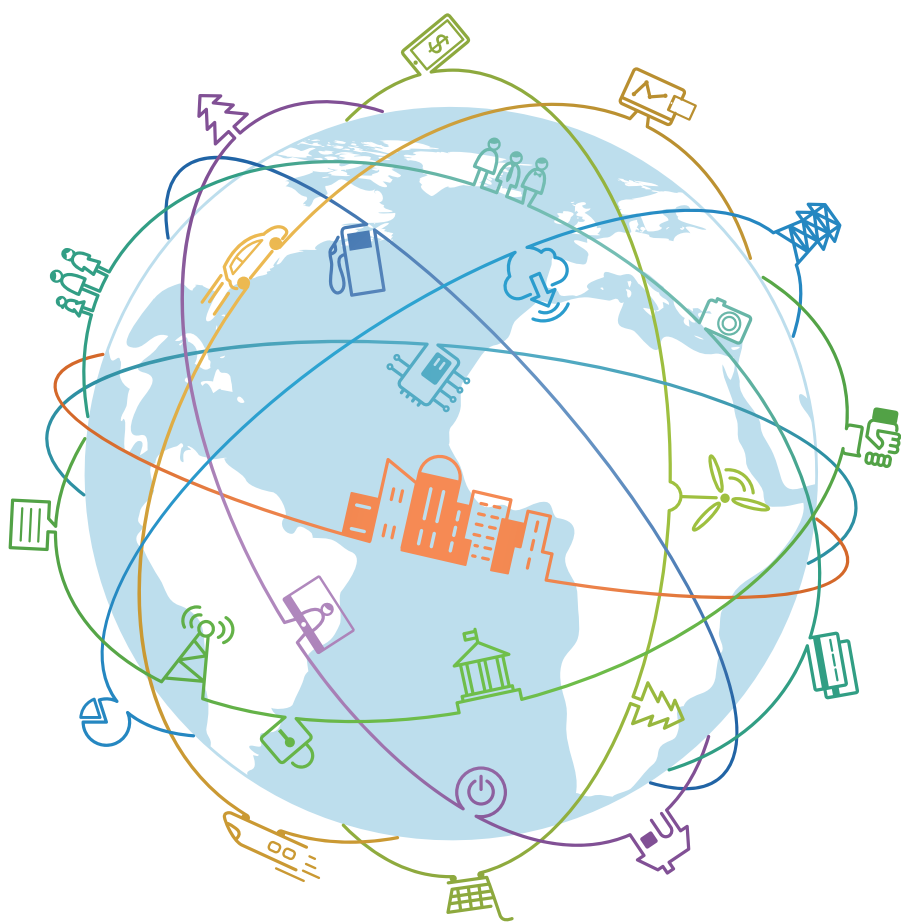


# ACCELERATING A SMART DIGITAL NATION

Building a Better Connected World



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# 1. FOREWORD

Dear Reader,

We live in an ever more competitive world. It is a world in which these competitive pressures are being applied to nation states, businesses and to the individual. Within this context, many nations are looking for ways to increase their productivity and competitiveness whilst preserving the culture, lifestyle and quality of life which define their sense of who they are as a people.

Malaysia is taking up the challenge; ambitious development targets have been set over the next five years and these targets have the potential to transform both the Malaysian economy and its people. The Vision 2020 and 11MP have laid the foundation for achieving these development targets and with this in mind. In this whitepaper, Huawei has outlined the technological aspect of the Smart Digital Nation vision; it is a journey on which we are excited to partner with Malaysia.

A Smart Digital Nation, will use the tools of the new digital economy, connected by a well developed network, to deliver a more productive, prosperous and innovative nation for all Malaysians. It is our firm belief that the Digital Economy offers the potential to radically transform the way Malaysians live, work and play. It has the potential to make industries even more productive and competitive and enable open lines of communication between public and public services. In order to achieve a Smart Digital Nation, four core elements are needed:

- A common ICT Vision for the nation.
- Unified Digital Governance to provide policies and a planning framework.
- Partnerships with businesses, enterprises, higher education and individuals.
- A common supporting ICT infrastructure.

The potential benefits for Malaysia are huge as a Smart Digital Malaysia will deliver important benefits to the nation:

- Higher paying jobs to retain and attract skilled people.
- Enhanced rural economic growth, services and social opportunity.
- Transformed existing industries – Tourism, Transport, Manufacturing and Agriculture.
- The establishment of new dynamic industries.
- Dramatically enhanced Government and Public Services – Education, Healthcare, Public Safety and Utilities.

We appreciate the foresight by the Malaysian government for starting this transformation journey.

Huawei is committed to supporting this digital transformation using world's best practice gained from our experience in partnerships within more than 140 countries around the globe. Huawei has been in Malaysia for over 14 years. We are dedicated to the development of this diverse nation and are a proud Malaysian corporate citizen with 2,300 staff in Malaysia, 75% of which are recruited locally. It is our belief that a Better Connected and Smart Digital Malaysia will have a prosperous future and we look forward to being an integral part of building that future for all Malaysians.

Regards,



Abraham Liu, Huawei Malaysia CEO.



## 2. SMART DIGITAL NