citizen participation through its deployment. These examples provide some innovative ideas for adoption in Malaysia.

Hong Kong

Organises intensive training programmes on STEM for curriculum leaders of primary and secondary schools to enhance their capacity.

Provides enhanced information technology (IT) training to secondary school students.

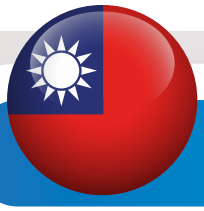
Enhances R&D capability through collaboration with renowned institutions in other jurisdictions.

Attracts and retains more IT professionals, especially in biotechnology, data science, artificial intelligence, robotics and cyber security.

Provides financial and non-financial support to young entrepreneurs and start-ups to build a stronger IT culture.

Expands incubation programmes at Science Park and Cyberport Smart-Space.

Strengthens training on innovation and application of technology for civil servants.



Taipei

Taipei “Living Lab” encourages citizen participation. Initiatives are created to engage citizens to help understand needs, working directly with agencies to identify opportunities and support their smart city initiatives. It engages the ICT community to promote innovative solutions through a proof of concept (PoC) model.

Taipei IoT Experimental Platform encourages innovation and speeds up solution commercialisation.

"Taipei CooC Cloud" allows students to study independently with online resources, provides teachers with one-stop teaching services, teaching materials and facilitates the exchange of teaching experiences.

Taiwan's JOIN Platform – is an i-Voting system inviting the public to vote online on issues of concern.

Sydney

The city of Sydney libraries have implemented an experiential learning programme that enables digital fluency through hands-on learning to create more ‘digital citizens’. They provide equality of opportunity, crucial employment skills and help people to remain connected in their communities to develop new skills, knowledge and ideas to enrich their lives.

Uses digital platforms such as the Sydney Your Say consultation hub for communities to provide comments, feedback and views on the work of the City through online platform, including via social media, website, surveys and live-polling.

Amsterdam

Internet of things (IoT) Living Lab promotes IoT interactivity in public spaces to encourage citizens and cities to test and prototype innovations.

The beacons (sensors) with LPWA network technology - a new standard machine-to-machine protocol is developed to push the development of IoT economy across public and private verticals.

iBeacon Living Lab is created to provide IoT infrastructure, actionable open data and a developer-friendly network to explore and experiment IoT-enabled interactive solutions in the urban environment.

As the process of developing smart cities in Malaysia evolves and cities have become gateways for highly skilled workers and new immigrants, there are a number of global state-of-the-art initiatives that can be adopted to empower citizens and create smart communities. ‘Living Labs’ to encourage citizen participation for one, can improve citizen engagement and identify need-based opportunities. Libraries too, can create experiential learning programmes to facilitate digital literacy and thus create digital citizens. In addition, community hubs are also important tools to enable feedback and comments to reach local authorities and service providers.

▶ **Article**

Concerted Efforts in Smart Cities in Spearheading the SDG4

By Ts. Farah Abu Bakar
Industry Development Division, MIGHT

The Sustainable Development Goals (SDG), also known as The 2030 Agenda for Sustainable Development was launched by The United Nations back in 2015. It comprises of seventeen (17) Goals that require actions of all countries regardless of their economic status in relation to the sustainability agenda.

The Fourth Goal, SDG4: Quality Education looks at "Ensuring inclusive and equitable quality education and promote lifelong learning opportunities for all" and made up of ten (10) targets in achieving the ultimate goal. Prior to Covid19, the progress in achieving SDG4 was too slow and it was projected that circa 200million students will still be out of school by 2030. However, the pandemic has exacerbated the inequalities faced in education. Therefore, concerted efforts and involvement at community level are indeed necessary in closing this divide.

Smart cities have been demonstrating a growing trend around the world. According to IMD's Smart City Index (SCI) 2020, below is the top ten (10) Smart Cities:

1. Singapore
2. Helsinki
3. Zurich
4. Auckland
5. Oslo
6. Copenhagen
7. Geneva
8. Taipei City
9. Amsterdam
10. New York

Kuala Lumpur is ranked at 54th position out of 109 global cities studied. Here, a 'smart city' continues to be defined as an urban setting that applies technology to enhance the benefits and diminish the shortcomings of urbanization for its citizens.

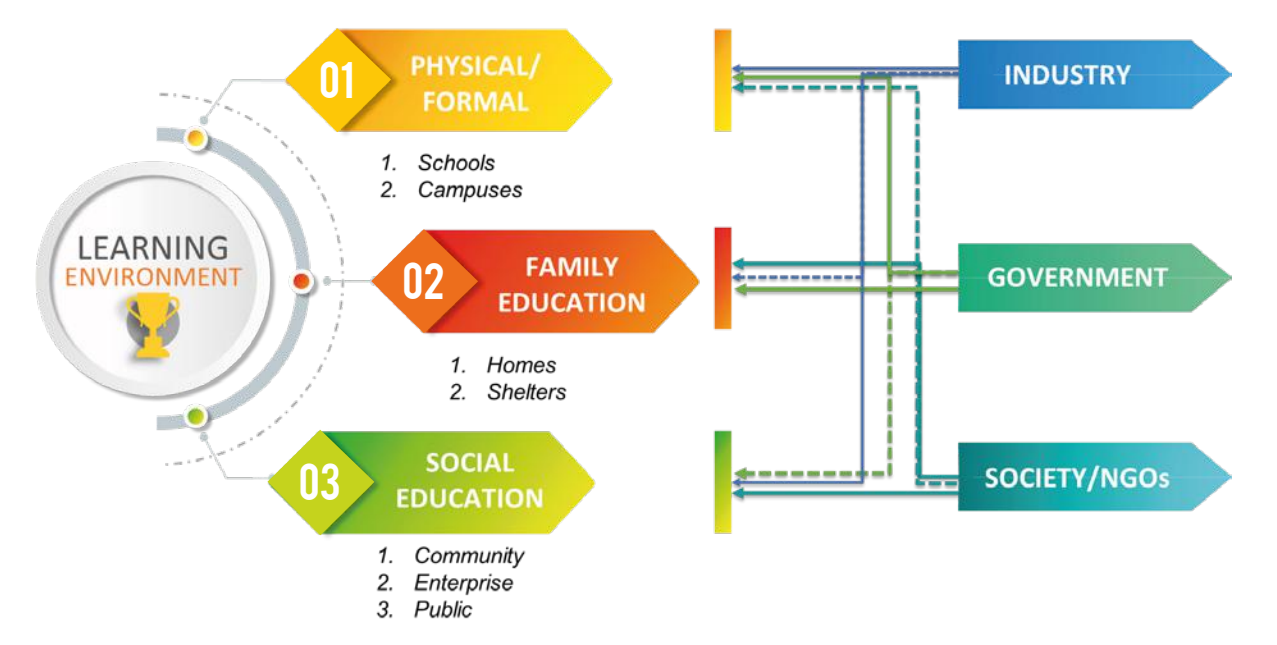
Undeniably, the fabric of smart cities development is being extensively woven by advancement of technologies. The Fourth Industrial Revolution (4IR) has propelled its growth via the emerging technologies that further initiated digital reforms of governments and industries alike. The COVID-19 pandemic which has taken the world by storm has elevated the importance of digital technologies which is one of the 2021 priorities outlined by United Nations as below:

Rightfully so. In the Malaysian context, the Ministry of Housing and Local Government has defined smart city as 'a city that uses ICT and technology and innovation advances to address urban issues including to improve the quality of life, promote economic growth, develop sustainable and safe environment and encourage efficient urban management practices'. Smart city Malaysia aims at addressing urban issues and challenges towards achieving then three main pillars of competitive economy, sustainable environment and enhanced quality of life. Via the Malaysia Smart City framework, there are seven (7) major components of smart city Malaysia, including Smart Digital Infrastructure.

The Department of Statistics has indicated that more than 90% of households in Malaysia have Internet access, where the household Internet penetration increased from 87% in 2018 to 90.1% in 2019.

However, as in other areas, education sector has also taken a major blow due to the pandemic which gives an alarming signal to authorities on improving the digital infrastructure. On 15th April 2020, in his media session, the Senior Minister of Education YB. Datuk Dr. Mohd. Radzi bin Md. Jidin has shared some glaring findings of a survey conducted by his ministry in late March 2020 on nearly 900,000 of its students where circa 36.9% do not have access to online learning due to the absence of devices such as pc, laptop or smartphones and do not have access to internet. Despite having more than 90% household with internet access, this does not mean thag there are no underlying, especially in relation to the adoption of online learning. The situation is far more complex especially involving bigger households to cater the needs of parents and children to go digital.

Malaysia is committed to developing local high-skilled talents that is required in country's growth, and hence in enhancing key sectors including smart cities development. In turn, smart cities initiatives must also be inclusive especially in improving livelihood and means for the people to work and learn. Given the situation at hand, education sector requires involvement from not just the government but the society and industry, especially in supporting different kind of learning environment. A typical learning environment in a smart city can be described as follows:



Source: Adapted from "Smart learning environments for a smart city: from the perspective of lifelong and lifewide learning".

COVID-19 has given painful lessons to the government, the industry as well as the people at large not to take matters for granted. Proudly, Malaysia is among the most proactive country in the region in addressing the COVID-19 and cushion the impact of the restrictions and caveats faced by the industry players and the people. However, many are still suffering from the economic blow due to the pandemic and more must be done to help the people to recover, stay afloat and to move forward.

Thus, a smart city must rise above the norms in developing an environment that is agile, swift in responding and more prepared in face of such threats and disasters, while also addresses the pressing need for access to proper education via provisions of the necessary infrastructures and facilitation via concerted efforts from the government, industries as well as the society as described above. This will also greatly assist the country in fulfilling the SDG4 aspirations, i.e., ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SMART DIGITAL INFRASTRUCTURE 04

Technological and Digital Enablers for
Sustainable, Advanced and Inclusive Cities

Introduction

What is Smart Digital Infrastructure?

Smart digital infrastructure is the foundation of information technology development for any modern nation. It is fundamental to the economic growth of regions and cities across the world, helping to secure good social, health and environmental standards. A highly advanced infrastructure strengthens a nation's digital capacity and radically improves the quality of life in the long run.

The Importance of Smart Digital Infrastructure

- Enables the use of data, computerised devices, methods, systems and processes to deliver smart tools.
- Transforms a city and creates sustainable ecosystem to integrate technology solutions to enhance public services.
- Reduces costs and improves the quality of life of city residents.
- Improves city safety and cyber security.

Smart digital infrastructure is the backbone of smart cities. Within the global context, there are six strategic technologies that form the fundamental of smart digital infrastructure as illustrated in the Figure 5-1. This includes:

- High-performance network and high-speed internet to facilitate IoT-oriented and integrated infrastructures
- Cost-efficient, lower power wide area network for connected cities
- Hyperscale data management centres that aggregate data and transform it into actionable intelligence
- Distributed infrastructure and edge computing that facilitate extended cloud computing
- Advanced cyber security to reduce cyber threats
- Connected sensors network for data collection from a wide range of sources

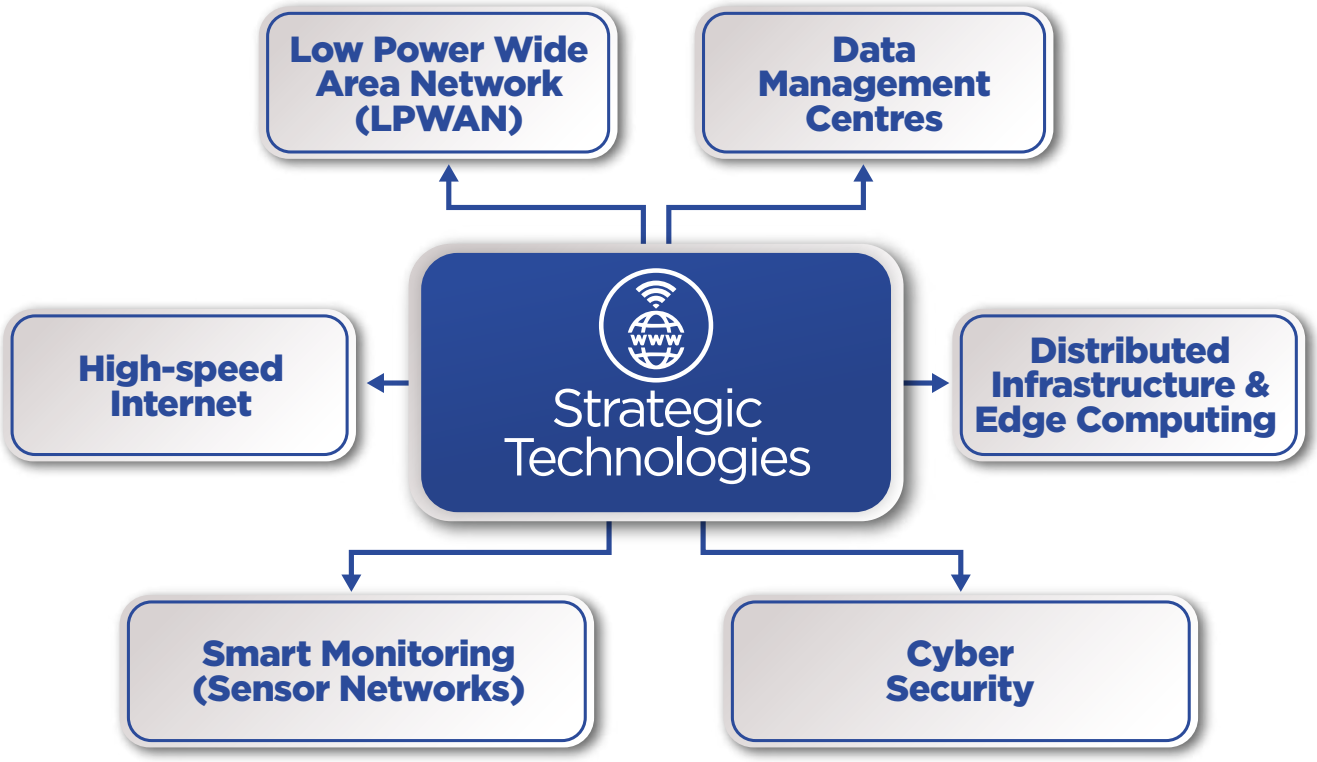


Figure 5-1: Strategic Technologies for Smart Digital Infrastructure

Smart Digital Infrastructure in Malaysia At A Glance

As economic activities are being digitised and communication services centre around speed, openness and efficiency, developments in smart digital infrastructures have supported Malaysia's digital journeys. Through the strengthening of ICT infrastructure, technology becomes the enabler of a knowledge-based society and the bridge to the realisation of smart cities, designed to address the challenges of population growth, climate change, urbanisation and resource depletion.

As illustrated in Figure 5-2, smart digital infrastructure initiatives that have been implemented by the local authorities to date are relatively low due to the high cost of implementation. However, 33.9% of the local authorities have put in place projects to strengthen their digital infrastructure in the next two years.

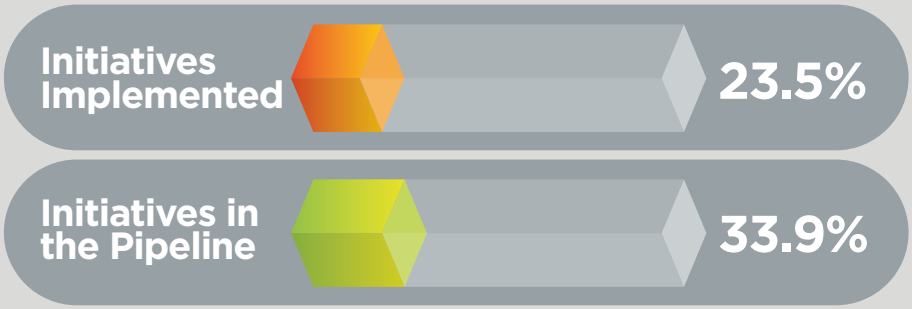


Figure 5-2, Source: MIGHT Analytics

As listed below, the government has set its priorities in ensuring better connectivity in terms of internet speed and wider coverage, strengthening also online security to support the growth of smart cities in Malaysia.

Figure 5-3: Priority Areas for Smart Digital Infrastructure Development in Malaysia

As illustrated in Figure 5-4, 77.7% of the local authorities emphasise on high speed internet solutions as the fundamental of their smart city development, followed by smart connectivity, smart monitoring system and big data sharing platform.

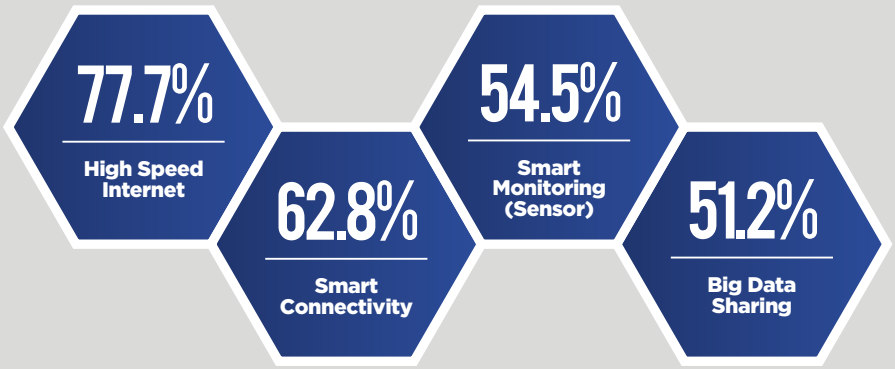


Figure 5-4, Source: MIGHT Analytics

Malaysia's Smart Digital Infrastructure Initiatives

As indicated in the timeline diagram below, starting from the inception of the Malaysia Digital Economy Corporation (MDEC) in 1996, the country's technological infrastructure has expanded exponentially to unlock its digital potential. Significant internet backbones including submarine cables, fixed broadband and communication satellites have been strengthened over the years. In addition, ICT installations, enabling the flow of data and the use of interconnecting web of systems, platforms and applications have also been boosted, widening connectivity to rural areas.

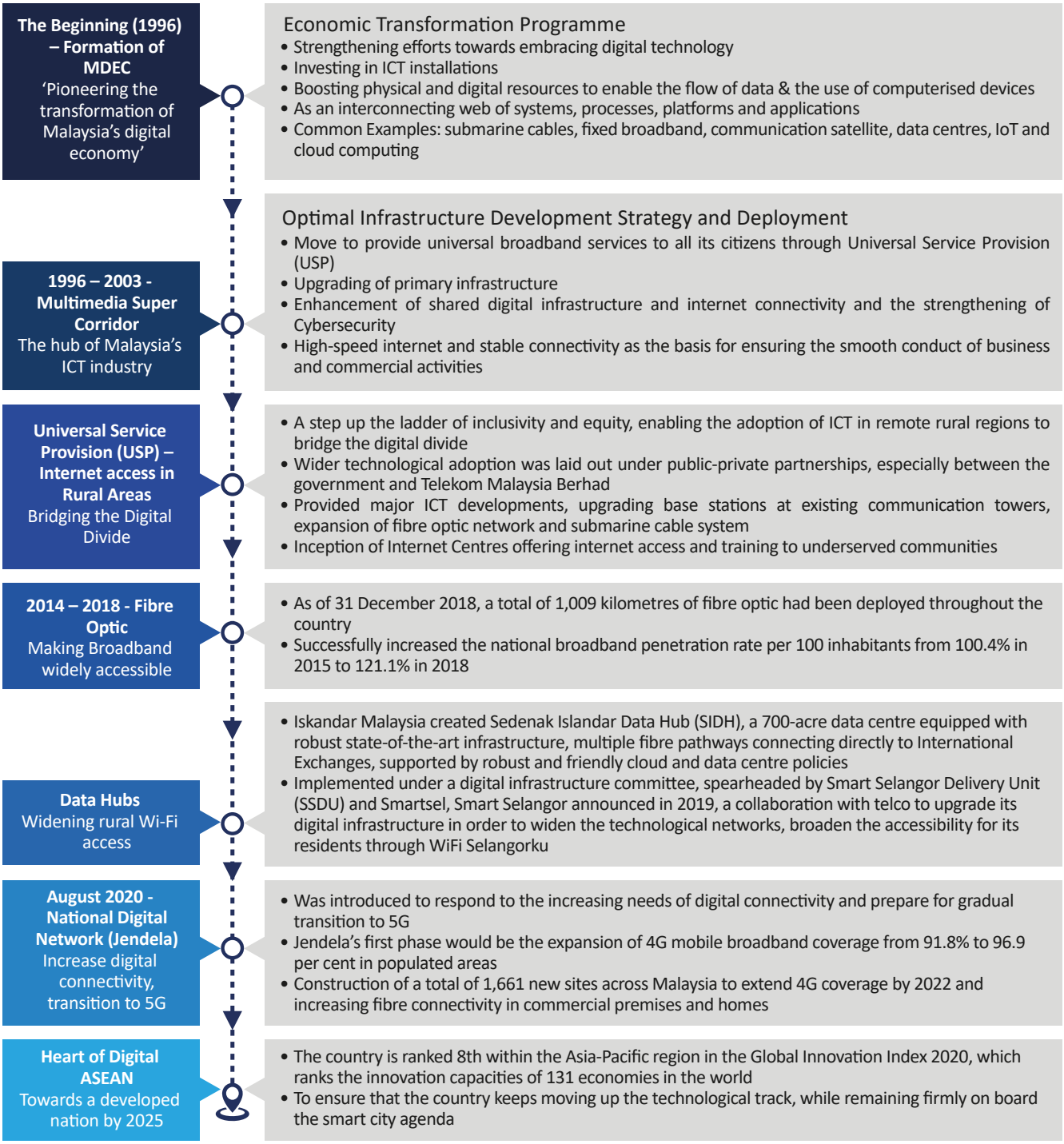


Figure 5-5: Malaysia's Smart Digital Infrastructure Chronology

In order for the country to achieve the target as a developed nation by 2050, Malaysia needs to continue its efforts to increase digital connectivity and widen digital literacy across the country. This will help accelerate the digital transformation and the development of smart cities in the country.

Companies like TNB Research Sdn Bhd, Three-Opp, Sistem Perintis Sdn Bhd and MNJ Teras have contributed to the smart digital infrastructure development in Malaysia.

Where We Are Heading

Covid-19 has underlined how important digital infrastructure is in the modern world. The new normal of working from home will not be possible without teleconferencing as well as cloud storage for documents and digital publishing. It is clear that fibre connections are an essential and critical infrastructure, to be treated as on par with utilities such as water and electricity.

Below are some of the critical digital infrastructures that global governments are putting in place in developing a more resilient smart city.

IoT Oriented and Integrated Infrastructures

- Secure wireless connectivity and IoT technology are transforming traditional elements of city life into next-generation intelligent platforms with expanded capabilities
- Integrating solar power and connecting to a cloud-based central control system that connects to other ecosystem assets
- Smart tools are equipped with sensors monitoring to provide traffic alert, weather and disaster warning and detect free parking spaces via a mobile app

Low Power Wide Area Network (LPWAN)

- Low Power Wide Area Network (LPWAN) technologies are well suited to most smart city applications for their cost efficiency and ubiquity
- These technologies include LTE Cat M, Narrowband-Internet of Things (NB-IoT), LoRa, Bluetooth and a few others that contribute to the fabric of connected cities

New Data Management Capabilities

- The increase of cybersecurity attacks and data privacy and protection regulations are accelerating cloud services over private networks and storing their encryption keys in a cloud-based Hardware Security Mode (HSM) at a location that is separate from where their data resides
- An HSM-as-a-Service model allows users to increase the level of control over their data, to strengthen resiliency of operations and to support a hybrid technology architecture
- New data processing capabilities such as multiparty secure computation, fully homomorphic encryption and secure enclaves will move towards mainstream and will allow enterprises to run their computation in a secure manner.

Distributed Infrastructure and Edge Computing

- Distributed infrastructure and edge data centres are growing in size and in importance, providing an evolving opportunity
- These smaller facilities typically connect to a larger central centre, or centres, but are situated as close as possible to the population that they are serving
- As people increasingly work from home and more commerce and education are conducted from the home, workloads are being pushed further away from the urban core
- Similarly, businesses want to make real-time decision where action is happening. Hence, extending cloud computing to the edge could solve challenges introduced by the highly distributed nature of modern digital business applications

5G

- Having more antennas and more fibre connected to them that will result in shorter distances between devices and the network, 5G can dramatically cut down electromagnetic emissions
- It will be better for the environment, as less power is used in each antenna site and will provide better user experience and more reliable networks

Global Practices

Advanced cities have rolled out various combinations of technologies to support their digital infrastructure. Seoul, Tokyo, Shanghai and Amsterdam are picked for this chapter for their wide-ranging state-of-the-art digital infrastructures, which would be relevant for Malaysia's adoption.

Seoul

State-of-the-art Digital Infrastructure
A cloud-based centre adopting integrated technologies such as virtualisation and blade technologies to improve efficiency. The centre operates on a low-energy, high-efficiency and eco-friendly infrastructure. Its equipment is upgraded for optical communication networks to cope with increased data and public WiFi usage. The centre offers free WiFi across Seoul and has installed Fibre Optic Cables along the subway lines.

Integrated Security Control System
The systems were created to prevent cyber-crimes. It makes swift responses by monitoring and analysing crimes 24/7. The security control tower reinforces its information security system and launches drills against cyber-attacks and malicious emails on a regular basis.

Tokyo

Highway Basic Strategy
A network strategy using the 5G next-generation telecommunications standard, boasting the development of the fastest mobile internet network in the world.

Multi-functional Smart Poles
Installation of multi-functional poles equipped with communication base stations, Wi-Fi, street lighting, signage, etc., to serve as useful infrastructure to provide new community services. One smart pole model incorporates LED lighting and 5G base stations for multiple telecommunications carriers. The second includes LED lighting and a 5G shared-antenna system for joint use by multiple telco operators, as well as WiFi, digital signage and pedestrian traffic flow analysis cameras.

Shanghai

Powerhouse for 5G
The government has built over 25,000 5G outdoor base stations and over 31,000 5G indoor small stations. There are more than 120,000 data centres currently. In 2021, an additional 60,000 data centres will strengthen the foundation for information technology development.

New Networks
High-level 5G network and "Double Gigabit" fixed broadband network. This is a new form of network security facilities, global information and communication hubs.

New facilities
Advanced industrial innovation infrastructures include an electronic microscope centre, advanced medical image integration innovation centre and a national innovation centre for integrated circuit and equipment materials.

New platforms
A new generation of high-performance computing facilities and ultra-large-scale artificial intelligence computing and empowerment platforms.

New terminals
Deployment of neuron perception nodes for social governance - adds 100,000 smart EV charging stations; builds a municipal-level public parking information platform; expands intelligent last-mile delivery facilities; constructs Internet+ medical infrastructure; cultivates benchmarking; builds intelligent "aerial and offshore" hubs and optimise the construction of urban intelligent logistics infrastructure.

Amsterdam

Advanced Data Centre
One of the largest data transport hubs in the world. Eleven out of 15 sea cables for digital traffic between the US and Europe come in through the Netherlands. There are more than 200 data centres across the Netherlands. Connecting to AMS-IX provides internet service providers, telecom companies and cloud providers with global IP traffic routed in an efficient, fast, secure, stable and cost-effective measures. This allows them to offer low latency and engaging online experiences for end-users.

To achieve the target of being the Heart of Digital ASEAN, there is an urgent need for Malaysia to accelerate the 5G roll-up and develop more advanced data centres to support the growth of smart cities in the country.

▶ Article

IoT Technology in Malaysia Smart City Context

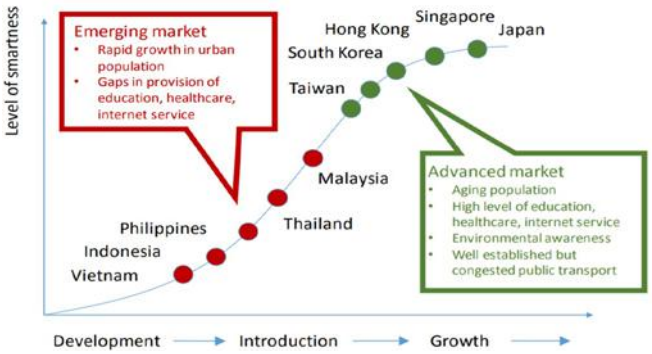
By Ts. Zulkifflee Mohamad
Sustainable Development Technology Division, MIGHT

"The Malaysian Smart city vision is an innovative city that uses information and communications technology (ICT) to improve the quality of life, effectiveness of urban governance and services, and competitiveness, while ensuring that it meets the needs of present and future generations."

Level of Smartness Cities in Asia

Based on the Netherland Ministry of Economic Affairs, Malaysia is currently placed at the level of emerging market for Smart City. At this stage, Malaysia faces rapid growth in urban population due to municipalities upgrading their local authority governance from local council to municipal council and from municipal council to city council. Urban population growth is not just about people moving to urban areas, but the changes made by the local government to their status of governance.

This action has resulted in the increase in the rate of Malaysian urban population growth without involving migration from rural to urban areas.



Source: Netherland's MoEA

IoT in the Malaysian Industry

Realising the importance of IoT, Malaysia introduced the National IoT Strategic Roadmap, which has justified the need for the study of IoT technology readiness in Malaysia. This roadmap was unveiled to achieve three goals: to create a conducive the IoT industry ecosystem, to strengthen technopreneur capabilities in Apps and Services layers and to transform Malaysia into a regional development hub for IoT. Malaysia aims to support IoT and create value for business, government, society, and the academic and research communities. This means that IoT would support business companies, especially small and medium-sized businesses, in both performance and future growth. The Ministry of Science, Technology & Innovation (MOSTI) introduced the National IoT Strategic Roadmap to implement the IoT in 2015. The mission is to create a national network to empower the creation of IoT use & industrialisation as a new source of economic expansion.

Electrical & Electronics

The Electrical & Electronics industry is the leading industry in Malaysia's manufacturing sector, contributing significantly to the country's exports and emplyment

Subsectors:
- Electronic components
- Consumer electronics
- Industrial electronics
- Electrical products

Machinery & Equipment

The Machinery & Equipment industry is one of the key areas for growth and development, focusing on high value-added and high technology M&E

Subsectors:
- Specialised M&E for specific industries
- General industrial M&E, parts and components
- Power generating M&E
- Machine tools

Chemical

The Chemical industry is one of the catalytic industries in the country with rapid growth due to the avalaibility of oil and gas as a feedstock

Subsectors:
- Petroleum products & petrochemicals
- Plastic products
- Rubber products
- Chemical & chemical products
- Oleochemicals

Medical Devices

The Medical device industry spans an extremely wide range of industries from rubber and latex, plastics, machinery and engineering support and electronics

Subsectors:
- Consumables
- Surgical instruments, clinical device & implants
- Healthcare equipment

Aerospace

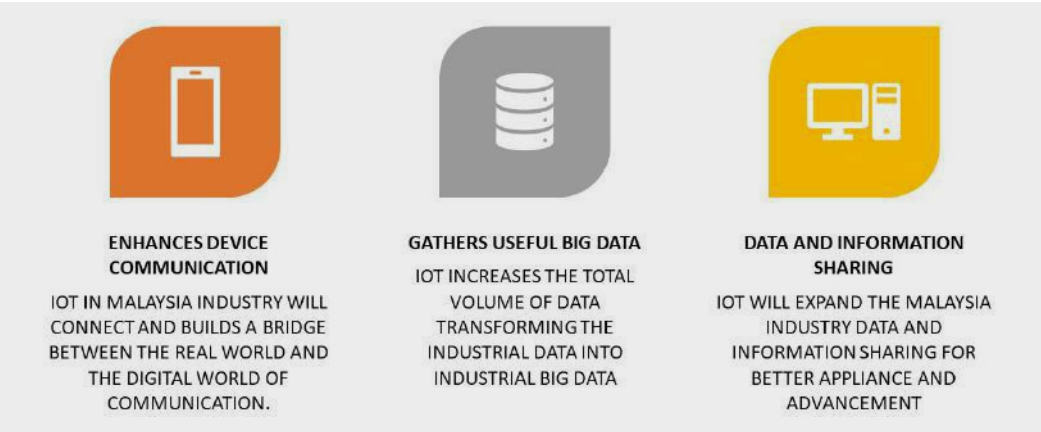
The Aerospace industry has been designated as a strategic sector with high growth potential in the country's industrialisation & technological development programs

Subsectors:
- Engineering & design
- Aero-manufacturing
- System integration
- Maintenance, Repair and Operations (MRO)

Other Sectors

- Automotive
- Transport
- Textiles
- Pharmaceutical
- Metal
- Food processing
- Services

IoT Impact on the Malaysian Industry



Importance of IoT in Malaysia Smart City

How IoT Suits Malaysia Smart City

Readiness of IoT in Malaysia

Based on a study by Might, Malaysian companies have the capacity to expand 'IoT and Sensor' services for Smart City initiatives. The Internet of Things (IoT) has become one of the most potent communication paradigms, attracting many research interests in the 21st century. The National IoT Roadmap has indicated IoT readiness by strength and weakness based on selected factors.

Factor	Strength	Weakness
Technology	Well-established mobile operators and five operators licensed to provide 3G services	1. Technology complexity 2. Legacy systems 3. Security and privacy concerns 4. Data accessibility and knowledge sharing availability
Resource	1. Creation of new MSC cybercities and cyber centres 2. SMEs as source of endogenous growth and innovation 3. E&E industry is leading in terms of investment, industrial output	1. Fragmented funding instruments unable to generate required impact 2. Barriers to free market competition exist
Societal	1. High phone and Internet penetration rates 2. Sophisticated consumers are eager to use mobile data and value-added services	Rural adoption and adaptation fear - technology phobia
Political	1. Various incentives like pioneer status, tax exemptions and allowances to promote ICT investment 2. Intellectual property protection and cyberlaws	1. Dedicated performance management entity exists to monitor and drive performance of innovation initiatives 2. Broken linkages across industry and public RIs 3. Multiple public agencies working in silos on innovation initiatives

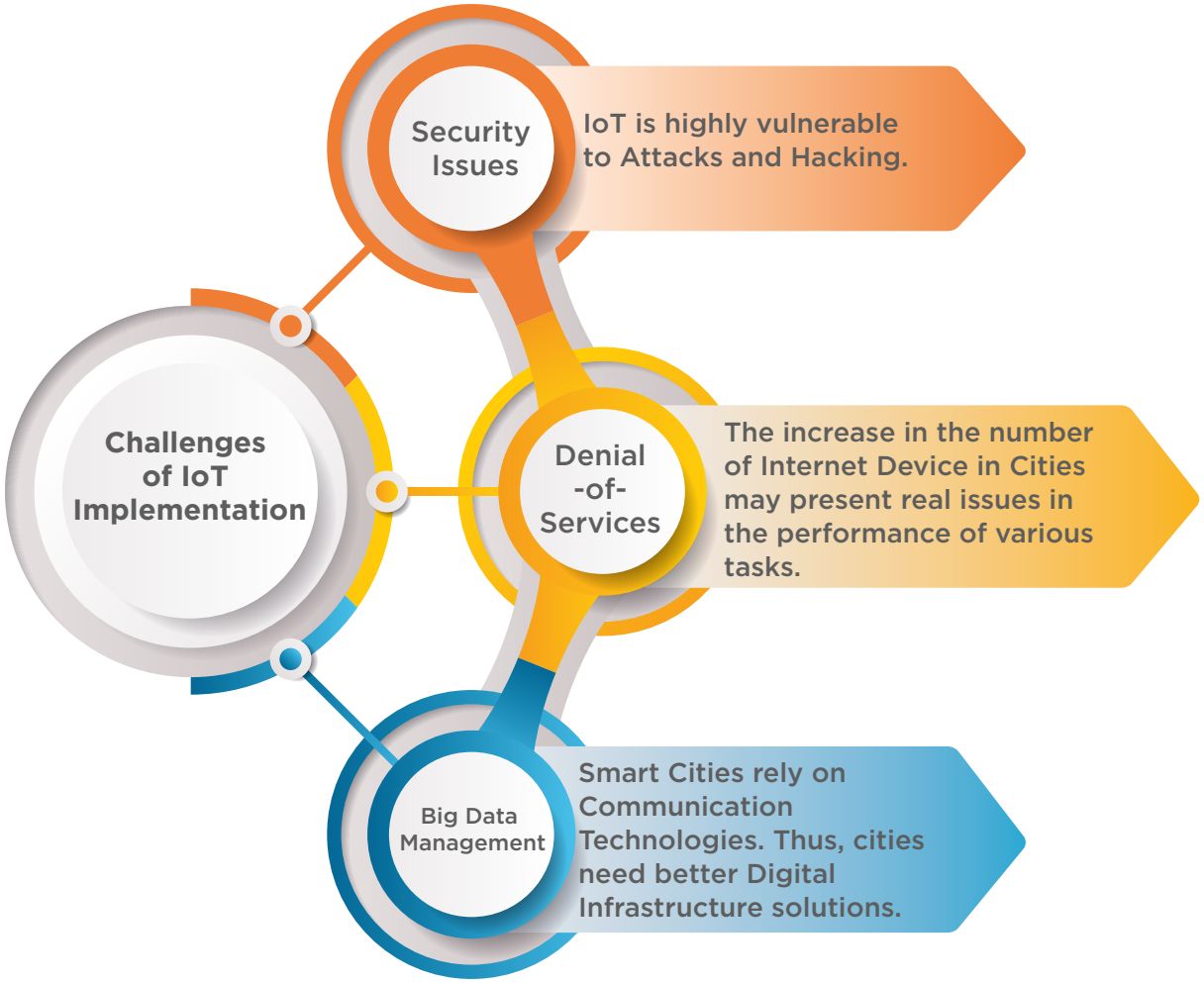
Focus Business Areas on IoT

Smart Waste Management
Computing Server collects the Information and optimise garbage-collection by the Garbage Trucks

Smart Parking
The Server can provide Parking Vacancy Information to other drivers

Smart Grid
Significant role In cost-effective Power Generation, Distribution, Transmission and Consumption.

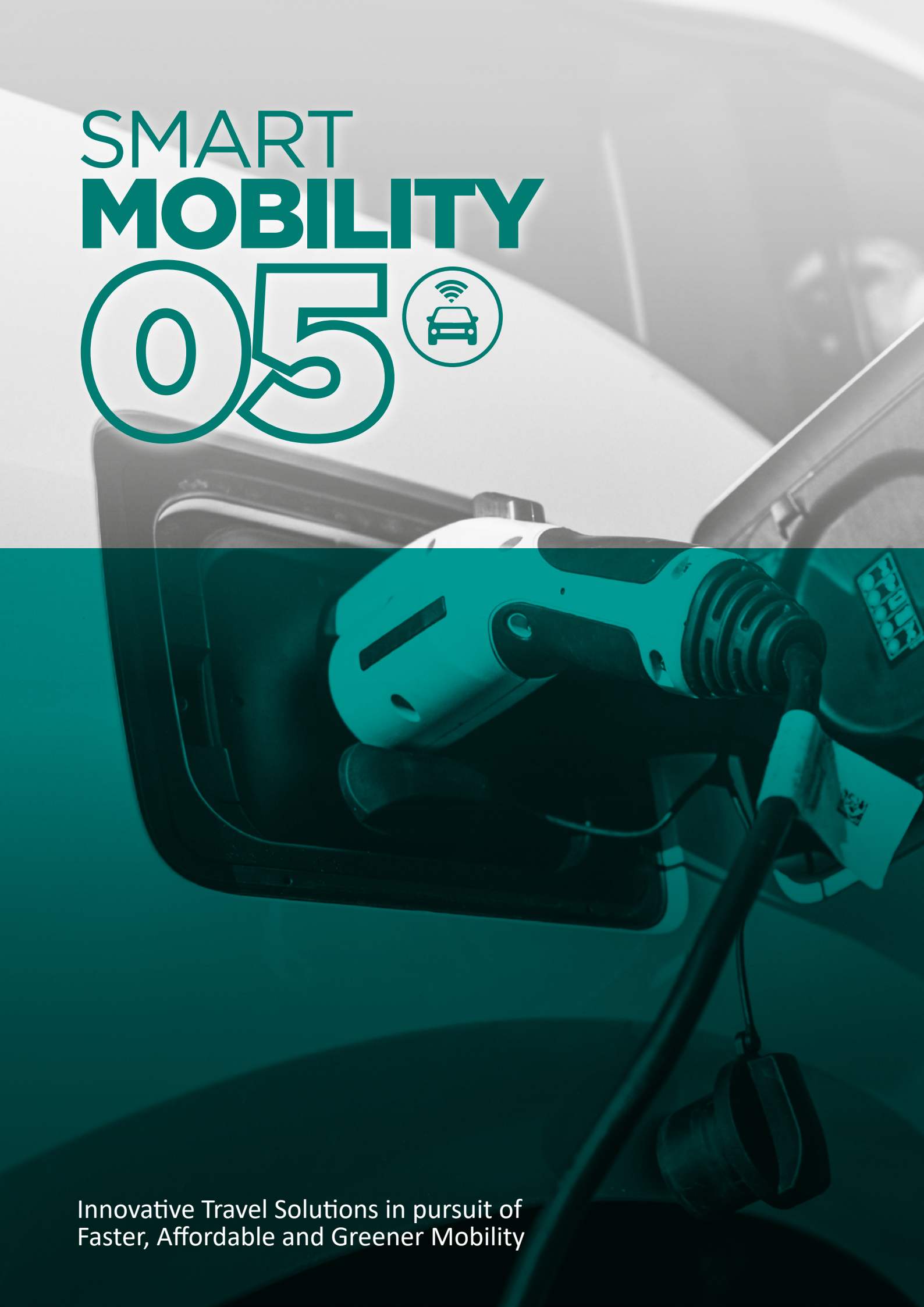
Autonomous Driving
Helps speed up the flow of traffic in a city and save parking space



Way Forward

IoT is one of the vital enablers that will redefine the field of technology and the smart city landscape in Malaysia. Due to its newness, IoT readiness in Malaysia Smart City is yet to be understood. IoT gives insights for people to integrate technology into their daily lives, as it brings invaluable information that could be applied in numerous ways. It brings forth the possibility for all things to be connected, including businesses, processes, people, and devices.

However, IoT is not without its weaknesses and difficulties that can be challenging to industries. But overall, the rise of the IoT creates new prospects. It utilises new applications which has helped a large number of industries to accelerate their move into a significant transformation cycle.



SMART MOBILITY 05

Innovative Travel Solutions in pursuit of
Faster, Affordable and Greener Mobility

Introduction

What is Smart Mobility?

Smart mobility is defined as the integration of new and emerging solutions to enhance mobility through the reduction of road congestion. It offers faster, greener and cheaper transportation options for the public. Smart mobility provides alternative modes of travel and puts emphasis on affordable transportation, whilst fostering sustainable lifestyles that are beneficial to the environment.

Principles of Smart Mobility

- Flexibility: Multiple modes of transportation allow travellers to choose which ones work best for a given situation.
- Efficiency: The trip gets travellers to their destination with minimal disruption and in as little time as possible.
- Integration: The full route is planned door-to-door, regardless of which modes of transportation are used.
- Clean Technology: Transportation moves away from pollution-causing vehicles to zero-emission ones.
- Safety: Fatalities and injuries are drastically reduced.

Smart mobility technologies aim to provide solutions to many mobility issues and promote greener and low emission mobility. Figure 6-1 shows the strategic technologies that form the fundamentals of mobility, including intelligent road, traffic and parking systems, hybrid and electric vehicles, multimodal transportation systems, low emission mobility, micro mobility solutions and travel assistance technologies.

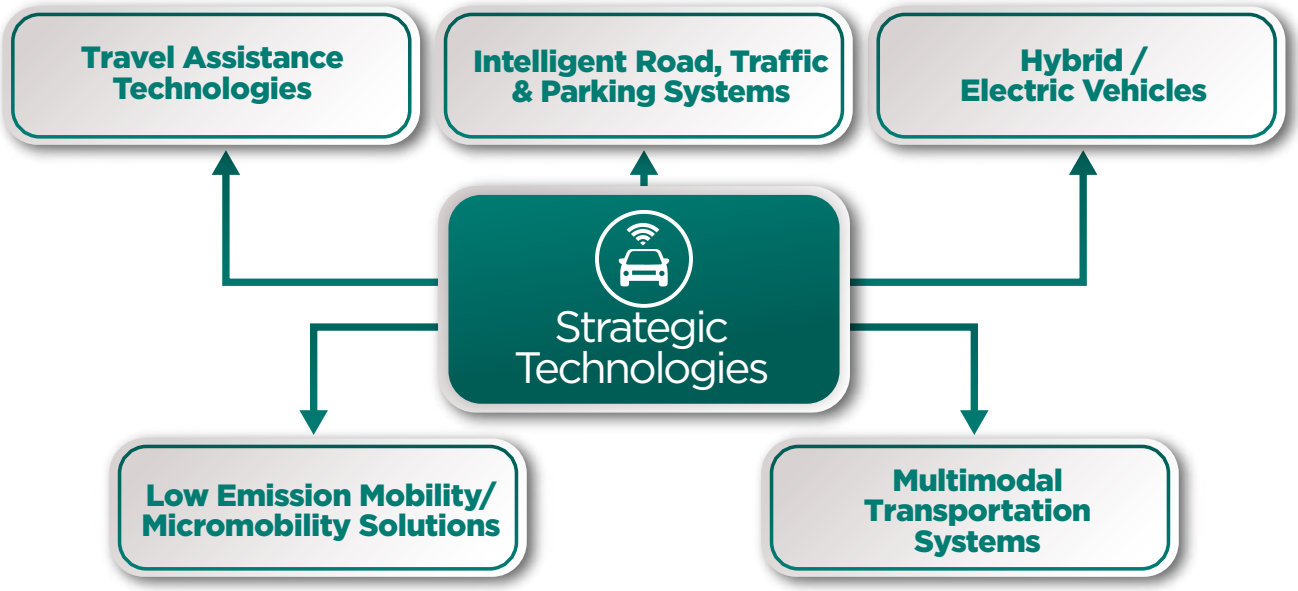


Figure 6-1: Strategic Technologies to Implement Smart Mobility

Where We Are Now

Smart Mobility in Malaysia At A Glance

In Malaysia, the transportation 'revolution' is now taking centre stage in urban planning and management, making its way across emerging smart cities. Smart Mobility, as a key component of the Malaysia Smart City Framework, underpins moves to address the multitude of complex and acute aspects of mobility (Figure 6-1) that have posed a challenge for major cities in Malaysia.

Main challenges of Mobility in Malaysia

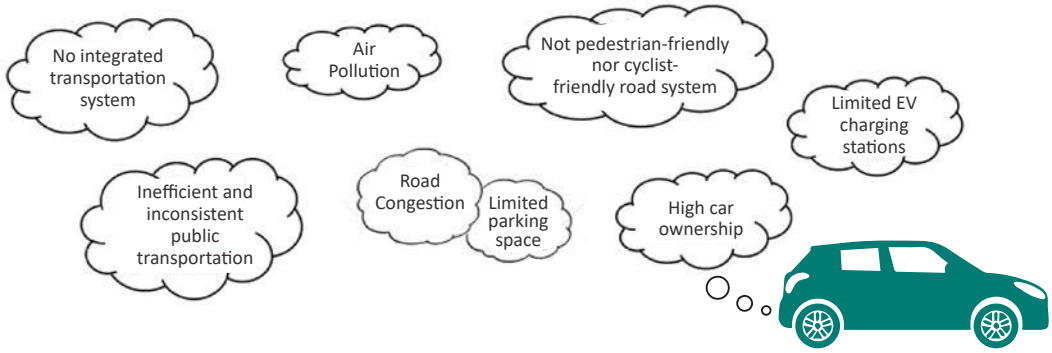


Figure 6-1: Main Challenges of Mobility in Malaysia

As estimated by the World Bank, road congestion in and around Kuala Lumpur reduced Malaysia's GDP by 1-2% per year. As traffic congestion in central Kuala Lumpur costs the economy 2.2% of GDP, it is hoped that technology-assisted e-hailing services will promote a wider usage of public transport to ease the problem.

As indicated in Figure 6-2, priorities in developing smart mobility in Malaysia include addressing the issue of car ownership as well as implementing smart solutions to upgrade public transportation systems and networks to make buses and trains a more desirable travel option. Creating more efficient road traffic management and parking systems, as well as applying sustainable principles to our mobility issues and reducing carbon footprint are some of the vital steps in addressing the problems faced by commuters and visitors into the city.

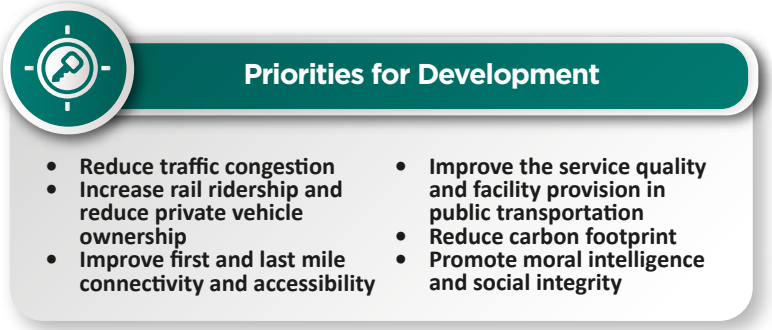


Figure 6-2: Priorities in Developing Smart Mobility in Malaysia

As illustrated in Figure 6-3, under plans by local authorities included in their smart mobility initiatives, smart traffic management system ranked as the most sought-after technology, followed by smart parking system and smart lighting.

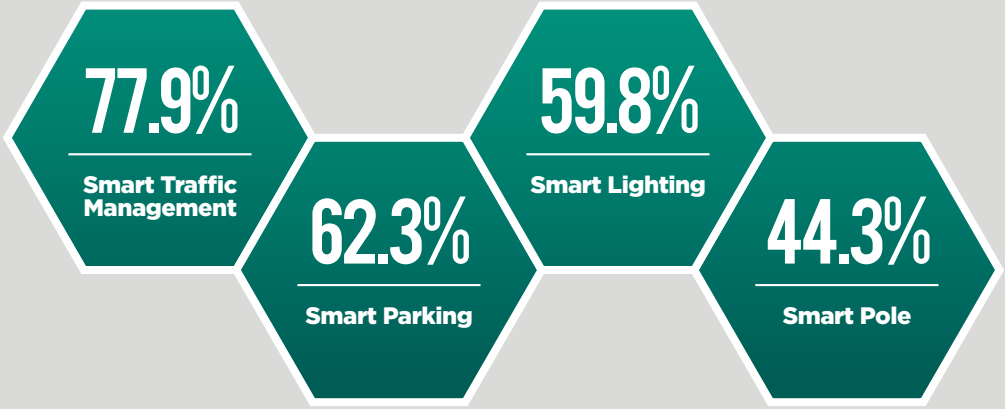


Figure 6-3, Source: MIGHT Analytics

Malaysia's Initiatives in Smart Mobility

As indicated in the diagram below, Malaysia's initiatives is to address the challenges of urban mobility cover a range of innovative digital solutions. Focusing on the need to reduce travel-related stress and carbon emissions, a range of advanced technological systems and interventions have been rolled out, incorporating such moves as integrated mobility management and car-sharing. Involvement of the private sectors such as Sena Traffic, JomParkir Sdn bhd, MyTraffic and Pixelbyte has contributed to the growth of smart mobility in Malaysia.

Additionally, there have been moves towards promoting alternative options, encouraging non-motorised forms of travel.

(I) Malaysia Intelligent Road and Traffic System Initiatives

Intelligent Transportation System Technology – Traffic Management Centres
- Introduced as part of the 11th Malaysia Plan (2016-2020).
- To upgrade the country's current transportation system, with big data analytics forming the core of the system
- Setting up of smart traffic management centres (TMC) operated by various government agencies, such as Kuala Lumpur City Hall (DBKL) and the Malaysian Highway Authority (MHA)

Smart Traffic Management - Cyberjaya
- Deploying IoT networks, digital analytics cameras and the establishment of a traffic management command centre
- Adoption of big data analytics, Artificial Intelligence, creative content, IoT, information security, mobile internet, green technology, cloud computing, robotics and systems integration
- Implemented of smart parking solutions with mobile applications

Smart Integrated Mobility Management System (SIMMS) - Iskandar Regional Development Authority (IRDA)
- Developed in partnership with the British High Commission under UK's 'Prosperity Fund Global Future Cities Programme 2019 – 2022'
- Minimising congestion and pollution by integrating and utilising data for sustainable urban and transport planning
- Sharing of data across different sectors and authorities

The Intelligent Transport System Blueprint, 2017-2022
- The foundation of technological adoption in addressing mobility problems
- Looking towards big data analytics as an intelligent information gathering tool
- Enabling consumers make informed decisions about transportation
- Facilitating more efficient operations

Malaysia City Brain Project
- A partnership between Malaysian Digital Economy Corporation (MDEC), Kuala Lumpur City Hall, and Alibaba
- To optimise traffic, parking and better manage energy via digitalisation and high technologies
- Integrate technological measures, amalgamating 5G, IoT and AI in the future traffic network
- Deployment of large-scale computing engines to manage traffic flow better and to generate data around traffic volume and speed

Grab Data Sharing
- Partnership of MDEC with Grab as a concerted effort to mitigate traffic congestion
- Real-time anonymised traffic data for popular Kuala Lumpur routes will be shared from Grab's GPS data streams to Malaysia's traffic management agencies and city planners

Malaysia's Initiatives in Smart Mobility

(II) Low Emission Mobility

Electric Vehicles (EVs) and Charging Stations

- Iskandar Malaysia's COMOS, a Cohesive Mobility Solution that is supported by PPPs, has included EV Car Sharing, EV EcoRide and EV Corporate Branding and Leasing. It has also installed electric charging stations
- There were about 67 EV charging stations in Malaysia as of Dec 31, 2015 of which 18 were installed by ChargEV. In 2019, ChargeEV had 271 public EV charging stations spread across 195 locations

Green Bus Network in Melaka

- Green Bus Network Plan in Melaka was developed to promote sustainable travel along the city's key access routes, featuring renewable energy-fuelled bus technologies and deploying technologies such as smart traffic management and smart ticketing
- SIMMS will also develop an integrated mobility plan for Melaka's heritage areas, offering alternative modes of transport, making walking and cycling attractive, promoting Intelligent Transport Systems (ITS), and making non-motorised transport options more accessible

Non-motorised forms of travel

- Cyberjaya's pedestrian-friendly city plan makes walking interesting and safe by establishing a Pedestrian Priority Zone which integrates pedestrian and cycling networks. The city plans to develop 50% accessible and comfortable walkaways by 2025 and aims to ensure a maximum of a metre 5-minutes' walk to public transport stops in the foreseeable future
- DBKL introduced 10 pedestrian zones over weekends and introduced bicycle lanes in Klang Valley to encourage walking and cycling, as part of its Low Carbon City's initiatives

(III) Travel Assistance

Selangor Intelligent Transport Systems Application (SITS)

- The Selangor Intelligent Transport Systems Application (SITS) enables the Smart Selangor bus users to plan their journey effectively and intelligently through the available bus networks covering all the 12 local authorities in Selangor
- This application allows users to identify the nearest bus terminals, check on the estimated time of bus arrivals and refer to the Smart Selangor Bus transport schedule

Mobility Apps and e-Fares

- Installation of information display panels at all public bus stops, integrating mobility applications and the introduction of electronic public transport fare collection form the basis of data sharing models, enabling seamless end-to-end trip planning, booking, ticketing and payment services across all modes of transport

Smart Bus Stops

- In Penang, the local government has partnered with a local telco infrastructure services company to install "Smart Bus Stops" fitted with USB charging pods, CCTVs, panic buttons, WiFi facility, digital directory and digital advertising signage to enhance convenience and safety
- The Smart Selangor Smart Bus Stops incorporated several smart features including CCTV, WiFi, air quality sensor, route map, USB charging pods, information display panels, panic button, passenger waiting signal to ensure public safety, convenient and comfort

Critically, the initiatives demonstrated above have been designed to address all aspects of travel and commuting in and around cities. Problems around city commuting have been met with the installation of digital systems to ease mobility issues. Traffic management and the quality of public transportation are some of the significant examples, whilst better pedestrian and cycle-friendly plans are encouraging people to rethink their commuting habits. As cities evolve, technological and infrastructural initiatives too are constantly being reviewed and upgraded. This is very-much needed in the evolution of smart cities.

Where We Are Heading

Judging from innovation trends and disruptive forces in urban mobility, it is realistic to envision a future scenario where smart city residents and visitors enjoy a wider range of affordable, multimodal, on-demand mobility options. Additionally, conventional cars and ownership practices are replaced by shared electric and autonomous vehicles.

The Boston Consulting Group believes the widespread adoption of autonomous technologies could yield substantial benefits by eliminating road fatalities and improving travel times by up to 40%. It could recover billions of hours lost to commuting and congestion and generate total benefits to society worth USD1.3 trillion.

It is predicted that close to 100% of new vehicles sold in 2025 in the developed world will be electrified (including hybrids). The rapid adoption and positive impact of electric vehicles will significantly reduce air pollution.

Mobility Solutions as a Service (MaaS)

- MaaS combines and facilitates the use of multimode transport and shared mobility services and enables payments via a single interface
- This smart urban mobility solution offers a multimodal capability which bundles transport options such as public transport, on-demand services, vehicle sharing, bike sharing and ride hailing
- With access to the app, users can book and pay for mobility services through an integrated account

Micromobility Systems

- Micromobility including systems and fleets of shared bikes and electric scooters
- Micromobility systems complement each other while reducing trips from other modes
- By using the mobile app, customers can book and unlock a free-floating scooter and pay only for minutes of usage
- This e-mobility solution aims to improve the customer's quality of life, contribute to urban sustainability, and reduce CO2 emission

Public Autonomous Transport

- The driverless-vehicle technology is now being widely adopted in urban public transportation. With more than 25 per cent driverless rail uptake and increasing adoption of autonomous buses in Asia, AV deploying a network of sensors, cameras, radar and LiDAR now ensure better road safety and improve commute times. Linking public transport to intelligent traffic control and management systems will increase energy efficiency, while reducing congestion
- The technology currently is at initial concept stage and the realization on this mode of public transport will be the year of 2030 and beyond.

Artificial Intelligence and Machine Learning in Traffic Management Solution

- There is an increased use of artificial intelligence and machine learning enabled intelligent traffic management solution that provides decision support
- These solutions offer intelligent traffic management services such as change of traffic light phases, road user information, and dynamic changes in traffic capacity
- They are designed to help transport authorities meet strategic goals by minimising vehicle emission levels and reducing traffic congestion in residential areas

Smart Travel Assistant

- Smart travel assistant focuses on the 'complete trip' by advising on the best time and method of transport to get to their destination, with real-time updates on traffic congestion and other unexpected delays
- The solution helps communities to develop comprehensive, seamless and efficient transportation solutions to increase mobility access
- The goal is to enable people to travel independently from one point to another, regardless of the number of connections, transfers or modes of transportation
- The programme focuses on holistic approaches that create more choices and better access for aged communities, people with disabilities and underserved communities in rural and small urban areas

Smart Parking

- An estimated 30% of traffic congestion in urban areas is caused by drivers looking for a parking space
- A cloud-based smart parking solution implemented in more than 15 cities worldwide provides parking managers with accurate data on parking space usage and also supports adaptive street light management, intelligent traffic management and retail services for easy navigation in a smart city

Global Practices

Growing population, traffic congestion and pollution are being addressed globally with the deployment of state-of-the-art digital infrastructures. Barcelona, Hong Kong, Shanghai and Seoul have each adopted integrated digital systems to improve connectivity and enable efficient mobility. From these examples, Malaysia can look towards adopting new technologies to improve accessibility and bring social benefits to communities.

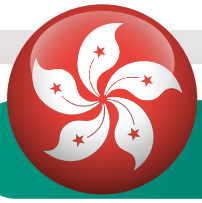
Barcelona

Sentilo - Smart Mobility Programme
An open-source data platform that integrates data from a dense network of sensors, used to manage street lights to accommodate real-time traffic conditions, regulate parking spaces and manage smart transit services.

Stellar Bus Transit System
A new orthogonal bus network with hybrid buses to reduce carbon emissions. It also has smart bus shelters using solar panels where a touchscreen provides waiting and arrival times and USB ports.

Bicing - Bicycle Sharing System
Provides 6,000 bicycles for short trips around the city. The Bicing app allows users to check out real-time availability at stations.

Urban Mobility Apps
TMB Virtual: A mobile app that indicates bus stops, lines and distance, superimposed on real-world images. It is also a compass for direction.
Tràmsit: An app with real-time traffic updates provided through the municipal traffic cameras.
Mapa Tricentenari: An augmented reality app which uses a map of Barcelona to show location information.



Hong Kong

Traffic and Incident Management System (TIMS)
TIMS automatically detects incidents, consolidate traffic and transport contingency plans, disseminate traffic and transport information and coordinate existing and future traffic control and surveillance systems.

Universal App
Integrate existing public transport applications into one universal app that makes mobility simpler.

In-Vehicle Units
IVUs furnish motorists with real-time traffic information, facilitate tunnel fees payment remotely using an integrated automatic tolling system without toll booths.

Real-time Traffic Data
Traffic detectors are installed to provide real-time traffic information. A powerful tool is used to collect the mobile phone data of drivers and passengers to analyse traffic flow and develop measures to reduce traffic congestion and enhance road safety. They provide real-time bus information to citizens' mobile devices and on displays at bus stops.

Shanghai

5G Smart Metro
A smart platform with smart operation, smart service and smart maintenance capabilities. The stations provide high-speed connectivity for phone calls, for accessing the Internet and making mobile payments.

Augmented Reality (AR) Smart Glass Panels
AR smart glass panels are linked to the train station's command centre to monitor passenger flow in real time; locate and control sudden incidents as well as to assess and judge the situation on the platform.

Seoul

Bus Management System
An integrated control centre that monitors the entire traffic system in real time and communicates the information to passengers through a service panel at bus stops and via various mobile applications and the Internet.

Shared Parking System
An IoT-based one-stop shared parking system which helps people to check the availability of parking spaces in real time, using a smartphone application. It is also for reserving parking space and paying parking fees.

AI Taxi
A system that predicts the demand for taxi in real time based on pick-up and drop-off, weather conditions demographics and information on commercial areas and public transportation.

As urban mobility gets more challenging with the rise in city population, Malaysia's smart city initiatives to encourage wider usage of public transport to reduce road congestion, needs to be reinforced with newer, alternative digital apps that will make buses and train more attractive to commuters. One way is to introduce newer, more efficient apps to enable passengers to plan their journeys better. The Universal App for example, integrates existing public transport applications into one universal tool, making travel easier.

▶ **Solution Provider's Insight**

MyTraffic Smart City

MyTraffic provides smart city solutions for intelligent traffic control, traffic analytics, smart street lighting and smart parking - all based on IoT. MyTraffic manages all facets of urban mobility under one open and universal platform. MyTraffic platform leverages machine learning, integrates remote monitoring with big data, processes and stores data either in Cloud, private server or hybrid system. As a total IoT solution provider, MyTraffic helps to move humanity around metropolitan areas and transform these areas into a smart city with Smart Traffic Flow, Traffic Analytics, Smart Lighting and Smart Parking. Here at MyTraffic, we build the cities of the future with one intelligent platform a creation for maximum satisfaction with an innovative solutions.

MYTRAFFIC Open Platform

SMART TRAFFIC SIGNAL SYSTEM

Features

Deep Learning Algorithm
Artificial intelligence to formulate optimal traffic algorithms in real-time.

Data Mining
Real-time traffic data gathering and data mining using by vehicle detector and video analytics.

Reduce Wait Time and Congestion
The signals communicate with each other and adapt to changing traffic conditions to reduce the amount of time that cars spend idling and avoid congestion.

Automatic Coordination and Green Wave
Integrating major junctions with minor or isolated junctions.

Automatic Faulty Notification
Every hardware is equipped with a sensor to notify maintenance team over which exact hardware or equipment is not working.

Fail-safe
MyTraffic is built to prevent any down-time and readily equipped with fail-safe systems to ensure the hardware is always online and ever-reliable.

Easy and Cost-efficient Maintenance
Operators can now do everything remotely via WIFI to it's user friendly User Interface via. Gone are the days whereby maintenance engineers have to input traffic algorithms or study traffic data manually.

Backup Algorithm
In the event that inaccurate data is being collected due to failed data collection hardware, the system will recognize this fault and by default would use the last known best performing algorithm.

Cutting-Edge
Latest hardware, software design and fiber optic video receivers, are used to anticipate next-gen technology. For future expansion, MyTraffic serves as a platform ever ready to support and integrate to newer systems.

TRAFFIC ANALYTICS

Deep Learning Algorithm
Deep learning image processing, AI, and cloud computing technology

Vehicle Detection
Provides real-time statistics of traffic flow, average stop, vehicle speed, and vehicle type

Vehicle Plate Number Recognition
Learn the letters and numbers used in license plates (increase recognition rate through various learning data transformation).

SMART STREET LIGHTING

Control LED & dimming
Street Lighting communicate to main gateway using LoRa Technology to control LED to turn ON/OFF, current measurement,LED faulty indication and dimming function.

Automatic Faulty Notification
Operators will be automatically informed if an outrage occurs. The system offers configurable fault types with different levels of severity, so you will know exactly why the luminaire has failed.

Intuitive user interface
The intuitive interface allow you to control and program lighting level for every individual street light, a street, or an entire district.

Secure remate control
Manage all connected street light securely and remotely through a real time, map base using any web browser

Accurate metering
Accurate metering of each individual light point to know how much energy are used and where. This help to evaluate running initiatives, verify your energy bills and plan for the future

Green technology
Smart lighting is designed to reduce energy usage and CO2 emissions.

SMART PARKING SYSTEM

Unique built-in vehicle detection algorithm

Reliable vehicle detection performance

Strong ambient electrical noise

Built-in LED lamp features a vehicle-induced

Red when the vehicle detects, green when there is no vehicle

Cutting-Edge Technology

Aligned with Malaysia smart city blueprint on mobility and transportation, the implementation of smart traffic control and smart parking systems in one universal platform will increase travel mobility and reduce the likelihood of road crash.

MyTraffic combines intelligent traffic analytics and cooperative game theory traffic algorithm to improve traffic management in urban areas. Traffic analytics calculates vehicle count by type, determine average delay, average stop and occupancy ratio. Traffic algorithm then translates these information to change traffic signal timing with local and areawide optimisation.

Smart parking and smart street lighting utilising sharable LoRaWAN frequency channels. LoRaWAN connectivity is expandable to connect to other IoT devices from any provider.

Intelligent System

Traffic congestion could be deteriorated with high variation in road structure and geometry, particularly in urban areas. These variation include traffic demand, location, distance between junctions, roadway structure and high pedestrian activity area. This system is anticipated to improve traffic mobility and increase the traffic flow in the suggested areas by coordinate traffic especially within high road network density area.

On the other hand, smart parking improve mobility by guiding motorist to the nearest available parking spots using a mobile application. Online payment is now just a finger click away. Towards smart infrastructure and utilities, MyTraffic introduces smart street lighting with LoRaWAN technology. All of these systems are integrated in one universal platform and the connection protocol is open to all standard providers.

Smart Traffic Signal System

Smart traffic signal system receives live data from traffic analytics and loop sensor. Traffic algorithm creates a green wave for all coordinated junctions by defining offset, adjusting stage length and applying cooperative game theory traffic algorithm. Timing is automatically changed in order to reduce congestion and waiting time at signalised intersections without any human intervention. Besides that, traffic signal is customisable to give priorities to certain vehicle, i.e. bus, fire engine or ambulance using information from traffic analytics.

The proposed traffic control system can strike the balance between traffic green wave creation and traffic flow optimisation. Consequently, this would lead to a fairer time distribution to traffic.

Traffic Analytics

Traffic data analysis can be conducted to gain insight of traffic short- and long-term growth, traffic distribution and related problems. This information is crucial in the development of sustainable transport systems. The designed traffic analytic tool optimizes the use and the distribution of green time at the signalised intersections. As a result, this would lead to the reduction of road congestion and the improvement in traffic mobility within the implemented area. Traffic analytic system can detect priority vehicles, such as fire engines and ambulances, and allocate “special” green time to facilitate the movement of priority vehicles. The system can be used as an enforcement tool to regulate traffic violations such as running red light, illegal parking and turning at the signalized intersection.

Smart Street Lighting System

Smart street lighting system manages street lighting securely and remotely through a real time web application. The intuitive user interface allows you to control and program lighting levels for every individual street light, a street or an entire district. You can boost light levels to improve safety and visibility, or dim them to save energy and prevent light pollution. You’ll be automatically informed if an outage occurs, enabling you to immediately initiate the work process.

Smart Parking System

Smart parking system combines parking management, parking guidance and payment system with a single access. The system is connected to Vehicle Management System and parking guidance display to guide driver to the nearest parking spots available. Online payment can be made easily through the mobile application and integrated with RFID, Touch N Go and online banking. The system is applicable indoor and outdoor, both for open- or closed- area.

All of the above smart systems are accessible using one centralized web-based application. Status operation can be monitored in real time using web-based control center instead of frequent site visit. The system automatically detect whenever failure occurs. Controller and IoT device will notify the control center to get immediate technical response.

The automation features of traffic control system in traffic mobility coordination, traffic optimization and efficient parking and lighting management system reduce the dependency on the use of manpower.

As the result of the implementation of smart traffic control system, a rise in travel mobility expecting an increases in travel speed and significant reduce of level of CO2 emission. A greener city with higher satisfaction and desirable lifestyle.

MYTRAFFIC SDN. BHD.
Website: www.mytraffic.com

MYTRAFFIC

SMART LIVING 06

Adopting Technologies and Embracing Nature
in Pursuit of Harmonious Urban Living

Introduction

What is Smart Living?

Smart living is about pursuing lifestyles that are smart, safe, clean, healthy and resilient. Smart living improves the quality of life as well as enriches the aesthetics of daily life in the city.

Characteristics of Smart Living

- Provides economic opportunities.
- Provides high quality of life.
- Promote strong and shared values.
- Facilitates the attention to local history, culture and nature.
- Provides a safe and secure environment for all age groups.
- Fosters creativity and promotes innovative thinking.

Smart Living solutions aim to improve the quality of life and to provide solutions to many issues impacting on the living and working environment. Figure 7-1 shows the four specific strategic groups of solutions that form the fundamental of Smart Living, as illustrated below.

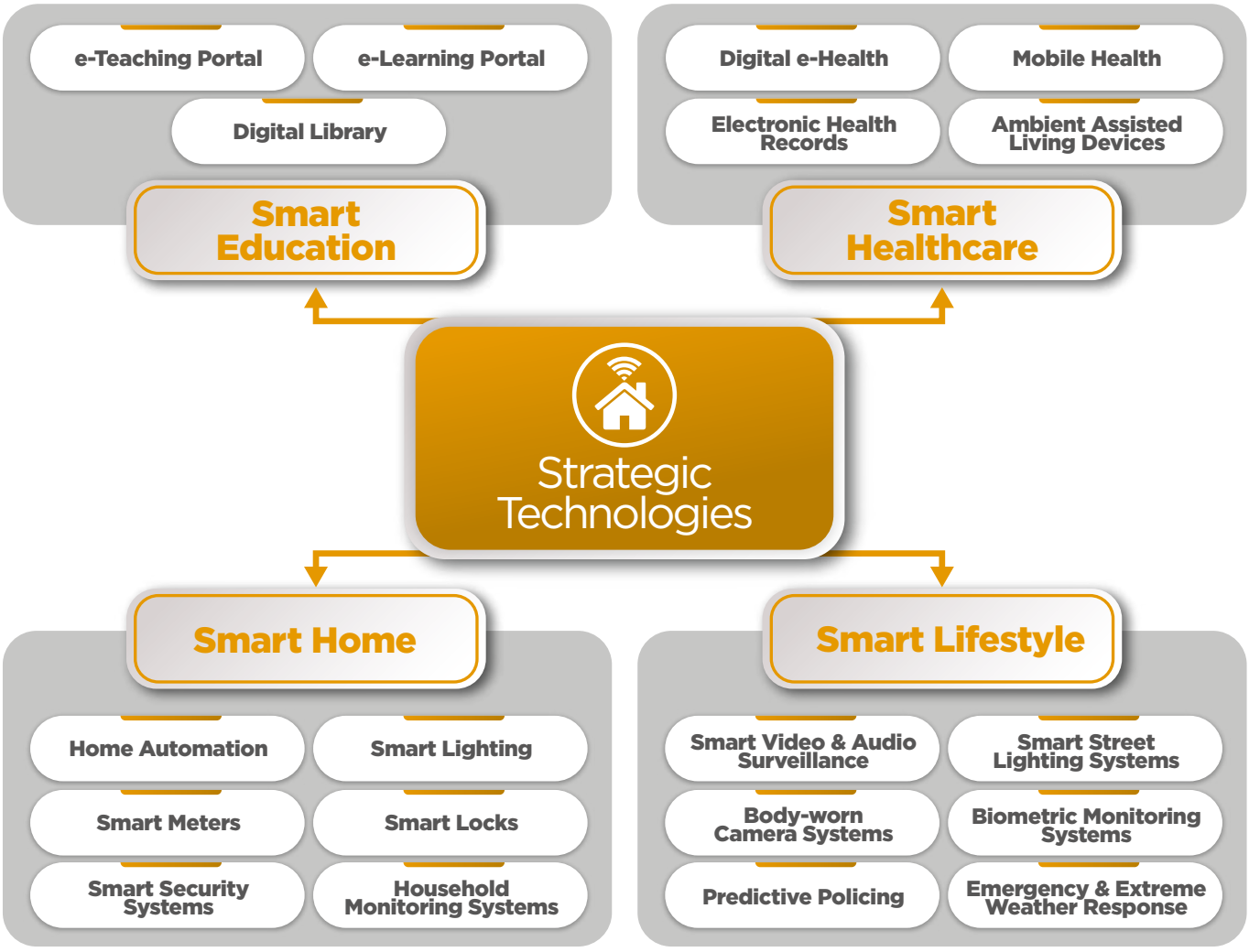


Figure 7-1: Strategic Technologies for Smart Living

Where We Are Now

Smart Living in Malaysia At A Glance

In Malaysia, the road to 'living smartly' is clearly signposted in the Malaysia Smart City Framework (MSCF), encapsulated in the five strategies and seventeen initiatives that make up its Smart Living component.

There are three policies that shape the Smart Living component, each delving into specific aspects of urban living, including safety and security, community empowerment and healthy living.

Policy No. 11 in MSCF points to the necessity of creating a safe and secure environment, which no doubt forms the basis of good physical and mental health as stipulated in Policy No 16 in MSCF. Additionally, community empowerment through programmes such as urban farming, as drawn out in the strategy no. 5 and the promotion of quality housing, goes a long way towards improving social wellbeing and the quality of life.

As illustrated in Figure 7-2, more than 24.4% of the local authorities have implemented Smart Living initiatives. Ongoing efforts are being planned, as 24.8% of the authorities have included smart living in their smart city initiatives for the next two years.

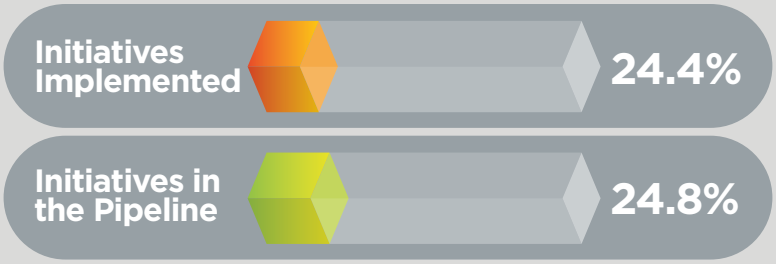


Figure 7-2, Source: MIGHT Analytics

As listed below, in order to improve the liveability index of Malaysian cities, the government has prioritised on improving the living environment, focusing on tackling crime more effectively and creating better healthcare services in the country.

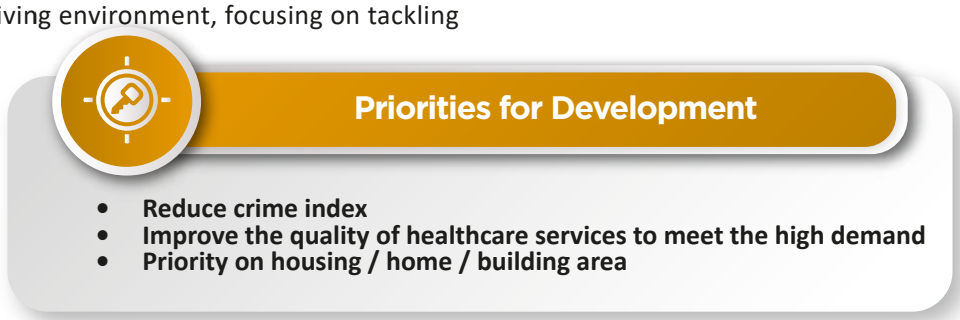


Figure 7-3: Priority Areas for Smart Living Development in Malaysia

As illustrated in Figure 7-4, smart building systems, smart home solutions, smart health and smart education systems are among the top priority technologies that the local authorities are focusing on in the implementation of their respective smart living initiatives.

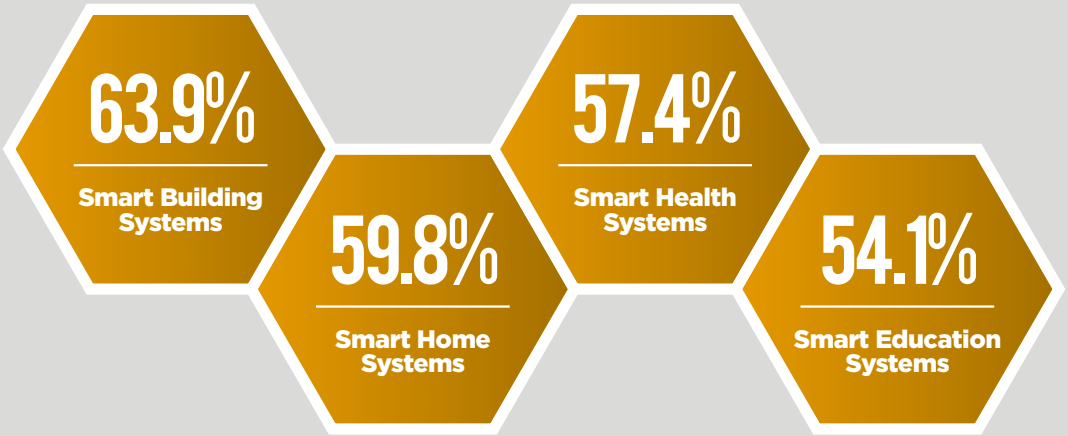


Figure 7-4, Source: MIGHT Analytics

Malaysia's Initiatives in Smart Living

As indicated in the diagram below, the government's Smart Living initiatives are wide-ranging and are also specific to the needs of respective local authorities. These look at every aspect of living, incorporating demands for a safe and secure environment as well as easy access to good health systems through advanced technological interventions. Overall, they adopt a holistic approach with digital systems, applications and platforms facilitating citizens' well-being, from feeling safe at home and on the streets to practising sustainable lifestyles. They offer convenience and efficiency in public service delivery, while upholding sustainable principles.

01 Modern Policing Deploying Cloud Computing & Big Data

Taman Tun Dr Ismail, a township in Kuala Lumpur, was reported to be one of the first to adopt modern policing by the Royal Malaysia Police and significantly reduced crime by up to 40 per cent.

Modern policing is aided by big data technology which can detect, deter and prevent crimes. Identification of potential criminal activity can be carried out using the person-based predictive policing theory, with the technical support of big data.

02 Smart Public Housing

Rumah Iskandar Malaysia (RIM), a project by Iskandar Regional Development Authority (IRDA) and operated by Prisma Harta Sdn Bhd (PHSB) is an example of Smart Living for affordable housing, demonstrating the adoption of a range of smart infrastructures and technologies, such as rain harvesting and solar power. It also includes units with special features for the disabled such as wider doors and ramps.

RIM incorporates the use of Crime Prevention Through Design (CPTED) system, advocating the idea of safety by design.

03 Malaysian Health Data Warehouse

A comprehensive data-collection tool providing a national healthcare information gathering and reporting system, covering all government and private healthcare facilities and services.

MyHDW includes a patient treatment information system (SMRP) and patient registry information system (PRIS).

The patient data collection facilitates evidence-based decision-making, helping in the identification of disease trends, thus enabling more targeted health action plans.

04 MySejahtera App

MySejahtera app was developed to monitor the Covid-19 outbreak in the country and to also provide health guidelines as well as a COVID-19 hotspot tracker. It is also being used for the registration of the Covid-19 vaccination programme.

Deploying analytics and in-house logistics and information system helps in the management of patient loads and expectations. It also crucially, supports the management of hospital resources.

05 Smart Urban Farming

Sunway FutureX, a project launched by Sunway Innovation Labs (iLabs) in 2020 is an urban farming project which aims to serve local communities and also to address the challenges around food supply chain, exacerbated today by the current pandemic.

Penang launched its first self-sustaining community urban farming in September 2020, which could potentially feed up to 400 households in each harvest. Known as "Kebun Kita" the project is a collaboration between Chief Minister Incorporated (CMI), Universiti Pendidikan Sultan Idris (UPSI) and Think City. The farm is strategically located at the Penang Digital Library on about 2,000 sq. ft of land, inevitably strengthening community engagement as well propelling the drive towards using smart technology in farming. This smart and green community farming is aimed particularly at providing food supplies to B40 households.

The farm is part of Think City's "Kita to Kita" (K2K) programme which utilises a digital platform to capture, analyse data and develop interventions than can improve the quality of life and wellbeing of the B40 communities. The K2K programme is incorporated in the farm operations to facilitate registration, tracking and distribution of produce to the targeted households in the B40 brackets.

In order to ensure healthy lifestyles and promote the well-being for all at all ages as enshrined in the UN Sustainable Development Goals, Malaysia has embraced digital technology as a means to create safe and healthy environments. From the perspectives of smart city, digitalisation is continuously helping people to transform their lifestyles, supporting them to for example, be pro-active in generating their own well-being through initiatives like smart urban farming. New technologies bring smart solutions to critical urban problems, particularly during these difficult times of the Covid-19 pandemic. The challenge thus, is not only to fit in the best technologies but to encourage their adoption. Creating awareness continues to underpin Smart Living initiatives.

Where We Are Heading

Smart Living projects use technologies and systems designed to help cities qualify as fast, sustainable, efficient and take into consideration the basic needs of local governments and their citizens.

Smart Home

- Smart home technology (home automation) provides homeowners security, comfort, convenience and energy efficiency by allowing them to control smart devices, often by a smart home app on their smartphone or other networked device.
- Smart TVs connect to the internet to access content through applications, such as on-demand video and music. Some smart TVs also include voice or gesture recognition
- In addition to being able to be controlled remotely and customized, smart lighting systems can detect when occupants are in the room and adjust lighting as needed. Smart lightbulbs can also regulate themselves based on daylight availability
- Smart thermostats come with integrated WiFi, allowing users to schedule, monitor and remotely control home temperatures. Smart thermostats also report energy use and remind users to change filters, among other things
- Using smart locks and garage-door openers, users can grant or deny access to visitors. Smart locks can also detect when residents are near and unlock the doors for them
- With smart security cameras, residents can monitor their homes when they are away or on vacation. Smart motion sensors are also able to identify the difference between residents, visitors, pets and burglars, and can notify authorities if suspicious behaviour is detected
- Pet care can be automated with connected feeders. Houseplants and lawns can be watered by way of connected timers
- Household system monitors may sense an electric surge and turn off appliances or sense water failures or freezing pipes and turn off the water so the basement doesn't flood

Smart Public Safety

- **Smart video and audio surveillance**
  While video surveillance has been around for decades, smart technology and new audio capabilities can make it more effective, actionable and connected to other municipal systems. Consider the way that blind spots in video networks, low-quality imagery, and slow data retrieval hampers authorities' efforts to protect their citizens - with smart video and audio capabilities, improvements to public safety efforts may include detecting vehicle license tags. Special high-resolution cameras can even trace on potential suspects as well
- **Smart street lighting systems**
  Street lighting is often the first smart technology that cities adopt for reduced energy consumption. Lights also can be networked and altered remotely to deter crime, detect gunfire and make public safety announcements over loudspeakers
- **Body-worn camera systems**
  Now capable of more than recording videos, some smart body-worn camera systems can include automated transcription, WiFi connectivity and other solutions to help with storing and processing the large amount of video data
- **Biometric monitoring systems**
  Some biometric devices can identify people based on fingerprints, facial features, iris patterns, gaits, voice prints and human thermal signatures. Back-end systems compare these features to a database of known individuals for positive recognition
- **Predictive policing**
  Analysing crime statistics, weather patterns and other geographic information can help law enforcement use resources more efficiently and improve public safety by identifying predictive hot spots, putting police in locations where crime patterns have been established. It also can help police arriving at crime scenes be better prepared to address a potential scenario
- **Emergency and extreme weather response**
  Powerful software tools used to aggregate information on local conditions and resources can help emergency response teams from different jurisdictions coordinate during an emergency

Smart Health – A new Form of Healthcare

- **eHealth – Using ICT for Better Healthcare**
  The usage of ICT in care helps improve access to care and quality of care by making the health sector more efficient with information and data sharing between patients and health service providers, hospitals, health professionals and health information network

  Electronic health records, telemedicine services, portable patient-monitoring devices, operating room scheduling software, robotised surgery and blue-sky research on the virtual physiological human provide instrumental information between countries when needed
- **mHealth – Making Healthcare more Mobile**
  "medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs) and other wireless devices

  Mobile phones and other devices are used to support patients and improve healthcare. Besides using mobile phones to make calls and send text messages, mHealth also includes more complex features and applications such as general packet radio service (GPRS), third and fourth generation mobile telecommunications (3G and 4G systems), GPS and Bluetooth technology
- **AAL – Tackling Challenges of an Ageing Society**
  Ambient Assisted Living, AAL is one new approach that aims at helping older people live as independently as possible. AAL technologies range from automatically switching off kitchen appliances or lights to monitoring vital functions and the automatic notification of medical assistance in case of an emergency

Global Practices

The desire to create better living and working urban environments and conditions have seen many advanced cities like Taipei, London, Seoul, Shenzen and Shanghai adopt innovative digital infrastructures and systems to improve the quality of life in cities. These take into account demands for a safe, secure and healthy environment. Opting for some of these technological adoptions worldwide can help Malaysia strengthen its current Smart Living initiatives.

Taipei

Smart Home & Smart Services
Public houses with smart water, electricity and gas meters, security and disaster prevention systems, community-based information exchange architecture, building automation, energy management, smart grid, smart property management services as well as BIM cloud management platform to improve the quality of lives of residents. The city offers a diverse range of smart services, including smart library, smart health care, smart day care, smart office and smart shops.

Smart Health
Smart health care services offer open information technology to medical suppliers. The public uses the cloud system to monitor and manage personal health. Innovative services including anti-fall detection system, emergency notice system and care by robots are offered to the elderly.

London

National Health Services
It connects the medical record systems of different NHS and partner organisations to improve the care and support of people who move between the NHS, council social care and third sector services. Care Connect offers comprehensive customer service (general enquiries, complaints, triage and feedback) on a simple point of access through a range of channels (online, phone, text and social media). Interactive maps and dashboards enable the public to track progress and openly see how NHS providers are responding.

Seoul

Dome Cameras / AI Crime Predicting Cameras
Dome cameras with varying functionalities are installed in public spaces to monitor people's movements. Crime-predicting cameras with Artificial Intelligence are installed to measure the likelihood of a crime taking place.

Transport Operation and Information Service (TOPIS)
Monitoring centre focusing on traffic, mountain climbers and mountain fires.

Ansimi App
The Ansimi app connects security cameras in the entire city to detect women who are in danger and needing rescue in any of the public areas.

"Safe Havens"
Wireless emergency bells are installed around the corners in the city to alert the nearest police station when help is needed.

Late Night Call Bus
The on-demand bus booked through an app, picks up passengers heading to similar destinations.

Shenzen / Shanghai

Smart Public Safety System network
Intelligent "Neural Cells" at public areas to assess risks and instantly report to the police. Installation of intelligent "neural cells" door lock and smoke-proof devices are to ensure "zero" indoor thefts, and provide solutions for senior care, parking congestion and illegal garbage disposal.

Digital Police / Security Guard
Equipped with police experience and artificial intelligence, it monitors traffic violation and street crimes.

Smart Signal Lamps & Smart Cross-Road Reminder
Provides real-time monitoring and makes corresponding plans to let the city operate in an orderly way.

Smart Security Check Equipment
A "non-contact, non-stop, non-offensive and non-radiation" equipment, used to shorten security check duration, differentiate risks and creates a more comfortable experience for people.

Big-Crowd Monitoring system
Applied at major tourism spots to implement visitor control and traffic control.

In order to promote healthy living and ensure the well being of the people, Malaysia's ongoing initiatives to develop Smart Living can be strengthened further in a number of ways using technologies that enable homes, streets and healthcare systems to have a high level of security and efficiency. Smart homes concept can also be extended to public housing with the introduction of smart water, electricity and gas. On the streets, wireless emergency bells can be installed to detect impending danger and to enable rescue work to be carried out

GENAXIS SMART CITY IN A BOX

The Smart City concept is an approach to urban management and development to make cities more livable, workable and sustainable. The applications of technologies make this concept more practical and economical for urban populations and city managers. Smart City is considered an ideal approach that we can use to act and react to urban and urbanization challenges, readdressing how cities and human settlements are planned, designed, financed, developed and governed.

OUR OFFERING

Data is a vital part of any smart city implementation. An integrated data in smart solutions can improve decision-making, support real-time operational, increase service quality and efficiency, and create value for citizens, businesses, and other stakeholders. In order for city to create value from these data, the use of artificial intelligence (AI) in processing, managing and interpreting the data is key for a success smart city implementation.

OUR APPROACH

THINK	We provide consulting on smart city starting from discovery phase where we assist cities to define what are the needs of the city, conceptualizing solutions, identifying best technology up to designing blueprint and roadmap for smart city.
BUILD	We develop smart solutions like smart IoTs, Cloud data platform, Urban observatory and other AI based solutions for cities.
OPERATE	The final piece in our approach is we provide manage service operation for cities. We manage city data, IoTs and provide city with analytics, dashboard and support in city operations management.

> Smart City Discovery
> Solution & Technology Mapping
> Smart CIty Blueprint
> Transformation Roadmap

Urban Observatory (UO) is an important tool for understanding how cities work, the analysing several areas such as environment, economy, society and housing in order to improve the planning efficiency for sustainable development towards improving the quality of life of citizens.

It is an analytic tool to aid user in performing data-driven decision-making based on big data analytics and machine learning. It aims to make the world's data both understandable and useful. It also a responsive web application system and compatible with other software or hardware.

Urban Observatory (UO) acts as an enhancement of urban knowledge throughout the place.

There are several benefits of UO, one of them is multiple data source where all data from different sources will be pumped into the platform. The data may be coming from different sources such as SAP, Oracle, social media, open-source system or crowd sourcing information. In order for the data to be meaningful and produce insights, the data must go through several processes of data analysing such as collecting data, data cleaning, massage and others. Indirectly, it helps improve customer service where it is able to find insight on how to improve customer service.

Additionally, analyzing data can be used to generate additional revenue such as targeting promotion towards 3rd party. Moreover, UO is responsive to the market as we can see most business have to be changed and adapt to current technology. But the adapting process cannot be implemented in certain organisations. Therefore, implementing UO will be more informative, based on data analysed in UO.

Genaxis smart city solutions are focused around providing a comprehensive data platform and AI solutions for cities. Our services include providing consulting work for city councils and local councils in identifying smart solutions, building digital platform through the use of Cloud infrastructure, IoTs and AI, and we also provide service operations management for cities.

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SMART ENVIRONMENT 07

Embracing Technologies for A Safer, More Secure and Healthier Urban Environment

Introduction

What is Smart Environment?

Smart environment is defined as the deployment of appropriate technologies in creating more connected and comfortable urban environment, drawn from much-improved climate plans. Smart environment ensures that the built and natural environment provide the physical and mental well-being and all-round happiness of its habitants, as well as help to build a sustainable future.

Aims of Smart Environment

- To achieve a quality of life of citizens in housing areas.
- To ensure environmental protection.
- To Increase city readiness towards disaster.
- To improve accessibility, speed, efficiency and inclusivity in day-to-day activities and business engagements.
- To reduce carbon intensity.
- To promote a wider application of renewable energy and ensure energy efficiency.
- To share information with citizens in order to empower and foster behavioural change.

Smart environment technologies aim to provide solutions to many environmental issues. As shown in Figure 8-1, the strategic technologies that form the fundamentals of smart environment are:

- Smart grid and renewable energies solutions to promote low-carbon and energy efficient utilities
- Integrated and advanced disaster management system that provide early alerts and solutions to mitigate and reduce the negative impacts of disasters
- Management system to preserve green spaces and better management of tree inventories
- Smart water and non-revenue water management systems for better water resources management
- Smart waste management system to reduce the impact of improper waste disposal on the environment

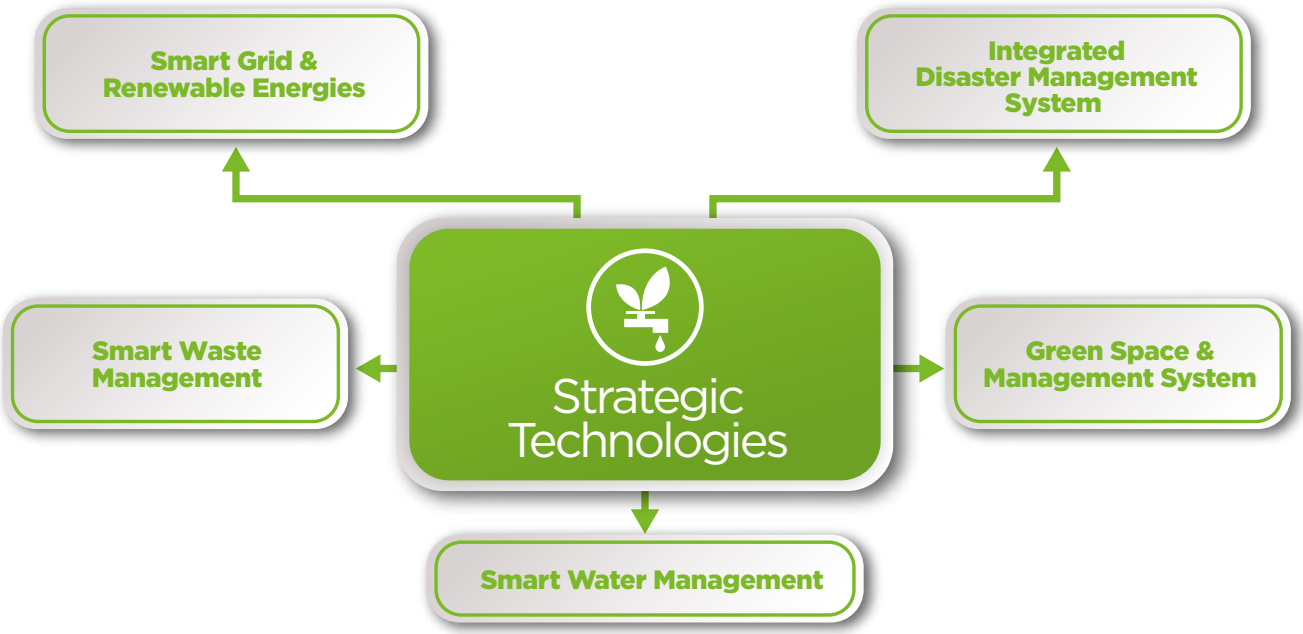

Figure 8-1: Strategic Technologies for Smart Environment

Where We Are Now

Smart Environment in Malaysia At A Glance

A smart environment from the perspectives of Malaysia's Smart City agenda is one where transformative organisational, consumer and community behaviour takes place to enable wider digital adoption in the pursuit of a smart and sustainable development.

In the Malaysia Smart City Framework, Smart Environment is the integrated outcome of Policy 8, whereby the government aims to ensure that "sustainable and smart environment practices shall be encouraged in all developments of Smart City". This means investing in collaborative technological initiatives and facilitating technological uptake as a precursor to environmental protection and development.

In this respect, public-private partnerships have been the national engine, propelling digital infrastructural developments to support smart environment initiatives, ensuring that digital solutions are deployed to create better lives.

As illustrated in Figure 8-2, as high as 42.9% of the local local authorities have implemented smart environment initiatives. Ongoing efforts are being planned, as 40.5% of the local authorities have included smart environment in their smart city initiatives for the next two years.

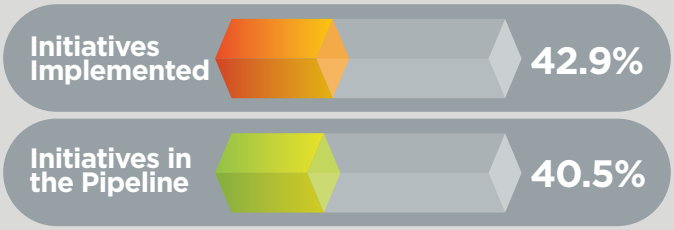

Figure 8-2, Source: MIGHT Analytics

As listed below, the government has set its priorities in addressing environmental issues at every level to support the growth of smart cities in Malaysia. Its goal is to create cleaner and greener urban spaces; improve sustainable resource and disaster management.

Figure 8-3: Priority Areas for the Development of Smart Environment in Malaysia

As illustrated in Figure 8-4, integrated disaster management system and smart waste management system are the two most sought-after technologies that the local authorities require for their smart environment initiatives; followed by smart grid & renewable energy and smart water management system.

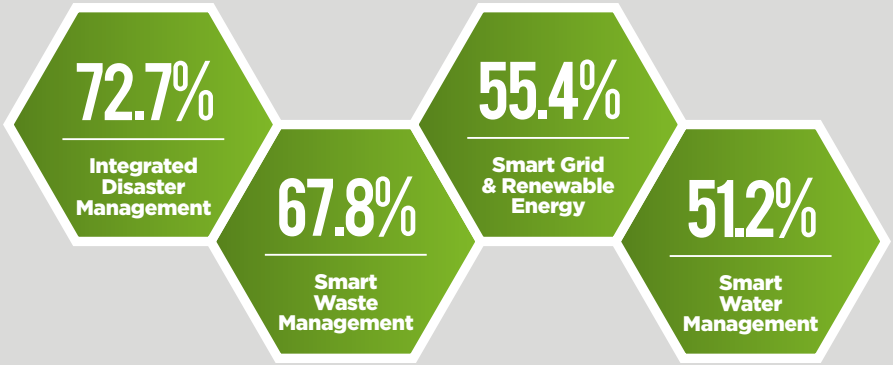

Figure 8-4, Source: MIGHT Analytics

Malaysia's Initiatives in Smart Environment

As indicated in the diagram below, new and emerging technologies are being deployed to address environmental issues in Malaysian cities to improve the quality of life and build a sustainable future. Ongoing initiatives have been wide-ranging – from waste to non-revenue water management. There is also focus on greening urban spaces to promote biodiversity in cities. Digital platforms and applications are increasingly helping to create clean, healthy, urban environments as well as sustainable resource management and disaster-resilient cities.

Waste Management

- Cyberjaya Smart Low Carbon City Action Plan 2025 highlights the importance of segregation / minimisation / pre-treatment of waste at source as well as conversion of waste to energy (waste-to-wealth) are projected to reduce 25% of carbon emission from waste sector
- Cyberjaya introduced a 3-bin system for organic waste separation, recycling and non-recycle materials in residential areas, public buildings and main roads to strengthen its efforts to enforce waste separation at source
- Cyberjaya introduced e-waste programme to ensure proper disposal of electronics waste such as mobile phones

Water Management

- Cyberjaya's Smart Low Carbon City Action Plan 2025 emphasising on improvements in water management system, which covers the supply and treatment of drinking water, has been activated through the city's proactive stance on utilising alternative sources of water supply
- Cyberjaya's Smart Environment actions have included the introduction of advanced underground water extraction technology and encourage the utilisation of recycled water from STPs to local area neighbourhood, as their strategies to manage water efficiently through diversifying main water sources and recycling grey water or waste water

Non-Revenue Water Management

- Ranhill Holding Berhad, working in collaboration with Primayer Sdn. Bhd. installed 295 Enigma3m remote correlating noise loggers in a water distribution network in Johor, has successfully cut net night flow by a third
- Implementing smart district metered areas (DMAs) of the water distribution network, Ranhill is also exploring technologies that can pinpoint leakage more efficiently

Greenery Management

- Penang Green Connectors project links different components of urban green spaces to create a network of biodiversity, as part of a broader strategy being developed to address climate change on the island
- The project's strategic tree planting strategy, which includes selecting the most adequate species of trees and aligning their placements with natural wind corridors, aim to reduce temperatures in the overall urban areas
- In Iskandar Malaysia, the Green Economy Guideline manual, a public-private collaboration, serves as a guide on how to go green in all sectors promoted within the city
- Cyberjaya Low Carbon Strategy (LCS) focuses on reducing emissions in resources and consumption and increasing carbon sequestration through improved greenery management, thus working towards the realisation of a low-carbon city

Carbon Management

- Low Carbon Society Action Plan was formulated in the state of Johor to accelerate the realisation of Low Carbon Society
- Iskandar Regional Development Authority in 2012 outlines a total of 281 implementation programmes projected to reduce Iskandar Malaysia's carbon intensity by 58% by 2025 (compared to 2005 levels)
- The Development of Low Carbon Cites (GTALCC), a UNDP and Global Environment Facility (GEF)-funded project, looking into green developments and technological sustainable solutions in Putrajaya, Iskandar Malaysia, Cyberjaya, Petaling Jaya and Hang Tuah Jaya to address the climate crisis. The five-year project beginning in mid-2017, is designed to remove barriers to integrated low carbon urban planning and development in the cities selected above. It is implemented by the Ministry of Science, Technology and Innovation (MOSTI) with the Sustainable Energy Development Authority (SEDA). Its initiatives include the introduction of Solar PV for urban spaces, such as shadings and shelters on walkways and car parks in Putrajaya to generate solar energy to power the neighbouring buildings

With the Green Agenda of the 12th Malaysia Plan firmly in place, smart city initiatives that put the environment and its people at the heart of urban planning have promoted green growth as a strategic thrust for development. Underpinning moves towards the care and protection of the environment in cities are the joint-efforts of government agencies, technology providers, as well as communities and academicians. Private companies like InnoNUSA, Xpernati IoT, Optergy and many more have come forward to work hand-in-hand with the government to provide smarter environments for the community. Together, they build a sustainable future for cities across Malaysia.

Where We Are Heading

There is no denying that one key concern of smart cities is environmental sustainability. The carbon footprints of cities dominate the total emissions of the country. This means by using advanced technology, we can start shaping cities so that they are better equipped to address today's urban challenges which, unless managed well, can have a negative impact on the environment and the quality of life for urban communities.

Reduce Carbon Emissions

The adoption of low-carbon technologies and applications is useful to tackle the identified needs of reducing the emissions of greenhouse gases, exploiting the potential of new renewable technologies and reinforcing their public acceptance

- **Renewable Energies**
  The Intergovernmental Panel on Climate Change report identifies nuclear, wind, solar, tidal, geothermal and hydroelectricity in suitable locations as technologies that can provide electricity with less than 5% of the lifecycle greenhouse gas emissions of coal power
- **Alternative mobility**
  Smart bike-riding services which allow users to unlock dedicated bikes located all over the city via an app on their phones, smart-ride sharing and self-driving, autonomous vehicles which use less fuel
- **Carbon Capture, Utilisation, and Storage (CCUS)**
  Carbon Capture, Utilisation, and Storage (CCUS) encompass methods and technologies to remove CO2 from the fuel gas and from the atmosphere, followed by recycling the CO2 for utilisation and determining safe and permanent storage options
- **Low Carbon Building Material**
  A building's overall embodied carbon is inextricably linked to the composition of the products from which it is built. The manufacture of materials like steel, concrete, aluminium and glass for use in building construction accounts for 11% of global carbon dioxide emissions. Use of carbon-friendly building materials from blast furnace slag, mature bamboo, natural clay and crushed basalt, rice straw, recycled high-density polystyrene, wood fiber for low embodied carbon

Urban Solid Waste Management

- Smart waste solutions are already a reality. The solar-powered trash compactors, for instance, use smart sensors to know when to begin compacting
- The containers communicate with local waste management organisation via cloud to signal when they need to be emptied. This reduces the activity of garbage trucks, thus reducing their carbon footprint and harmful emissions

Real-time Monitoring and Management of Energy and Environment

- Systems have been developed which leverage new technologies such as Internet of things (IoT) connectivity, big data, machine learning and analytics to gather energy and environment data, including:
  - air pollution levels
  - how much water is being wasted
  - renewable energy performance
  - solid waste measurements
- The data is collected via sensors and cameras placed in strategic places, like on solar panels on top of buildings or garbage bins across the city. City officials and citizens alike can access and use this information to make informed, more conscious decisions and identify new opportunities which can ultimately lead to improved air quality, less energy use and a cleaner city

Support Energy Efficiency Programmes

- Smart LED street lights, which last longer and require less energy to operate. What's more, they can be dimmed or brightened based on the location and time of day to ensure efficiency without compromising safety
- Some smart lights can even automatically turn off when they don't detect any activity on the street.
- Implementing energy-efficient IoT systems like GPS, cameras and traffic light coordination systems to regulate traffic is another way smart cities can save energy

Global Practices

Globally, the care and protection of the environment, as an essential part of smart city, incorporates the use of highly advanced technologies and collaborative efforts to promote sustainable practices in cities. The initiatives provided below in Shanghai, Taipei, Melbourne and London demonstrate an integrative and holistic approach in addressing environmental issues. These would be relevant for adoption in Malaysia.

Shanghai

Sponge City / Sponge Park
Sponge cities act similar to a sponge that can comprehensively collect and store rainfall and purify it in related facilities. Sponge park is built with grass ditches, water-permeable pavements, greenery rooftops and wetlands to store rainwater underneath the garden. Plants are planted to purify the rainwater and connect it to self-service car washing facilities.

Smart Rainwater Management System
A control system with IoT sensors, big-data analysis and cloud-computing technologies to monitor the amount of rain and react quickly to prevent pooling.

The Smart Anti-Flood System
It can measure the amount of rainwater, send alerts and dispatch personnel and flood-prevention materials automatically.

Remote Meteorological Terminals
The terminals provide important weather information and send flood alerts in different colour codes.

Electronic Gauges
Electronic Gauges are installed to measure accumulated water on runways and roads. With 4G network, the data will be sent to the smart system in real time. The gauges are connected to dams to release water if necessary.

Taipei

Disaster Prevention Monitoring
Combined with low-power wide-area network transmission technology, smart messaging recorder, solar power system with ultrasonic / radar wave water level meter, to collect real-time water level data. When it storms, the system will issue a warning notice.

Smart City Pollution Source Tracing Program
Integrates volatile organic compounds, road conditions and weather conditions, and use of AI to make preliminary judgments on high-polluting hotspots set up monitoring to analyse the composition of VOCs on-site and complete the positioning of pollution sources.

24- Hour Waste and Resource Recycling System
This solution is equipped with airtight deodorisation, low-temperature, bacteria-inhibiting and compression functions. It comes with sensors that collect system information through cloud and provide IoT technical analysis to assist in management and recycling efforts, as well as trash collection route-planning.

Melbourne

Public Solar Smart Recycling and Litter Bins
The new bins are solar-powered and contain sensors that alert contractors when they need to be emptied. The bins use a gentle compaction system which maximises bin capacity. They take up less space on footpaths, reducing clutter and making it easier for people to move around the city.

Food 'Digester'
Food digester converts food waste into environmentally safe water that flows into the sewerage system. Dehydrator is used to transform food waste into soil conditioner which is used in the parks.

London, UK

FlexLondon Smart Meter
Commercialisation of new digital technologies and safe and secure management of the city's energy data.

London Plan and All London Green Grid
Protecting and conserving the city's parks, green spaces and natural landscapes; providing a guiding set of principles, including standards on access to green space.

Improving Access to Green Space and Nature
- Providing community grants for creating greener space – investments in small and medium-scale greening projects in green spaces across London.
- Greener City Fund – investments in strategically important green infrastructure projects.

In order for Malaysia to improve the liveability of her cities, solutions like sponge city, IoT-oriented waste bin could offer immediate solutions to many of our environmental challenges. The adoption of renewable energies should be encouraged at all levels in efforts to build more resilient and sustainable cities.

▶ Expert's Insight

Making a Difference

Smart cities are no longer a dream or science fiction, they're our reality and the focus should be on developing more smart cities around the globe.

Today 54% of people worldwide live in cities and this is expected to grow to 70% by 2050. This growing urban population will increase demand on our already overburdened, pollution filled cities, putting pressure on transport, health, sanitisation, water and waste management which can create the spread of diseases and infections - making some cities rather unpleasant, unsafe places to live.

Cities need to make changes to cope. Disorganised approaches to urbanization will and have created badly planned cities with overcrowding, which is resulting in wastage of the worlds natural resources, ghettos and lack of facilities.

Smart City technology's main goal is to combine technological innovation with the economic social and ecological challenges of the city of tomorrow to enable us to live better together - whilst protecting our planet and respecting our environment.

HyperCity

HyperCity is the latest technology from the team at HyperSphere.

A hardware agnostic - seamlessly integrated, smart city, digital transformation platform, HyperCity is your one-stop-shop, smart city platform allowing decision makers the ability to monitor, communicate and manage many things, enabling a better quality of life, better management and mitigates risk. Decisions are real time and more accurate.

The tool is non-propriety, modular, scalable and totally sustainable; the capabilities of the platform are unlimited and absolutely anyone can use the platform to have access to all things smart!

HyperCity digitalizes various aspects of a city to help carry out activities efficiently. It also consists of several modules that function together to perform tasks that seamlessly run a city.

The modular design of HyperCity means it can scale up and down quickly according to your project. It will work on larger city projects or in smaller communities such as hospitals, universities, housing developments, office blocks and so on.

Being hardware agnostic - HyperCity is the perfect solution to integrate all applications into a unified database and common user platform, alleviating the nightmare of managing multiple platforms and different user interfaces.

Fast, real time data analysis is crucial to the success of your project - as is collaboration and communication. With HyperCity you manage all your data – it's secure, certified and centralized with a City Command and Control central dashboard. Providing Government or City officials with this dashboard helps to monitor, control, communicate and manage everything in just a few smart clicks and gives real time data which is vital for fast decision making.

Using our HSE technology HyperCity gives convenient and easy accessibility to everything in your city with just a few taps through an ease-of-use UI [User Interface] for a positive UX [User Experience].

How HyperCity can be used:

- Transportation – from detecting slow moving traffic to improving traffic flow, to fleet management & parking.
- Smart urban mobility - parking, buses/bus stops, public transport, electric bikes and scooters, shortening commute times, keeping the city green.
- Smart Energy - sustainable renewable energy sources promoting greater eco-friendliness while driving down costs.
- Smart Waste management – notifying when waste bins are ready to be emptied keeping cities cleaner and safer.
- Smart Health - connecting with anything to do with health care and wellbeing.
- Smart Water management – keeping water clean, conserving water, detecting leaks in real time, monitoring usage.
- Security – people, blockchain cyber-security.
- Smart tourism - ensuring tourist have access to places of interests, public transport, airports, maps.
- Public safety - all the above including increase lighting and CCTV but also real time smart devices reacting to crimes allowing fast responses.

Engagement

Implementing even the best Smart technology is only half the battle.

To create a truly impressive seamlessly integrated Smart Solution, it must work from a human perspective too. It needs to provide a positive user experience if it is going to encourage citizen engagement. With HyperCity the data analysis is fast and secure and easy to access from any smart device.

Allowing citizens to be part of any decision making on initiatives taking place in cities or spaces or asking them to voice opinions or give feedback or approval via their smart device can boost participation and allow for citizens to really feel a part of where they live.

Successful cities are built on a solid base of trade and commerce. HyperCity provides Citizen, Tourist and Business engagement with everyone being able to readily access information - this will bring the city together and will generate revenue to boost the economy.

Making brighter cleaner more secure spaces and cities that are easier to get around can also aid citizen engagement. Having greener spacious and connected places to live with better utilities, waste management and buildings will make Smart cities and spaces sustainable for all of us. Creating harmony and trust can only create better places to live.

HyperSphere Ltd

Frank Sheehan, CEO of HyperSphere is greatly influenced by environmental and sustainability issues and looks for solutions to help protect and maintain the world's resources for future generations. He knew Smart technology would make a difference to the world and he wanted to be a part of it. HyperSphere Ltd was developed and this was the beginning.

HyperCity is part of HyperSphere Group - Big Data visualisation and simulation specialists providing strategic consulting, innovative design, project management and implementation of engaging smart solutions, delivering positive user experience and enhancing people's lives.

HyperSphere is a member of:

- The Malaysian Smart City Alliance
- SDVoE Alliance
- IEEEE & IEEE Smart & Grid
- BRITCHAM
- Smart Cities Global Network

Orient Telecoms

Orient Telecoms, a major Managed Telecommunications Service Provider (MSP) based in Kuala Lumpur, offers a wide range of Telecom Services as well as a one stop centre for fully managed connectivity and network security solutions. Amongst the company's key strengths are the ability to provide broadband infrastructure (fiber and wireless) at short turn-around time; as well as a visionary ability to simplify complex information and communication technology solutions.

In recent years, Orient Telecoms has focussed on the development of smart solutions that capitalize on the next generation technologies that enhance living standards in all aspects and now, Orient Telecoms is excited and passionate about the development of Smart Cities in Malaysia and the benefits they can bring to citizens.

Collaboration

The confluence of common technology aspirations and business goals has brought together HyperSphere and Orient Telecoms, with the agreement by both parties to collaborate in the promotion and deployment of smart city solutions in Malaysia.

HyperSphere will focus on the provision of technology solutions as well as consulting services; while Orient Telecoms, will leverage on its local knowledge and experience, as well as its proven readiness to provide ICT and broadband infrastructure on demand, to bring about the benefits of smart city solutions to Malaysia.

Regional development agencies and city planners looking to develop smart cities are welcomed to contact us for further consultation.

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FEATURED ARTICLES

Smart City Policy & Standards

Overview of Smart City Policy in Malaysia

By Kamarul Ariff Omar
Sustainable Development Technology Division, MIGHT

Malaysia Smart City Policy

Malaysia smart city is defined as developing any city using ICT and technological advancement to achieve a better quality of life and smart living. Smart City development is important in improving the quality of life, encouraging economic growth, providing sustainable and safety environment, as well as encouraging the efficiency of hands-on city management. Initiating Smart Cities should be focusing on 5G connectivity, cashless community, efficient public transport, drone-delivery system, energy-efficient building, smart waste management and smart water treatment. Table 1 shows the list of existing framework and policy from each state in driving their respective goals for smart city.

Three states have successfully developed their own smart city framework which is aligned with the Malaysia Smart City Framework produced by the Ministry of Housing and Local Government (KPKT).

Components of the Smart City Policy

Smart City Policy	Smart City Component	Number of Component
Malaysia Smart City Framework	Smart Economy, Smart Living, Smart Environment, Smart People, Smart Government, Smart Mobility, Smart Digital Infrastructure	7 Components
Smart Selangor Blueprint	Smart Governance, Smart Disaster Management, Smart Building, Smart Safety & Security. Smart Food & Agro, Smart Energy, Smart Water Management, Smart Digital Infrastructure, Smart Transport & Mobility, Smart Waste Management, Smart Healthcare & Wellbeing, Smart Education	12 Components
Penang2030	Smart Community, Smart Environment, Smart Government, Smart Mobility, Smart Economy	5 Components
Sarawak Digital Economy Strategy	Digital Government, Digital Health, E-Commerce, Smart City, Cyber Security, Digital Innovation & Entrepreneur, Social, R&D, Digital & Data, Digital Skills & Talent Development, Digital Inclusivity, Digital Infrastructure Agriculture, Manufacturing IR4.0, Tourism.	15 Components
Putrajaya Smart City Blueprint	Smart Transportation & Mobility, Smart Home & Environment, Smart Government Services, Smart Infrastructure & Utilities, Smart Safety & Security, Smart Economy, Smart Community	7 Components
Cyberjaya Smart & Low Carbon City	Smart Mobility, Walkability, Compact Development, Integrate Nature into Urban, Efficient & Effective Resource, Smart & Green Building, Smart Community	7 Components
Smart City Iskandar Malaysia Framework	Smart Governance, Smart Living, Smart People, Smart Mobility, Smart Environment, Smart Economy	6 Components

Table 1

Direction of Smart Cities Policy

The governments have a substantial role in spreading the 'smart' city strategies and policies by coordinating and facilitating the city authorities to evaluate the possible advantages of establishing 'smart' solutions.

Smart City Policies	Direction	
	Vision	Target
Malaysia Smart City Framework	Quality and Smart Living	• Determine the smart city concept including vision, definition, criteria, and components of smart city. • Plan and prepare policies, strategies, and action plan for the implementation of smart city framework in a smart comprehensive, detailed, and inclusive manner. • Provide implementation and monitoring mechanisms to ensure that the proposals are properly implemented by the implementing agencies and Stakeholders
Smart Selangor Blueprint	Dynamic, economically vibrant, culturally rich and caring Smart State	1. Enhance quality of life 2. Ensure environmental preservation 3. Increase economic growth 4. Create quality employment 5. Strengthen fiscal position of the state
Penang2030	Penang Toward s A Smart International State	To formulate the implementation and monitoring mechanism on smart state development
Sarawak Digital Economy Strategy	Sarawak New Economy Powered by Knowledge, Innovation & Digital Technology	1. Accelerate Sarawak's Economic Growth 2. Reduce Socio-Economic divide 3. Increase Youth Employment
Putrajaya Smart City Blueprint	Smart Urban Living for Sustainability & A Higher Quality of Life	1. To offer a liveable and well-connected city for its people 2. To provide better services and improve resource efficiency 3. To create stronger, safer, and more resilient communities
Cyberjaya Smart & Low Carbon City	Transforming Cyberjaya into Smart & Low Carbon City	1. To mitigate any adverse impact of the development 2. To minimise demand for and use of resources 3. To undertake appropriate adjustment measures
Smart City Iskandar Malaysia Framework	Strong & Sustainable Metropolis of International Standing	1. International Rim Positioning 2. Economic Driver and Catalyst Projects 3. Hard & Soft infrastructure enablers 4. Institutional framework and Regulatory Authority 5. Socio-economy equity & buy-in from local population

Malaysian PBTs are looking forward to envisioning the smart city in their effort to seek solutions for a range of urban issues and challenges. This will focus on mobility and environment components and more importantly, on implementing solutions under the smart government. Generally, governments are widely immersed in meeting the challenges of mass rapid growth of technology trends, often neglecting to understand the need to include them within the scope of its current issues and challenges.

A Smart City Policy is invaluable in providing PBTs with the directions and guidance needed at the early, strategic developmental stage of the smart city framework. Furthermore, a smart city policy would serve as a good reference and provide the right tools to help the government launch a smart city campaign to revive old cities. This would create synergies between new and old cities.

The Strategies on Implementing the Smart City Policy

Successful Smart Cities tend to have one thing in common: "a strategic approach". The strategies ensure the incorporation of different components and sidestep any ad-hoc solutions. The strategies would also stimulate cross-sectorial solutions, such as data platforms, sensor networks and service integration. Additionally, this helps to set up a milestone target and built-up responsibilities for the implementation of smart city initiatives. Fundamentally, a good policy implementation must facilitate the deployment of a number of driving factors towards achieving the objective, strategies, and vision of the policy.

Rationale of Smart City Policy

A good smart city policy regards both challenges and solutions as optimally invaluable inputs to the city. A smart city is an ecosystem comprising many different actors, subsystems, activity layers, and institutional logics, with their interactions augmented by various technological applications. To realise the smart city policy, it is important for Malaysian PBTs to harness the enablers that are prominent in their respective contexts. However, the different challenges faced by Malaysian cities need to be analytically justified by experts.

Even though there is a differentiation of smart city directions by states or PBTs, it would be an important next step for any new smart city policy to be planned and developed according to the unique local characteristics of each city, depending on their individual strengths, such as their affluence, economic profile, human capital skills, technology literacy and bureaucratic efficiency.

Smart City Projects in Malaysia – The need for standards

By Mohamed Shajahan Bin Mohamed Iqbal
Malaysia Smart City Alliance, MIGHT

Smart cities would require a new standard which would encompass water, electricity, telecommunications, and computer technology, internet of things, cloud services, private data protection and cyber security.

The most important person in the city is the citizen or the consumer or user of the application of the smart cities' solution. Standards provide a protection of quality of products or services which are benchmarked to international standards or professional bodies specialized in the industry. At the same time the public welfare is guarded if non-compliance can endanger public safety and health. Citizens would require the standards to ensure that the products or service protect their surrounding environment, provide reliable and valid information on a timely basis.

Standards for smart cities will provide a basis for any required legislation for controlling quality via technical minimum or maximum requirements as required by the respective industry benchmarks. In this regard especially, IT enabler in the digital infrastructure which is led by the International Telecommunication Union ITU-T e.g., United for Smart Sustainable Cities (U4SSC) and the Institute of Electrical and Electronics Engineers (IEEE). The respective bodies govern all the products and services in the IT and Telecommunications industry. Smart cities standards merge ITU and Stakeholders requirements.

ICT infrastructure providers, the citizens, property developers, consultant engineers, Architects, contractors, town planners, city planners, mayors, chief ministers of states, university professors, research organizations. Media. Politicians and policy makers, Financial institutions, and Banks.

"how will the developed standards get absorbed in each stage of smart cities planning?"

The objective is to improve the quality of lives of the cities' citizens. The digital technologies will be used to improve the sustainability, make it more eco-friendly -greener, more livable and provide a good environment for the economy to thrive with long term sustainability and lower carbon footprint.

This is attained by strategies that enhance socio economic, ecological, logistic, integrated transport and digitally connected citizen with broadband high-speed connectivity and super gigabit digital e-commerce infrastructure for businesses.

Standards ensure compatibility, interchangeability, and interoperability to benefit of the citizens and consumers. Standards reflect the requirement at national and international levels. This is important when key performance indicators globally are benchmarked to other cities.

Although different cities may have different levels of threshold or guidelines, but the methodology and the standards are uniform for the benchmarking. This is important for each city to monitor its progress in relation to national and international benchmarks.

This also facilitates to understand the gaps if the KPI's are not achieves as predicted by each project area. Further standards provide matters regarding smart cities industrial products to be efficiently deployed due to standardization and compliance. This includes all terminology and symbol standards are uniform which can be easily understood by the implementor, designer, contractor and finally the citizen to recognize the parameters that are being focused and targeted as KPI's.

Uniform product standards will also ensure that products deployed between adjacent jurisdiction of councils have similar designs and standard quality of product to ensure delivery of products under smart cities which require good aesthetic designs, eco-friendly and reduce carbon footprint. Uniform standards also provide economies of scale in purchase on cost of construction through interchangeability of components, materials, and code of practice.

Importantly, testing standards complying to the relevant ITU, IEEE, IEC, CIDB and MCMC should be clearly identified by the various stakeholders to ensure that compliance will be met. The compliance verification should be done at different levels by the various of stakeholders through the different levels of planning, design, implementation, commissioning, and delivering smart cities services and products.

Standards also facilitate communications and use of the standards by the different cities to organize citizen-centric solutions which are reliable and able to meet the KPIs under the Sustainable Development Goals (SDG) under the United Nations.

Local SMEs and entrepreneurs can create economic growth by using and customizing solutions to create products and services according to the established Malaysian standards which would give them an advantage over overseas vendors who are addressing issues in their respective countries. These standards also can be used as non-tariff measures to help import substitution and to promote Malaysian companies to export their products

Since the beginning of the 2000s, the intention of the municipality has been to set a benchmark to monitor the activities of the commune. The U4SSC initiative provides an opportunity to obtain a set of indicators based on an international standard. Consequently, we did not have to develop the measurement of criteria ourselves. Moreover, this initiative gives us the opportunity to work closely with other cities, it would be very much appreciated of the confederations or the canton were to propose standardized target values."

- Marc Zoliiker, City Councilor in charge of the Directorate of Technical Office and Industrial Services.

The current efforts by MIGHT to coordinate the activities of smart cities with KPKT - PLANMalaysia, MCMC, Local council, State Government , Federal Government and industry through the Malaysian Smart City Alliance (MSCA) is a solution that would benefit Malaysia in the long-run. This centre of excellence and industry and global benchmarking to fit the Malaysian Cities and Citizen Requirement is critical for the success of any initiative that will be embarked on. The further complexity of our government structure for administration by ministries creates multiple silos and multiple legislations which are not aligned to the future digital smart city frameworks. This requires massive inter-government liaison and co-ordination for any of this smart city projects to be successful. Further strong political will and strong leadership is required to ensure success in delivering solution on smart cities in Malaysia. Technology still has an important role in the development of a smart city, but an ethical level has been added to the concept - the objective is to use technology wisely and sensibly, without violating the rights of citizens. The Malaysian standards benchmarked to international standards and KPIs will be what shows the world that we are a world class nation and able to achieve the UN Sustainable Development Goals through smart city initiatives

"We must also be aware of the limits of the "global vision" type of indicators, and it is important to place their use in its proper context. There is a risk that some people might interpret these elements as either black or white. For me, the main benefit of these indicators is to obtain an overall appreciation, to provide a trend"

- Gil Reichen, Mayor.

Track, monitor, verify, validate, and update the standards and technology to current knowledge.
MIGHT has the ability to provide this support together with the MSCA.
Malaysia Smart cities Alliance industry organisation.

Quick Digest...

- What is the quality of the ITU indicators?
- How pertinent are the target values?
- Does the U4SSC initiative take proper account of local, regional, and national characteristics?
- Are the ITU indicators sufficiently standardized?
- Does the city really have full control of all the smart cities' standards indictors?
- Are the proposed ITU indicators appropriate and sufficient for smart cities' standards?

Smart City Financing Model

▶ Financial Institution's Insight

Bank Pembangunan Malaysia Berhad - Your Smart City Financing Partner

Smart city development – where sustainability and liveability of cities provide vast ESG investment opportunities

The concept of "smart" cities had already emerged way back in the 1970s, when Los Angeles created its first urban big data project: "A Cluster Analysis of Los Angeles". Thereafter, the smart city concept in urban planning gained wider awareness and traction in various initiatives across the globe. Barcelona's smart city brand become a reference for all other cities seeking to redirect their economies, particularly after the city government started the Smart City Expo and World Congress in 2011 – the most important global annual event for smart city development.

The United Nations ("UN") however, only launched the Sustainable Development Goals ("SDG") in 2015. That blueprint might have reinforced collective action by member countries to adopt a more holistic approach in managing and developing smart cities as the urbanization pace continues to accelerate at unprecedented speed and scale. Urbanization has always been associated with environmental degradation and social ills.

While technology-driven solutions have helped address some of the urban woes in earlier smart cities around the world, the new narrative on smart city development drawn from the objectives set under the 17 SDG targets, is to focus on ***sustainability*** and ***liveability*** of cities. The structural changes brought about by the pandemic, particularly resource constraints and continued urban growth are making a new case for investment in smart city development across the globe more pertinent than ever. A smart city development opens up various investment opportunities – not only the smart management of all that is vital in urban planning, enabled by technological advancement – traffic, buildings, public transportation, sewerage, waste management etc. - but also the reduced carbon footprint i.e. green solutions attached to each and every urban living requirement.

The Internet of Things ("IoT") and Artificial Intelligence ("AI") have become critical infrastructure behind most smart cities technology. This includes smart real-time data tracking of energy demand changes, pollution, transportation, public security and citizen services for faster response and lower cost solutions by the authorities. 5G connectivity will inevitably be the key technology enabler of smart city development. While the commercial roll-out of 5G technology in Malaysia can only be expected by 2023, various case studies worldwide have shown companies that positioned themselves much earlier stood to gain, and had better access to new opportunities of 5G use cases in industry or government-led smart city development projects.

As is the case for many parts of the world, funding for smart cities is the main challenge faced by stakeholders, i.e. local governments. As the nation's development bank, BPMB is committed to its role in bridging the funding gap to achieve our national development aspirations. BPMB strives to make sustainable financing more accessible to companies contributing to the creation of smart cities, which not only will have huge multiplier effects trickling through the economy, but also fulfil environmental, social and governance ("ESG") aspects of future urban development.

Why choose BPMB as your smart city solutions partner?

We have a long track record of being at the forefront in providing financing to support the nation's infrastructural development needs, as well as promoting the key sectors of the economy. Moving forward, BPMB's role as a development financial institution ("DFI") will align closer to the Government's new areas of focus that reflect the changing structure of the global and domestic economy prioritising sustainability and inclusive growth.

As a DFI, we perform our mandated roles to promote strategic sectors identified by the Government via the dedicated schemes ("DS"). Guided by our mandate, we channel our financial resources for development, whilst the Government provides compensation through subsidies for financing of up to 2.0%. The DSs that BPMB currently offers are the National Development Scheme, the Sustainable Development Financing Scheme, the Green Technology Financing Scheme, the Digitalisation Transformation Scheme, the Maritime & Logistics Scheme, the Tourism Infrastructure Scheme and the Public Transportation Scheme. For smart city-related projects, we can offer funding facilities under the Sustainable Development Financing, Green Technology Financing and Public Transportation Financing schemes.

In prioritising and promoting industries that drive sustainable and inclusive growth to meet the Government's development agenda, we have developed a framework, in collaboration with related government ministries and the World Bank. This framework, named "Measuring Impact to National Development" ("MIND") is aimed at measuring the impact of our financing on national development. In essence, the framework was developed to ensure support is provided to projects that balance positive impact on the present as well as the future.

Under the MIND framework, we will assess projects to ensure they make a sustainable and meaningful contribution to the nation's development and support projects that have the best outcomes for everyone — benefitting people, the environment and national development.

Measuring Impact to National Development

Contact us

We are proud to be spearheading this initiative in the field of development finance and we are ready to be your key financing partner in driving the national smart city development agenda. For any enquiries on the dedicated schemes or how we can help you customise your financing needs, please contact us at fund_enquiry@bpmb.com.my.

We look forward to partnering with businesses looking for opportunities in building smart city development projects.

Bank Pembangunan Malaysia Berhad
www.bpmb.com.my

BPMB
Malaysia Development Bank

Funding For Smart City Development

By Jeffrey John Delmon
World Bank, Singapore

The Municipality needs to identify robust revenue streams for PPP projects, sufficient and timely to fund capital and operating expenses, including debt service and equity return. Municipalities often perceive Smart City initiatives solely as a public service, a cost center.

When a Municipality partners with the private sector to deliver a Smart City initiative, the private sector does not provide its support for free. Even if in the early days of the partnership, the private sector does not speak directly of revenues and profits, these need to be a focus of the partnership. Whatever the form of private investment and financing, equipment needs to be purchased, debt needs to be repaid and equity investment needs to earn a return. This focus on revenues is also good for the Municipality, it will make the Smart City initiative sustainable, it will have a life and resilience of its own, without constantly competing for scarce Municipal resources or relying on benevolent funds from the private sector.

Main Sources of Revenues for Smart City Projects:

User payments

Charges may be collected from the users of the service. The level of user charges allowed is generally defined by agreement and/or by a regulator. Charges must be affordable to all potential users, and demand for the services must be sufficient to ensure the anticipated revenues. Users may need to be disconnected for failure to pay, which may not be legal or practical for core services. Disconnecting users from key services like access to data, key public services, water, solid waste or sewerage can be unpopular and even dangerous. While user payments may be economically appropriate, they often do not deliver enough revenue to cover the Smart City investment.

Land value

The development of Smart City services might result in an increase in land values adjacent to the project site, for example, the construction of technology-driven communities will result in an increase in the value of the land around the community. Innovation parks designed for start-up incubation will attract several associated commercial activities. The Municipality has several methods available to capture part of this land value increase to help fund its investment.

Commercial revenues

The project generates commercial revenues from part of, or in some way related to, the Smart City services it delivers, for example, concession rights, land and access rights provided for technology driven communities and innovation hubs can leverage additional commercial revenues from commercial activities such as advertising, parking, office space, residential space, and retail facilities. Data collected on energy usage, traffic volume and patterns, pollution levels, and other topics may have commercial uses and value. Advertising space may be available on the aps and websites used for smart city initiatives. Installation of energy-efficient lighting for public roads may provide opportunities to sell advertising space.

Municipal payments

The private sector may be paid a fee (an 'availability payment') by the Municipality (or some other public source) to make specified Smart City services available for use. This approach is used where the contracting agency itself is the main user (for example, paying the private partner for providing a building or facility), where the contracting agency is itself collecting charges from users (for example, where the contracting agency collects solid waste charges from households and pays the private partner for services),or where users cannot be charged (for example, where a contracting agency pays the project company to provide street lighting). The contracting agency may prefer to retain responsibility for collecting charges, where placing collection risk on the project company is not efficient or practical (for example, where people are less likely to pay charges to a private entity, where collection risk is too high for the project company to manage or where it is illegal for the project company to collect user charges). Some projects may receive additional support in the form of grants from national government and/or external donors or agencies and in the form of capital grants to reduce initial construction costs.

A project should maximize sustainable revenues from all potential beneficiaries, and therefore the contracting agency should use the hierarchy of revenue sources when designing a project -

Hierarchy of Revenue

First:-
Maximize sustainable revenues from service beneficiaries. Those who receive a service, or a better service, should pay for it. Sustainable means that the tariffs are progressive in nature and affordable for users and the contracting agency, and that the users are willing to pay proposed tariffs.

Second:-
Capture part of the land value increase. This can be achieved through taxation, property development levies, contributions, and several other mechanisms.

Third:-
Maximize sustainable commercial revenues. Smart city services should be used to create additional economic opportunities and improve existing economic activities.

Finally, only then should public money be used as project revenue or public guarantees to enhance project viability, and only where that public support represents VFM for the government, the community, and the economy. In summary, the project will be vulnerable if the private partner makes too little or makes too much.

- failure to mobilize enough revenue will make it difficult or impossible to attract private partners for Smart Cities, there will also be sensitivity to private companies making too much profit from such initiatives -

Municipal Finance

By Anusha Magendram & Kamarul Ariff Omar
Sustainable Development Technology Division, MIGHT


Urbanization has become one of the most pressing development challenges of the 21st century. Development of a city costs a lot of money. The challenge for many cities is that municipal revenues are insufficient to meet the large and growing needs for infrastructure financing. Municipal finance is about ensuring sound and efficient financial performance. It covers the sources of revenue that are used by municipal governments – taxes (property, income, sales), user fees, and intergovernmental transfers. This also includes ways of financing infrastructure through the leveraging of revenues and borrowing as well as charges on developers and public-private partnerships. Municipal finance also addresses expenditure management and accountability.

"only 4% of cities in low and middle-income countries are assessed to be creditworthy", which means that "the availability of massive investments is currently out of reach for cities".
- Joshua Gallo, UNIDO's Head Investment Coordinator and former Senior Municipal Finance Specialist at the World Bank

Challenges faced by local governments

To Keep Cities Economically Viable By Delivering A High Level Of Services

Keeping Taxes Sufficiently Low So As Not To Discourage Individuals And Businesses From Locating In Their Jurisdiction

Local governments faced several issues and challenges that put stressed on their ability to meet to provide transportation network, digital infrastructure, water & sewerage system, fire & police protection, parks & recreational facilities, cultural institutions, social & public health services, and housing unit. These services and infrastructure must coop with the current rapid urban population growth, yet the limited funding for infrastructure has put further strain on local governments to maintain existing services or even to meet future demands. This has resulted infrastructure deficit among local government.

Globalization is another challenge faced by municipalities.

To Provide The Supportive Infrastructure To Attract Business

Action taken by municipalities to be globally competitive

Municipalities in some countries deliver primary and secondary education

to provide a wide range of services for cities movement .

Municipal finance plays an important role in local service delivery, particularly in the context of globalization, decentralization, and a focus on sustainable development. With the urgency to pursue Sustainable Development Goals (SDGs), such goals can only be achieved together with the reform and enhancement of municipal governments across the world. Well-functioning municipal governments are especially necessary for SDG 11, which seeks to make cities and human settlements inclusive, safe, resilient, and sustainable. Municipal governments are uniquely suited to respond to challenges of poverty, education, water, and the environment; an over-reliance on central government and international institutions may mean that responses are out of touch with local people.

Developing more effective municipal finance is essential for several reasons (Figure 1). Without reliable revenue flows, it is not possible to develop sustainable towns and cities. One implication of this is that municipalities will lack the resources that they need to effectively plan for the impact of urbanization. This is likely to have a negative effect both on the livelihoods of citizens but also on the way in which high levels of immigration impact the environment. In turn, this can have long-term implications for residents' quality of life and for the ability of the area to attract investment in the longer term. management and accountability. Therefore, it is crucial to implement effective municipal finance management which can assist municipalities to transform their local areas into a better place to live and work.

Figure 1

Public-Private Partnership: Smart Cities Township Development

By Anusha Magendram
Sustainable Development Technology Division, MIGHT

Throughout the world, cities are highly concerned that they need to modernize their infrastructure and cities' systems to improve the living environment of people. Cities' Township development embrace varieties approach especially in funding or financing the smart city developments.

Public-Private Partnerships (PPPs) aim at financing, designing, implementing, and operating public sector facilities and services development. the public-private partnership offers an option that lies somewhere between public procurement and privatization for governments to seek and expand cities' infrastructure development. PPPs brings private sector competencies, efficiencies, and capital to improving public assets or services as the government faced deficiency of upfront cash. Private sectors agree to take on risk and management obligation in exchange for profits reimbursement. PPPs is an increasingly preferences choice by policymakers in executing important public works projects, especially in facing shortage of government financial resources and to counter public inefficiency. PPPs enables governments that are already stretched for resources with the present economic climate, to utilize alternative private sector sources of finance while concurrently gaining the benefits that the private sector can bring in terms of skills and management. PPPs is a very particular type of contract whereby the public partner (government entity) delegates some of its own responsibilities to a private partner under a long-term contract that defines the rights and obligations of each party during the term as well as the mechanisms for its financial re-equilibrium arising from unforeseen events or lack of compliance of the parties. PPPs is an important instrument for financing and funding cities' infrastructure development and therefore promoting economic growth. PPPs applied for various infrastructures development like roads, airports, ports, power, water, and solid waste treatment and typically involve investment and operation and maintenance. PPPs also used for social infrastructure like health and education.

The challenge in financing the smart cities' township development needs a creative thinking that varies from traditional models of infrastructure finance.

Good PPPS Implementation

One unique issue local authority face is that would-be sources of finance may fear that being an 'early adopter' in this technology can be a drawback, particularly as some areas of digital infrastructure remain untested, or tested only to a limited capacity. To encourage reticent investors to commit to the project, local authorities need to fully understand it themselves: its potential cashflows, the range of financing options available to ensure its fruition (both at local and international levels), and procurement methods.

PPPs is continuously implemented in Malaysia cities' infrastructure development and other infrastructure best practices. Understanding the constraints for succeeding PPPs adoption enquired relevant parties, the Government neither the private sector to take the necessary effort in identifying constraints and ensure maximum benefit achieved from the PPPs.

In particular, the findings show the shortage of government guidelines on PPPs procedures, thus a signal to the PPP regulatory body to concern about the immediate need to overcome the issue. This is because, PPPs implementation still new in Malaysia, yet it is important to consider the requirement for transparent PPPs guidelines and procedures by the key players in the industry.

Nevertheless, only a few guidelines on PPPs have been published in Malaysia. The Government needs to clearly state the objectives of promoting PPPs as a tool to deliver cities services in Malaysia. PPPs provides clear objectives, methods, and the execution of the policies, while highlighting the progress achieved and addressing the future direction of the program.

In the meantime, continuous economic development also requires the public sector to enhance the practice of PPPs in Malaysia to ensure and meet the needs of the public followed the standard to achieve best value to both sectors.

Meanwhile, public sectors need protections from the private partner. Private investors typically provide performance guarantees or parent guarantees that can be unlimited or limited. If private sectors do not deliver the product or service at the agreed level of quality or the timing contracted or the building is not finished on time or the water supply does not meet the specified safety levels, the public sector (government) pulls on such agreements.

Proportion of penalties regarding the type of non-compliance is vital for the sustainability of the PPPs contract over the long term. Contracts should mainly rule by incentives rather than penalties, giving both parties every reason to fulfil their commitments for the whole term of the contract and without a government champion, PPPs hardly succeed. In any cases, they require a lot of negotiation and consensus building to develop a common understanding of the project at each phase among main stakeholders.

It is common for PPPs contracts to include requirements that address the concerns of a multitude of stakeholders and there is debate at each stage.

Funding / Business Model

PPPs is about good financing model and bankability. Thus, a contract must assign risk properly. The tools for financing keep being developing and adjusting. Currently, there is a lot of interest on project bonds for middle-income markets. In places where you have a lot of financial resources, we see participation of local banks. In some developing economies, private banks will not be able to finance with long terms, so financing source will differ on leveraging or simply mobilizing organizations like the World Bank's International Finance Corporation or others. Guarantees for a project can leverage private lenders and lower the cost of financing, but it is very specific to the country and the structure of the project.

Summary

There are also constraints that delay the successful of PPPs implementation in any projects through the possibility of project default, projects completed at a higher cost to the Government and where value for money is not realized. Likewise, understanding the perceptions of both public and private sectors is critical because successful implementation of PPPs requires commitment from both collaborate parties. This fundamental flexibility presents both opportunities and challenges for cities' authority from a funding/ financing outlook. Regardless of the broad recognition of the benefits of smart cities technology, funding on investment for smart city development are not constantly easy to acquire. A clear vision is necessary for better collaboration and sharing of risks and rewards by both sectors. Public-Private Partnerships (PPPs) are a progressively trendy method for nowadays township development.

From Vicious to Virtual Urban-Industrial Symbiosis

Joshua Gallo
Municipal Financing Consultant, United Nations Industrial Development Organization (UNIDO) &
Associate Fellow, Johns Hopkins University, SAIS Europe

Have you noticed that every report in your mailbox points to cities as the cause and solution for most development challenges? This is good news, in the sense that there seems to be a consensus on where we should focus our efforts to meet the world's sustainability goals. This article doesn't dispute that premise, but perhaps it's time to make a step beyond that, a step in which Malaysian cities can champion innovation across the globe.

We've well established that, with advancements in technology, industry, and urban infrastructure, cities have come to contribute 70% of global wealth. The flip side, of course, is a parallel trend in cities' greenhouse gas emissions. If we're are to achieve sustainability, something needs to change in cities' "vicious" business as usual. Development goals, whether global or local, will be impossible to reach without first ensuring the sustainability of cities.

But exactly who is responsible for growth and emissions within cities' perimeters? Municipal administrations and their subsidiaries account for only a small portion of these phenomena. Yet they perform a crucial role in steering and enabling private sector agents that drive growth and related pollution. Industrialization and urbanization have a long history of mutual development and reinforcement. "Cities" in abstract are not the solution to our challenges. The "real" space where long term development impact can be realized is the interplay between the public and private sectors within cities.

Cities provide industries with the required infrastructure, the workforce, and many essential services such as a reliable administration. A well-functioning city is a critical factor for industrial development which, in turn, drives investments, innovation, and growth. Eventually this cycle translates into revenues that the city can use to finance more and better services for all. How can we exploit to sustainability's advantage the crucial interplay between cities' administrations and industries? What city-led strategy can help industries contribute more efficiently towards urban sustainability?

The proposed approach aims to enable municipal entities and private enterprises to jointly plan and finance climate-smart (resilient and "clean") infrastructure. This translates into green industry development and private sector investments flowing towards cities. Below are a few instances where this virtuous urban-industrial symbiosis is exemplified. These are not new concepts, certainly not in the Malaysian context, but the underlining approach and the priority given to it is less common.

City-planned and public-privately financed industrial areas

There are variations on the theme (special economic zones, eco-industrial parks, etc) and plenty of examples in Malaysia and elsewhere. The novelty lies in the city-led planning and financing (with private sector participation) of all related infrastructure, including the adoption of circular economy models. All cities in the world have a capital investment plan of sorts, i.e. a list of projects to be executed. The difference would be the adoption of readily available, well-established, climate-smart methodologies turning these "lists" into a cleaner and more resilient portfolio of projects. If applied specifically toward the development of industrial areas such as "industrial parks", this approach can yield significant sustainability benefits.

Cluster of city-led interventions

These refer not to a single/larger development (such as an industrial park), but multiple/smaller infrastructure improvements that spread out across the city, more or less explicitly supporting commercial activity, e.g. solar-powered battery recharging stations around malls, marketplaces, and commercial buildings. Nothing new as such. However, with relatively limited but well-targeted capacity building, city officials can apply the same investment planning methodology described above to also identify and pursue innovative financing solutions that can apply to this type of projects (i.e. leveraging resources through mechanisms such as land-based financing, public-private partnerships, and debt issuances). This is not to say that these solutions are easy, but that cities can structure their role and approach to these solutions in a more systematic and strategic way. Technological and engineering solutions for these interventions should be identified jointly with private sector providers and end-users. A climate-smart capital investment planning methodology will help scale-up such solutions and turn this approach into systemic change.

Preparedness for commercial-based financing

A precondition for crowding-in private investments and for the approaches outlined above is the overall creditworthiness of cities. While this is a long-term goal for most cities, a few relatively straightforward steps can be undertaken by cities to improve their preparedness for commercial-based financing. Other steps may require lengthier efforts, sometimes even reforms at the Central Government level. But this should be no excuse, including for the development community, to overlook the fundamental importance of improving cities' creditworthiness. Successful endeavors for supporting green industrial development require a strong public sector counterpart, both in terms of capacity to interact with the private sector and in terms of fulfilling investment grade prerequisites to attract investments.

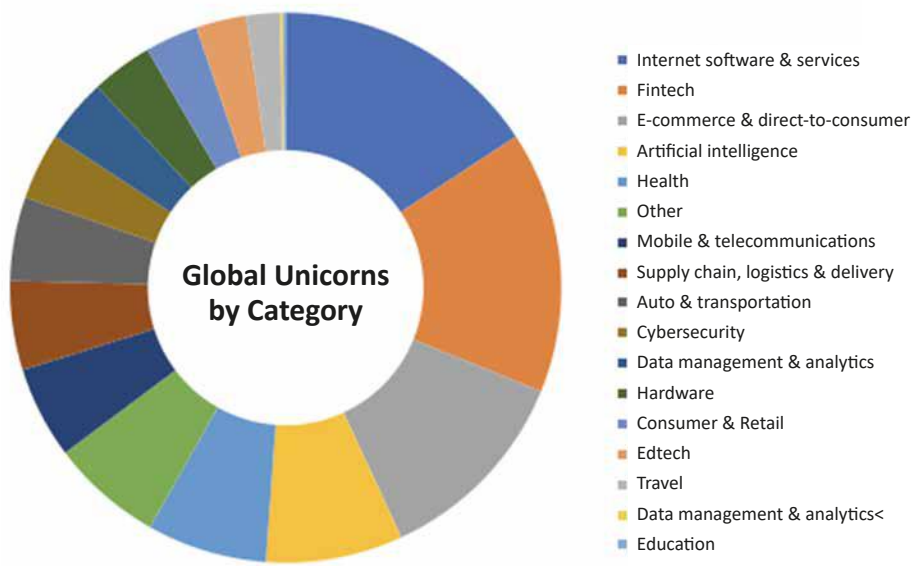
Malaysian cities have demonstrated already great prowess attracting private investments, particularly with respect to industrial parks. Malaysia can also count on a solid enabling environment and a well-developed capital market. The case to "upgrade" to a fully climate-smart and financially sustainable model for urban-industrial infrastructure development couldn't be stronger. Malaysian cities, in collaboration with the Government, can unlock the potential of a virtuous urban-industrial symbiosis, demonstrating to cities worldwide that a sustainable model is within reach.

Smart Cities Drivers for Start-up Unicorn

By Mohd Hasan Bin Mohd Saaid
MYFORESIGHT, MIGHT

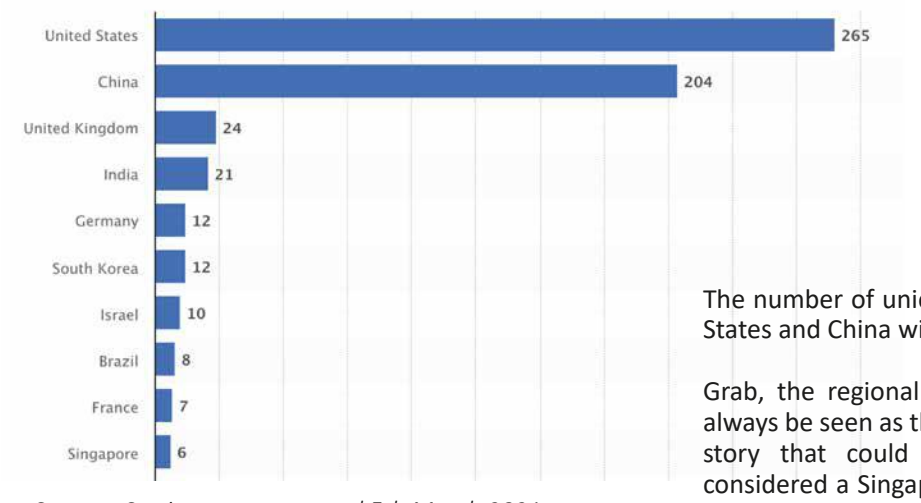
Under The National Urbanization Policy, the goals is to drive and coordinate sustainable urban development planning that emphasized on a balanced physical, environment, social and economic development in Malaysia. Smart Economy is part of the smart cities component which aim to create a sustainable environment through reduce greenhouse emission, low-carbon lifestyle with focus on energy efficiency, renewable energy and green technology. The goal can be achieve alternatively by innovation through start-up companies and potential unicorn.

Unicorn company defined as privately owned companies that reached a market value of over one billion U.S. dollars through either private or public investment. Both the term and the definition of a "unicorn" were coined in 2013, mainly to indicate the rarity of companies that breached this barrier. As of March 2021, there are more than 500 unicorns around the world.



Source : MIGHT Analytics, Global Unicorn Club: Private Companies Valued at $1B+ (as of March 24th, 2021), CB Insights

As above analysis shown, most of the Unicorns companies Globally are technology based companies.



Source : Statista.com, accessed 5th March 2021

The number of unicorn companies dominated by United States and China with 265 and 204 respectively.

Grab, the regional super app with unicorn status, will always be seen as the "one that got away", or the success story that could have been from Malaysia, now considered a Singaporean company even though it's run by Malaysians and was founded in Malaysia.

POLICY DIRECTION

Malaysia government has aspiration in its latest Malaysia Digital Economy Blueprint (MyDigital). In the roadmap Phase 3 : 2026-2030, strategy of high ease of doing business, where the government provides a highly conducive environment for businesses to start and operate, Malaysia target to achieve 5 unicorns company from this strategy. Startup ecosystem players in Malaysia driven by government including Malaysia Digital Economy Corporation (MDEC), Malaysian Global Innovation & Creativity Centre (MaGIC) and Cradle Fund.

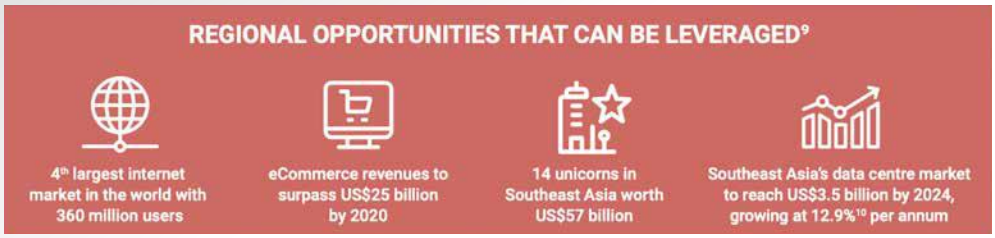
POST PANDEMICS COVID-19

During the pandemics COVID-19, startups and potential Unicorns are in the mood of the new mantra: 'surviving the winter'. In adjusting to the new reality, startups need to immediately focus on playing short-term defense in manueavor this hard time. This however, doesn't stop regional and countries aspiration in nurturing unicorns. Europe for example recently has started deploying the largest venture capital fund ever created in the region, in its latest attempt to create health and deep-tech startups that will rival the U.S. and Asia.

ATTRACTIVENESS

Why the Unicorn attractive for nation growth? If we look at ASEAN level, we could tell that there is huge opportunity ranging from internet market, eCommerce, and potential growth of unicorn company. Having unicorns could serve as a role model for local start-ups and prove Malaysia ability in tech market. By having Unicorns, we expecting to see a ripple effect from founders or employees of the companies giving back to the ecosystem.

Most of the world's unicorns come from very large and homogeneous markets like the United States and China. So, its clear that the first and most important criterion is this large market opportunity, which due to its homogeneity makes it easier to sell products and services. Even Singapore with low population compared to Malaysia had several unicorns like SEA Ltd, Grab, Razer and Lazada but they serve a wider Southeast Asian or global market.



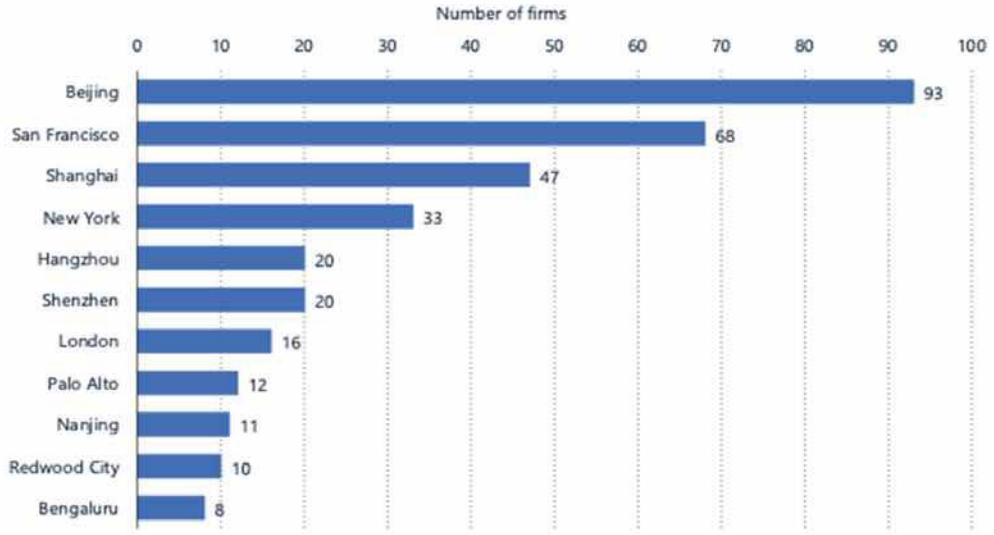
SMART CITIES AS POTENTIAL NURTURING GROUND

Potential of Smartcities as Nurturing platform Future identified Jobs based on emerging application of 4IR technologies, Cognizant report on 21 Place of the Future identified 21 places around the world where the future is being built right now. The smart cities had a potential to be a platform in nurturing Unicorn through its ecosystem and infrastructure readiness. Places that are hotbeds of innovation and new ideas, will be places that people gravitate to, including affordability and social environment of the places.

Part of the place mention is Nairobi where it stand among the top three cities for tech startups in Africa, along with Lagos and Cape Town, according to Startupblink. Accelerator hubs such as Nairobi Garage are helping to create some of the region's future digital unicorns. In Brazil, the creative and entrepreneurial talent cultivated at those offices has been a galvanizing force in São Paulo's startup scene. As entrepreneurs leave the big-tech companies, they take with them the institutional knowledge, relationships and skills to build their own. Vibrant ecosystem fostering the startup activity. As a result, Loft, Nubank, 99 and a handful of other startups have all reached unicorn status in the past two years alone.

Cities with the highest number of unicorns worldwide in 2020

Cities with the highest number of unicorns companies 2020



Glance at 3 Selected Cities for Key Advantage for Unicorn Ecosystem;

F.I.R.S.T Key Strength for Unicorn's Ecosystem

BEIJING

- Awarded as the "Unicorn city," Beijing is among the densest regions breeding these type of companies, clustering 43 percent of China's total, and 12.5 percent of the world total, a PricewaterhouseCoopers (PwC) report shows.
- The entrepreneurial atmosphere and aggregated investment institutions and talents are among the reasons leading to the city's unicorn cluster.
- Beijing has embarked on strengthening intellectual property rights (IPR) protection as a way to optimize its business environment.
- The city has formulated trial measures in arranging financial funds to support IP creation, including patents and trademarks. It is now exploring new products of IPR pledge financing insurance and providing IPR pledge loans.
- Recently, The Beijing Economic and Technological Development Area, also known as 'Beijing E-Town', rolled out a package of preferential policies to boost the high-end industries in its pilot free trade zone (FTZ).

San Francisco

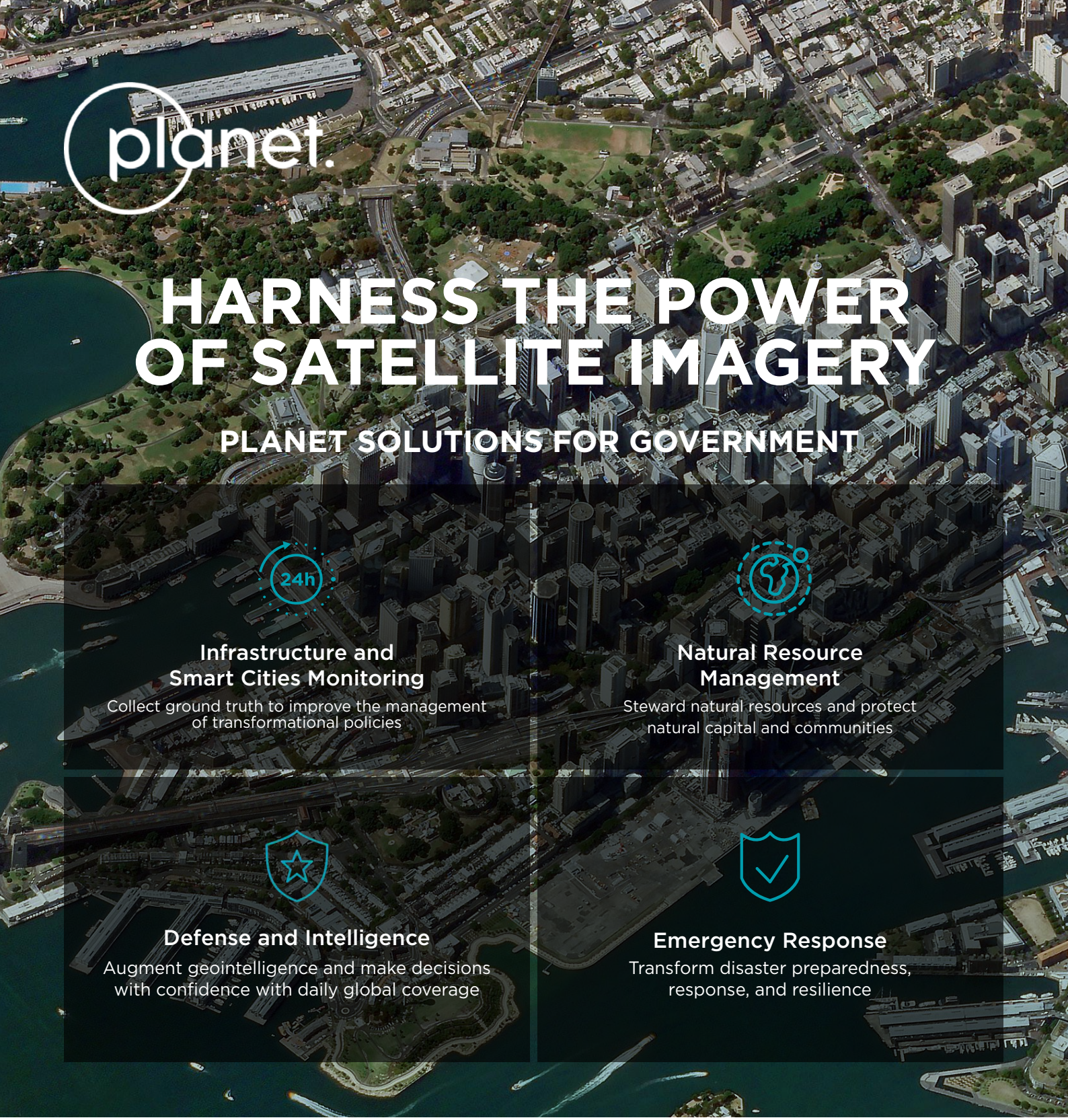
- Capital Frontiers ranked the 53 largest cities in America across several metrics:
  - Cultural metrics: Population growth, Global World Cities rating, Top 100 universities and top 10 medical institutions, Fortune 500 companies, Per capita GDP, Downtown jobs, Downtown built intensity, and overall population density
  - Livability metrics: Housing affordability, average commute times, and average climate.
- San Francisco is among the top 5 cities that excel as cultural hubs but not as livable places with Average cultural ranking: 5, Livability ranking: 46 and Balance ranking: 53.
- The majority of U.S.-based unicorn startups have headquarters in the San Francisco Bay Area, New York City and similar tech hubs including Boston, Seattle and Southern California.

Shanghai

- Shanghai is one of China's cities with a high level of innovation, mature technologies, skilled talent, supportive policies and the presence of other leading technological and innovative enterprises.
- Chinese unicorns gravitate to large cities with skilled talent; 80 percent are headquartered in Beijing, Shanghai, Shenzhen, or Hangzhou.
- Lack of talent is seen by companies as the biggest bottleneck in their development of new technologies, especially in emerging technologies, such as AI and blockchain. This city put it as a top priority.
- The urban policy tensions associated with the evolution of new "sharing economy" firms such as Uber and Airbnb, which have aggressively challenged municipal regulations in the taxi and property rental fields.

Conclusion

According to World Bank, more than 80% of global GDP generated in cities. Urbanization can contribute to sustainable growth if managed well by increasing productivity, allowing innovation and new ideas to emerge. Startup and potential unicorn required a conducive environment for them to flourish. One of key challenges is to raise large funding rounds. For example, it's been more difficult for European companies to raise large funding rounds due to a lower supply of late-stage capital compared to U.S according to McKinsey's Analysis on Europe's start-up ecosystem. Streamlining governance of smart cities could provide a vibrant ecosystem for cultural and liveable cities.



HARNESS THE POWER OF SATELLITE IMAGERY

PLANET SOLUTIONS FOR GOVERNMENT

Infrastructure and Smart Cities Monitoring

Collect ground truth to improve the management of transformational policies

Natural Resource Management

Steward natural resources and protect natural capital and communities

Defense and Intelligence

Augment geointelligence and make decisions with confidence with daily global coverage

Emergency Response

Transform disaster preparedness, response, and resilience

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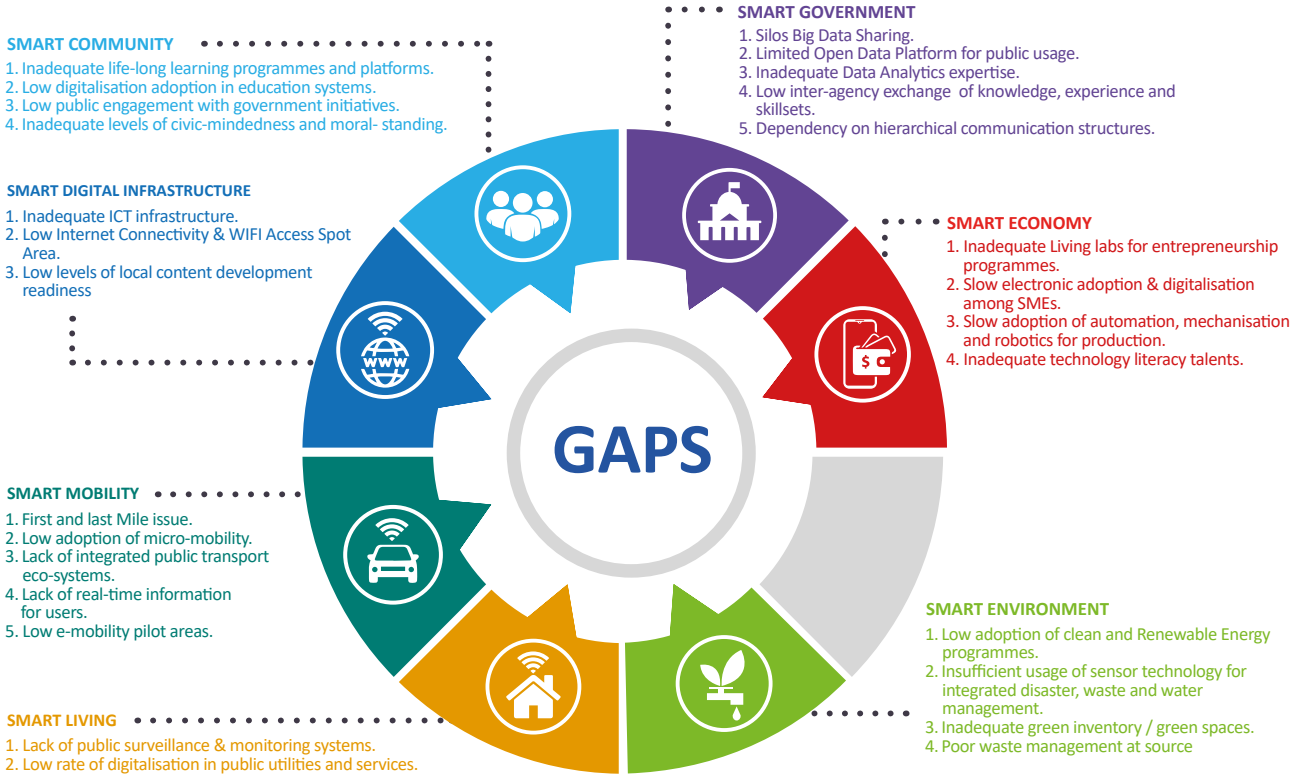
Gaps & Recommendations



Key Takeaways

Smart city is a global agenda to transform cities into sustainable and more liveable urban centres. As cities grow, not only in numbers but also in size, the smart city agenda continues to evolve, finding innovative technological and socially-inclusive solutions to address socio-economic and environmental challenges that are constantly changing the urban landscape.

Evidently, global moves to create safer, secure, more efficient and sustainable cities have facilitated improvements in the management of resources including energy, water and the environment, as articulated under goal 11 of the UN-SDGs. Equally important, they have also advocated the adoption of high technology to support business and community developments.

It is clear from the assessment that the primary cities in Malaysia are particularly making good progress in pursuing the journey to be among the top smart cities of the world. This is driven by rapid urbanisation, Malaysia's commitment to global sustainable agendas and the rising global trend of disruptive technologies adoption. The national drive towards digitalisation and digital economy and the need to attract more foreign investments are also contributing to the growth of smart cities in Malaysia.

The Malaysia Smart City Framework and numerous blueprints announced by leading states and local authorities have set clear directions and identified initiatives and pilot projects for adoption as the local authorities pursue sustainability whilst adopting new and emerging technologies.

The many facets of the digital technology including e-services, e-payment, Artificial Intelligence, IoT, smart monitoring and their adoption, are shown to have been incorporated at varying levels and rates of adoption in smart cities in Malaysia; specifically, on smart government, smart mobility, smart environment and smart economy. Each of these fulfils the respective needs of individual local authorities. Nevertheless, embracing more state-of-the-art initiatives is needed to improve the attractiveness and liveability of Malaysian cities.

From the survey and interviews conducted, supports and collaborations with the private sector are vital in helping local authorities and smaller businesses access and embrace disruptive technologies, addressing issues of financing and know-how in making inroads into developing a smart nation.

In addition, initiatives in empowering citizens through more inclusive educational and employment opportunities, as well as facilitating technology and digital adoption are equally important in creating successful smart cities.

Inevitably, the goal is to embrace technology in inclusive and locally-relevant ways to enable cities and their communities thrive within safe, healthy and sustainable environments.

Potential Smart City Business Opportunities

To date, we have already identified the technologies with the greatest potential that will support us in Embracing Technology, Towards Enhancing Smart Cities and Communities. Smart City development is being enabled, powered and integrated by these technologies, making lives easier, more fulfilling and secure for communities in many cities. The transformation of Malaysian cities is beginning to take shape and is gradually accelerating as cities continue to grow and respond to the increase in urban population and growth in community predictions. In this respect, current urban challenges demand that energy efficiency, urban sustainability and more importantly, government systems are continuously being upgraded to propel the transformation.

BIG DATA SHARING & PLATFORM

- Big Data Sharing
- Open Data Platform
- Data Analytics

DIGITALISATION & ELECTRONIC SYSTEM

- Cashless & E-payment
- Digital Economy
- E-commerce
- Blockchain
- E-services

WELLBEING IMPROVEMENT

- Smart Health Systems
- Smart Education Systems

CITY & COMMUNITY INFRASTRUCTURE

- High Speed Internet
- Smart Connectivity
- Smart Parking
- Smart Lighting
- Smart Pole
- Smart Grid & Renewable Energy

SYSTEM MONITORING & MANAGEMENT

- Cybersecurity
- Smart Monitoring
- Smart Traffic Management
- Smart Building Systems
- Smart Home Systems
- Integrated Disaster Management
- Smart Waste Management
- Smart Water Management

Key Takeaways

POLICY MAKERS

1) To create an environment where all stakeholders can continue to prosper, although sometimes these emerging technologies may even disrupt them.

REGULATORS AND FACILITATORS

1) To take on the challenge of learning how to manage the capacities of new and emerging technologies.
2) To protect the end-user rights and privacy, using effective regulations and guidelines.

PRACTITIONERS & ASSOCIATIONS

1) To advocate the implementation of smart city solutions and aligning smart city business opportunities between government and industry players.

ENABLERS & PROVIDERS

1) To foresight and competitively provide advantages on smart city business opportunities trend.
2) To support the government in pursuing smart city development.
3) To collaborate with local authorities to develop smart city infrastructures.

END-USER

1) To participate in any government smart city campaigns.
2) To adopt new & emerging technologies in smart city living.
3) To be ready to accept new economic boosts and new city infrastructure transformation.

FINANCIAL & INVESTMENT INSTITUTIONS, HIGHER LEARNING & RESEARCH INSTITUTIONS

1) To support government initiatives, start-up companies and citizens to penetrate smart city business opportunities.
2) To provide skills and talents that can be leverage for new smart city business

WHAT'S NEXT?

1 Smart city initiatives implementation and monitoring

The monitoring and implementation of the many smart city initiatives under the framework should be strengthened. Only through effective monitoring and implementation can these initiatives be evaluated for their effectiveness and relevance to address the smart city directions. The monitoring, which should be based on agreed measuring parameters and standards, will provide useful feedbacks to further improve the various aspects of the initiatives that are being undertaken. Also, sharing such experiences with the relevant stakeholders would further provide lessons for the implementation of other, new initiatives. In fact, the outcome of the monitoring exercise will offer useful inputs for the framework itself, indicating if it needs further adjustments or corrective actions. No framework is cast in stone. It should be dynamic and flexible. Conclusively, a key agency must be identified to lead and coordinate the implementation and monitoring of the country's smart city programmes.

2 Preparing for the development of smart city human capital, skills and talents

The MSCO has clearly indicated the strategic role of technologies, especially digital, in implementing the many smart city initiatives. Technologies including, but not limited to, IoT and Data analytics are prominent elements of the smart city development. But both these depend on reliable digital infrastructure, mainly internet connectivity and broadband speed. Various forms of interconnected sensors provide data which are to be analysed to enable good decision-making. There are of course other technologies related to mobility and the environment and these should be based on low carbon design. All such technologies cannot be effectively rolled out without the support of the right technical skills. This is where the implementation of all smart city initiatives rests heavily on the availability of relevant talents and human capital. There must be investments made in capacity-building of the human capital in order to support a sustained implementation of smart city programmes. This also provides opportunities for job creations which will accompany investments in smart cities.

3 Smart city industry development

There is no denying that the basic premise of venturing into smart city is to improve and sustain a healthy and safe living environment for all citizens. In addition, the use of the appropriate smart city technologies would help optimise the cost of running cities. Many cities now face tough times, balancing their revenue stream with the costs of operation, which continue to escalate. However, arising from the deployment of the many revenue optimisation technologies, new economic opportunities are now being created. These can be best described as the green economy, which is currently being widely discussed in the move towards embracing low carbon business. Inevitably, the consequent industry that is being created needs effective nurturing to facilitate its development. Here, there are excellent opportunities for locally-based businesses to participate in smart city industry development. Thus, there must be a conscious effort to strengthen the smart city industry to propel it into becoming internationally competent businesses. We need to be aware that countries in the region are all gearing up to embrace the smart city approach to sustainable urbanisation. Undoubtedly, Malaysia should prepare itself to tap into the expanding smart city business globally.

DIRECTORY

Ministries

Ministry of Communications and Multimedia (KKMM)

KKMM is responsible for communications, multimedia, broadcasting, information, personal data protection, special affairs, media industry, film industry, domain name, postal, courier, mobile service, fixed service, broadband, digital signature, universal service, international broadcasting, content.

Tel : +603 8911 5254
Fax : +603 8911 5885
Add : Lot 4G9, Persiaran Perdana, Presint 4, Pusat Pentadbiran Kerajaan Persekutuan, 62100 Putrajaya, Malaysia.

Email: mohammad.mentek@kkmm.gov.my
Website: www.kkmm.gov.my

Ministry of Federal Territories (MFT)

MFT was established to oversee the planning and development of Kuala Lumpur, the Klang Valley, the territories of Labuan and Putrajaya.

MFT ensures the development and implementation of smart city initiatives within the Klang Valley

Tel : +603 8889 7873
Fax : +603 8889 4948
Add : 7th Floor, Block 2, Menara Seri Wilayah, Precint 2. 62100 Putrajaya, Malaysia.

Email: rosidajaafar@kwp.gov.my
Website: www.kwp.gov.my

Ministry of Housing and Local Government (KPKT)

KPKT is responsible for urban well-being, housing, local government, town planning, country planning, fire and rescue authority, landscape, solid waste management, strata management, moneylenders, pawnbrokers.

KPKT is the key driver of Malaysia smart city development. It is responsible for the policy development, monitoring and measuring implementation of smart city initiatives among local governments.

Tel : +603 2094 7033
Fax : +603 2094 9720
Add : Aras 3-7 Blok K, Pusat Bandar Damansara, Peti Surat 12579, 50782 Kuala Lumpur, Malaysia.

Email: zainal@kpkt.gov.my
Website: www.kpkt.gov.my

Ministry of Science, Technology and Innovation (MOSTI)

MOSTI is championing scientific exploration and shifting innovation through efficient, ethical and professional services in the management and distribution in R&D and Commercialisation funds, increase the quality and number of human capital in Science, Technology and Innovation (STI) as well as disseminating and applying technology by emphasizing customer needs, delivery time frame, quality services and compliance to laws and regulations.

MOSTI is responsible for cultivating and promoting smart city technologies and solutions among the private stakeholders.

Tel : +603 8885 8020
Fax : +603 8888 9000
Add : Block C5 Level 6, Complex C, Federal Government Administrative Centre, 62662 Putrajaya, Malaysia.

Email: sitihamisah@mosti.gov.my
Website: www.mosti.gov.my

Ministry of International Trade and Industry (MITI)

MITI is responsible for formulating and implementing investment, trade and industrial policies to generate sustainable economic growth; to create innovative and high skilled employment opportunities for Malaysia's growing workforce and to drive Malaysia towards a developed nation and enhance the well-being of the rakyat.

MITI is responsible for boosting the Industry 4.0 adoption and digitalisation among industry stakeholders in supporting the smart economy initiatives.

Tel : + 603 6200 0069
Fax : +603 6206 4693
Add : Menara MITI, No. 7, Jalan Sultan Haji Ahmad Shah, 50480 Kuala Lumpur, Malaysia.

Email: lokmanhakim@miti.gov.my
Website: www.miti.gov.my

Ministry of Works (KKR)

KKR is a ministry that is responsible for overseeing the public works, highway authority, construction industry, engineers, architects and quantity surveyors.

KKR is one of the key drivers in the development of smart cities, specifically on the built infrastructure and smart environment initiatives.

Tel : +603 2771 4021
Fax : +603 2711 3320
Add : Tingkat 1-14, Kompleks Kerja Raya,Jalan Sultan Salahuddin, 50580 Kuala Lumpur, Malaysia.

Email: syedomar@kkr.gov.my
Website: www.kkr.gov.my

Department

Department of Local Government

The Department's key role is to provide the necessary support, assistance and guidance to Local Authorities in enhancing quality management and to develop the culture of good governance; to ensure that LAs play an active and effective role in the development of urban and rural areas with the aim of creating a healthy, prosperous and developed society.

Tel : +603 8891 3000
Fax : +603 8891 3090
Add : Aras 25-29 No.51, Persiaran perdana Presint 4, 62100 Putrajaya, Malaysia.

Email: ihsan@kpkt.gov.my
Website: www.jkt.kpkt.gov.my

Department of Standards Malaysia

Standards Malaysia provides confidence to various stakeholders, enhance the quality of Malaysian products and services through credible standardisation and accreditation services for global competitiveness.

Tel : +603 8008 2998
Fax : +603 8008 2901
Add : Level 4-7, Menara 2, Menara Cyber Axis, Jalan Impact, 63000 Cyberjaya, Selangor, Malaysia.

Email: shaharul@jsm.gov.my
Website: www.jsm.gov.my

National Housing Department (JPN)

JPN's key role is to ensure the development of the housing sector is managed systematically, ensuring liveability and sustainability for all.

Tel : +603 8891 4001
Fax : +603 8891 4088
Add : Aras 30-38, No. 51, Persiaran Perdana, Presint 4, Pusat Pentadbiran Kerajaan Persekutuan, 62100 Putrajaya, Malaysia.

Email: jayaselan@kpkt.gov.my
Website: www.ehome.kpkt.gov.my

National Landscape Department (JLN)

Creating a sustainable country through the development of quality and comprehensive landscape to meet the needs and well-being of the people.

Tel : +603 8091 0502
Fax : +603 8091 0669
Add : Aras 10, Blok F10, Kompleks Bangunan Kerajaan Parcel F, Presint 1, Pusat Pentadbiran Kerajaan Persekutuan, 62000 Putrajaya, Malaysia.

Email: rotina@jln.gov.my
Website: www.jln.kpkt.gov.my

National Solid Waste Management Department (JPSPN)

JPSPN is tasked with establishing a sustainable solid waste management system so as to safeguard public health, protect and conserve the environment and preserve natural-resources; formulating policy, strategy, action plan and law on solid waste and public cleansing management; and coordinate the cooperation between Federal Government agencies, State Government, the local Authority, the private sector and communities to ensure smooth implementation of solid waste and public cleansing management.

Tel : +603 8891 4500
Fax : +603 8891 3190
Add : Kementerian Perumahan dan Kerajaan Tempatan, Aras 23, 24 & 34, No. 51, Persiaran Perdana, Presint 4, 62100 Putrajaya, Malaysia.

Email: suliman@kpkt.gov.my
Website: www.jpspn.kpkt.gov.my

PlanMalaysia

PlanMalaysia is tasked with ensuring excellent quality town planning services and satisfactory information systems for long-term planning needs; formulate and implement planning regulations, policies, plans and guidelines and to ensure effective adoption by all agencies at the implementation stage

Tel : +603 8091 0001
Fax : +603 8091 0455
Add : PLANMalaysia (Jabatan Perancangan Bandar Dan Desa), Kementerian Perumahan Dan Kerajaan Tempatan Blok F5, Kompleks F, Presint 1, Pusat Pentadbiran Kerajaan Persekutuan, 62675 Putrajaya, Malaysia.

Email: shamsaini.shamsuddin@planmalaysia.gov.my
Website: www.planmalaysia.gov.my

Agencies

Akademi Sains Malaysia (ASM)

ASM strives to be the nation's Thought Leader for matters related to science, engineering, technology and innovation. ASM is committed to pursuing excellence in the fields of Science, Engineering and Technology (SET) for the benefit of all.

Tel : +603 6203 0633
Fax : +603 6203 0634
Add : Level 20, West Wing, MATRADE Tower, Jalan Sultan Haji Ahmad Shah off Jalan Tuanku Abdul Halim, 50480 Kuala Lumpur, Malaysia.

Email: admin@akademisains.gov.my
Website: www.akademisains.gov.my

Construction Industry Development Board (CIDB)

CIDB is tasked with regulating, developing and facilitating the construction industry towards achieving global competitiveness. The Board advises the Federal and the State Governments, as well as other stakeholders on matters affecting or connected with the construction industry.

Tel : +603 5567 3300
Fax : +603 4047 7070
Add : Tingkat 10, Menara Dato' Onn, Pusat Dagangan Dunia, No. 45, Jalan Tun Ismail, 50480 Kuala Lumpur, Malaysia.

Email: asri@cidb.gov.my
Website: www.cidb.gov.my

CyberSecurity Malaysia

CyberSecurity Malaysia is committed to providing a broad range of cybersecurity innovation-led services, programmes, and initiatives to reduce vulnerability of digital systems, and at the same time strengthen Malaysia's self-reliance in cyberspace.

Tel : +603 8800 7999
Fax : +603 8008 7000
Add : Level 7 Tower 1, Menara Cyber Axis, Jalan Impact Cyber 6, 63000 Cyberjaya, Selangor, Malaysia.

Email: info@cybersecurity.my
Website: www.cybersecurity.my

Digital Penang Corporation

Digital Penang Sdn Bhd is created to accelerate efforts in pursuing opportunities in the Digital Economy. Geared towards moving the state into a Digital Society and nurturing the growth of Digital Innovation.

Tel : +604 228 3306
Add : 10, Jalan Brown, Taman Selamat, 10350 George Town, Pulau Pinang, Malaysia.

Email: contact@digitalpenang.my
Website: digitalpenang.my

Energy Commission

Energy Commission is responsible for regulating the energy sector, specifically the electricity and piped gas supply industries, in Peninsular Malaysia and Sabah. The main focus of the commission are reliable electricity and gas supply, reasonable costs and safety.

Tel : +603 8870 8601
Fax : +603 8888 8637
Add : No. 12, Jalan Tun Hussein, Precinct 2, 62100, Putrajaya, Malaysia.

Email: razib@st.gov.com
Website: www.st.gov.my

GreenTech Malaysia (MGTC)

MGTC is mandated to lead the nation in the areas of Green Growth, Climate Change Mitigation and Climate Resilience and Adaptation.

Tel : +603 8921 0800
Fax : +603 8921 0801 / 0802
Add : No.2, Jalan 9/10, Persiaran Usahawan, Seksyen 9, 43650 Bandar Baru Bangi, Selangor, Malaysia.

Email: info@greentechmalaysia.my
Website: www.mgtc.gov.my

Agencies

Housing and Local Government Training Institute (i-KPKT)

The Institute is to provide training to Local Authority Officers / Staff and will serve as an information collection center, Referral center and Referral Center to Local Authorities (in the field of technology, product and service development, policy formulation, planning and implementation of programs / projects).

Tel : +609 222 9000
Fax : +609 222 9014
Add : Km 48, Persimpangan Lebuhraya Bertingkat Karak, Berjaya Hills, 28750 Bukit Tinggi, Pahang, Malaysia.

Email: azalina@kpkt.gov.my
Website: ikpkt.kpkt.gov.my

Iskandar Region Development Authority (IRDA)

IRDA is tasked with the objective of regulating and driving various stakeholders in both public and private sector towards realizing the vision of developing Iskandar Malaysia into a strong and sustainable metropolis of international standing.

Tel : +607 233 3000
Fax : +607 233 3001
Add : #G-01, Block 8, Danga Bay, Jalan Skudai, 80200 Johor Bahru, Johor, Malaysia.

Email: enquiries@irda.com.my
Website: www.iskandarmalaysia.com.my

Land Public Transport Agency (APAD)

APAD is responsible for planning and defining land-based public transport policies, programs and strategies to enhance the country's public transportation system which is the core of the National Key Result Area (NKRA). This includes determining policies and planning rail, bus and taxi services and transporting goods through rails and roads.

Tel : +603 2603 6600 Ext. 6666
Add : Block D, Platinum Sentral, Jalan Stesen Sentral 2, Kuala Lumpur Sentral, 50470 Kuala Lumpur, Malaysia.

Email: azlan@spad.gov.my
Website: www.apad.gov.my

Malaysian Communications and Multimedia Commission (MCMC)

MCMC's key role was the regulation of the communications and multimedia industry. The Commission is also charged with overseeing the new regulatory framework for the converging telecommunications and broadcasting industries and on-line activities.

Tel : +603 8688 8000
Fax : +603 8688 1000
Add : MCMC Tower 1, Jalan Impact Cyber, 663000 Cyberjaya, Selangor, Malaysia.

Email: scd@mcmc.gov.my
Website: www.mcmc.gov.my

Melaka ICT Holdings Sdn. Bhd.

Tel : +606 232 1360
Add : Aras 11 Menara MITC, Jalan Konvensyen, Kompleks MITC, 75450 Ayer Keroh, Melaka, Malaysia

Email:
Website: www.micth.com

Perbadanan Teknologi Hijau Melaka (PTHM)

PTHM is to implement the green technology policy and policies as set by the Malaysian Green Technology Council Melaka (chaired by the YAB Chief Minister of Melaka). Acted as the Secretariat of the United Nations-Urban Environmental Accords Members Alliance (UEAMA) Secretariat for the State of Melaka. Role in planning, implementing and monitoring the implementation of green programs and projects of the State of Melaka together with the Melaka State Economic Planning Unit (UPEN)

Tel : +606 333 3333
Add : Level 3, Wisma Negeri Hang Tuah Jaya, Malacca International Trade Centre, 75450 Ayer Keroh, Melaka, Malaysia.

Email: admin@melakagreentech.gov.my
Website: www.melakagreentech.gov.my

Agencies

Sarawak Multimedia Authority (SMA)

SMA is established to spearhead, oversee and facilitate the development and implementation of the communication, multimedia and the State's Digital Economy Initiatives.

Tel : +6082 268 017
Fax : +6082 268 019
Add : Level 5, Bangunan Yayasan Sarawak, Jalan Masjid, 93000 Kuching, Sarawak, Malaysia.

Email: drzaidi@sma.gov.my
Website: www.sma.gov.my

Smart Selangor Delivery Unit

Smart Selangor Delivery Unit has been mandated by the Selangor State Government to spearhead the implementation of smart initiatives and mainly involved in implementing suitable solutions and technologies for smart state applications, enabling Selangor to achieve its vision to become a premier regional smart state in ASEAN by 2025.

Tel : +603 5035 0900; +603 5513 8898
Add : 4th Floor, Bangunan Darul Ehsan Jalan Indah, Section 14, 40000 Shah Alam, Selangor, Malaysia.

Email: corp_comm@mbiselangor.com.my
Website: mbiselangor.com/smart-selangor

Urbanice Malaysia

Urbanice Malaysia is a Center of Excellence for Sustainable Cities and Communities Wellbeing under the Ministry of Housing and Local Government. Among our key roles are to foster public-private partnerships among stakeholders in various areas of sustainability in the objective of advocating the sharing of knowledge and development of integrated urban solutions towards a sustainable urban nation.

Tel : +603 2011 0921
Add : No 5 Jalan Chelagi, Bukit Damansara, 50490 WP Kuala Lumpur

Email: info@urbanicemalaysia.com
Website: www.urbanicemalaysia.com.my

Associations & Professionals

Board of Engineers Malaysia (BEM)

BEM's primary role is to facilitate the registration of Engineers, Engineering Technologists, Inspectors of Works, Sole Proprietorships, Partnerships and Bodies Corporate providing professional engineering services and; to regulate the professional conduct and practice of registered person in order to safeguard the safety and interest of the public.

Tel : +603 2691 2090
Fax : +603 2692 5017
Add : Tingkat 17, Blok F, Ibu Pejabat JKR, Jalan Sultan Salahuddin, 50580 Kuala Lumpur

Email: enquiry@bem.org.my; bem1@jkr.gov.my
Website: www.bem.org.my

Malaysia Board of Technologists (MBOT)

MBOT looks at technology-based profession that cuts across discipline based from conceptual design to a realized technology and covers from Technicians up to Technologists. As a whole, these professionals have integrated roles from concept to reality.

Tel : +603 8800 6268
Fax : +603 8800 6208
Add : A1-3-1, Ayer@8, Jalan P8G, Presint 8, 62250, Putrajaya

Email: info@mbot.org.my
Website: www.mbot.org.my

Board of Town Planners Malaysia (BTPM)

The Board is responsible for coordinating the town planning profession for it to become one of the professional practices in Malaysia.

Tel : +603 8091 0461
Add : Lembaga Perancang Bandar Malaysia, d/a PLANMalaysia (Jabatan Perancangan Bandar dan Desa), Aras 6, Blok F5, Parcel F, Presint 1, Pusat Pentadbiran Kerajaan Persekutuan, 62675 Putrajaya

Email: lembagaperancang@gmail.com
Website: www.lpbm.gov.my

Malaysia Institute of Planner (MIP)

MIP's chartered object is "to promote the science and art of Town Planning for the benefit of the public…" It does this primarily by ensuring the existence of a body of professional planners with the appropriate knowledge, training and skills to promote the advancement of town planning in Malaysia since 1972.

Tel : +603 7877 0636/ 0637
Fax : +603 7877 9636
Add : B-1-02 Jalan SS7/13B, Plaza Kelana Jaya, 47301 Petaling Jaya, Selangor, Malaysia.

Email: pertubuhanperancang@gmail.com
Website: www.mip.org.my

Malaysia Smart Cities Alliance (MSCA)

MSCA is a platform established for the council members to deliberate on Smart City's issues and challenges and creates an opportunity for networking among the stakeholders. The formation of MSCA consist of cross sector participations from academician, governments and industry players. Thus, forming a new structure comprising founding, core, vertical, innovator, market & funding governed by the strategic objectives, specific roles and responsibilities for the members.

Add : Malaysian Industry-Government Group for High Technology Might Partnership Hub, Jalan Impact, 63000 Cyberjaya, Selangor, Malaysia.

Email: info@icsc-my.org
Website: www.icsc-my.org/malaysia-smart-cities-alliance

Universities

Institute for Environment and Development (LESTARI), Universiti Kebangsaan Malaysia (UKM)

LESTARI was also established to serve as a reference centre capable of dealing with environment and development issues, assisting government in formulating policies based on research of a holistic and balanced kind. The development function is directed towards enhancing human resource capacity through skill development and training, for both government and private sectors.

Tel : +603 8921 4149
Fax : +603 8925 5104
Add : Universiti Kebangsaan Malaysia (UKM), 43600 Bangi, Selangor, Malaysia.

Email: lestari@ukm.edu.my
Website: www.ukm.my/lestari

Malaysia Institute of Transport (MITRANS)

MITRANS is responsible for transportation research, consultancy and training. The aim of the institute is to play a leading intellectual role in strategic transportation and logistics planning and development. In addition, to contribute to nation building by providing a stronger focus on delivering innovative solutions to address transportation problems.

Tel : +603 5544 2343
Fax : +603 5544 2344
Add : Universiti Teknologi Mara (UiTM), 40450 Shah Alam, Selangor, Malaysia.

Email: mitrans@uitm.edu.my
Website: www.mitrans.uitm.edu.my

UTM Low Carbon Asia Research Centre

UTM Low Carbon Asia Research Centre brings innovative science and technology solutions to the promotion of sustainable urban futures to the Asian region, specifically in the subject area of climate change mitigation.

Tel : +607 553 6225
Add : Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia.

Email: lcs@utm.my
Website: www.utm.my/iclca

Digital Cities Research Institute (Digital Cities RI), Multimedia University (MMU)

Digital Cities Research Institute promotes cities that provide core infrastructure and give a decent quality of life, a clean sustainable environment and applications of smart solutions through digitalisation in research, consultancy and education.

Tel : +603 8312 5080
Add : Second Floor, Chancellery Building Multimedia University, Persiaran Multimedia, 63000 Cyberjaya, Selangor, Malaysia.

Email: digitalfutures@mmu.edu.my
Website: www.digital.mmu.edu.my

Jeffrey Sachs Center on Sustainable Development, Sunway University

The Jeffrey Sachs Center hosted in Sunway University Malaysia with the support of the UN Sustainable Development Solutions Network, is a regional center of excellence that advances SDG achievement in Malaysia and Southeast Asia. The center will be a hub for research and policy practice, creating world-class programs to train a new generation of students, practitioners and policy leaders and develop linkages with major universities in Malaysia and around the world solving problems related to the SDGs.

Tel : +603 7491 8622
Fax : +603 5635 8630
Add : 5, Jalan Universiti, Bandar Sunway, 47500 Petaling Jaya, Selangor, Malaysia.

Email: jsc@sunway.edu.my
Website: www.jeffreysachs.center

Institute of Energy Policy and Research (IEPRe), Universiti Tenaga Nasional (UNITEN)

IEPRe main focus areas include directed research, capacity building, fellowship program and sharing of industrial experiences. IEPRe relies on its internal capability to carry out academic research and consultancy projects in the six research focused areas through collaborations with experts from other institutions and industries.

Tel : +03 8921 2020 Ext. 3400
Add : Universiti Tenaga Nasional (UNITEN), Putrajaya Campus, Jalan IKRAM-UNITEN, 43000 Kajang, Selangor, Malaysia.

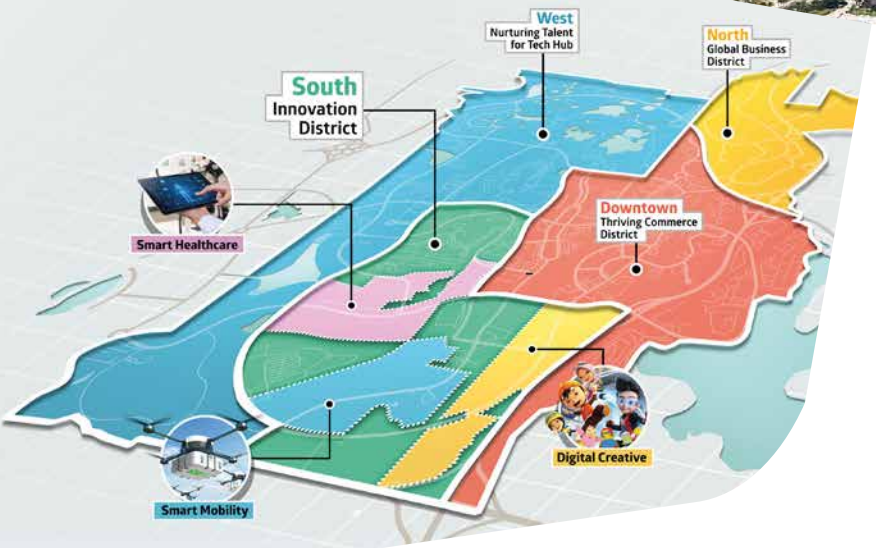
Email: iepre@uniten.edu.my
Website: www.uniten.edu.my/research/institute-energy-policy-and-research-iepre

CYBERVIEW

MALAYSIA CYBERJAYA BY CYBERVIEW

Cyberview - Tech Hub Developer of Cyberjaya

Evolving from its fundamental role as landowner in 1996, Cyberview has now emerged as a Tech Hub Developer, mandated by the Malaysian Government to spearhead the development of Cyberjaya. This translates into the creation of the country's Global Tech Hub that uniquely offers a holistic ecosystem for its tech community to thrive and prosper upon.



Cyberjaya New Masterplan

With the vision of further catalysing tech-based economic growth in Cyberjaya, the new masterplan geographically divides the city into four zones with its own unique characteristics known as West, North, South and Downtown Cyberjaya. Ultimately, these four districts come together with the singular aim of driving the development of Cyberjaya to become a vibrant Global Tech Hub.

Cyberjaya as a Living Lab

Cyberjaya is the ideal stepping stone for technology evolvement. The city is equipped with facilities and infrastructure for innovators and inventors to test, pilot and validate their solutions before launching. We work on collaborative ways to bring your ideas to realisation. This is possible through our Living Lab initiatives, developed to enhance and encourage the growth of local talent, intellectual property, startups and SMEs.

CYBERVIEW
Living Lab | Talent
Grooms talent from the young and impressionable to aspiring university students.

CYBERVIEW
Living Lab | Accelerator
Acceleration of products or services through intensive mentorship, initial funds, network alliances, marketing and market access.

CYBERVIEW
Living Lab | Pilot
A platform to test and validate proof of concepts and prototype fit for commercialisation.

CYBERVIEW
Living Lab | Enterprise
Connects businesses with profitable public-private partnerships and linkages.

Cyberjaya, An Investor-friendly Location

The Cyberjaya Investment & Services Centre (CISC) in RekaScape provides end-to-end assistance and facilitation to help investors and businesses set up base in Cyberjaya.

Talk to Us!
Call/ WhatsApp **+603 - 8750 5170**
Email us at **cisc@cyberview.com.my**

CyberviewMY | CyberjayaBuzz
cyberview.com.my | cyberjayamalaysia.com.my

Corporates

AccelTeam Sdn. Bhd.

One of the leaders in providing data-driven analytics solution in this region.

Tel : +603 2725 9208
Fax : +603 2725 9209
Add : Unit 17-16, Q Sentral, 2A,Jalan Stesen Sentral 2, KL Sentral 50470 Kuala Lumpur.

E-mail: info@accelteam.com
Website: www.accelteam.com

Atilze AI Sdn. Bhd.

One of Malaysia's leading AI and Telematic companies offer AI algorithms, products and solutions for Government, enterprises and end-consumers.

Tel : +603 2714 6118
Fax : +603 2714 6119
Add : B-23A-3A, The Ascent Paradigm No.1, Jalan SS7/26A, 47301 Petaling Jaya, Selangor

Email: hello@atilze.com
Website: www.atilze.com

Aura-Lite (M) Sdn. Bhd.

Expert in designing, supplying and installing Rainwater Harvesting, Storm Water Management and Water Filtration Systems solutions in Malaysia.

Tel : +603 5192 9758; +603 5891 4930
Fax : +603 5192 3410
Add : 36-G, Jalan Putra Mahkota 7/6B, Putra Heights, 47650 Subang Jaya, Selangor, Malaysia.

Email: info@aura-lite.com.my
Website:
www.aura-lite.com.my
www.MalaysiaRainWaterHarvesting.com

Cenviro Sdn. Bhd.

The leader in Green Revolution, holds the license to handle 76 categories of 77 scheduled wastes listed under Environment Quality (Scheduled Wastes) Regulation 2005 for collection, treatment, recycling, recovery and final disposal.

Tel : +603 2727 6100
Fax : +603 2727 2100
Add : 13-1, Mercu UEM, Jalan Stesen Sentral 5, Kuala Lumpur Sentral 50470 Kuala Lumpur, Malaysia

Email: csd@cenviro.com
Website: www.cenviro.com

Chulia Facilities Management Sdn. Bhd.

The leading Malaysian provider of facility and operations management services to the government, corporations, banking and health institutions including real estate, providing technical expertise and streamlined processes to client portfolios.

Tel : +603 90580020/ 21/ 22
Add : Wisma Chulia, No. 5 & 7, Jalan Tasik Selatan 3, Metro Business Center, Bandar Tasik Selatan, 57000 Kuala Lumpur, MALAYSIA

Email: info@chuliafm.com
Website: www.chuliafm.com

FAVORIOT Sdn. Bhd.

Provides an IoT platform, tools and services to help you become more innovative, effective and productive.

Tel : +603 8071 0381
Add : Suite 30, 3A Floor, IOI Business Park, 47100 Puchong, Selangor, Malaysia.

Email: info@favoriot.com
Website: www.favoriot.com

SMART GOVERNMENT | SMART DIGITAL INFRASTRUCTURE | SMART COMMUNITY | SMART LIVING | SMART MOBILITY | SMART ENVIRONMENT | SMART ECONOMY

Corporates

Fusionex International

Fusionex is an established multi-award-winning data technology provider specialising in Analytics, Big Data, Machine Learning and Artificial Intelligence.

Tel : +603 7711 5200
Fax : +603 7711 5300
Add : 12, Tower A, Plaza 33 1 Jalan Kemajuan, Section 13 46200 Petaling Jaya, Selangor, Malaysia

Email: my.info@adv-fusionex.com
Website: www.fusionex-international.com

Global Top Technologies (M) Sdn. Bhd.

The trusted market leader in cutting edge digital surveillance systems, GTC is the leading one-stop integrated security access control and surveillance solutions expert that provides a 'peace of mind' to homeowners and businesses.

Tel : +603 6158 6666
Fax : +603 6158 1616
Add : Wisma GTC, No 3, Jalan Teknologi 3/4A, Taman Sains Selangor 1, Kota Damansara, 47810 Petaling Jaya, Selangor.

Email: sales@gtc.my
sales@globaltop.com.my
Website: www.gtc.my

Handal Indah Sdn. Bhd.

Handal Group of Companies (HGC) is the largest public bus provider in Johor, delivering efficient and sustainable public transport system for the Community.

Tel : +607 360 2244
Fax : +607 358 4970
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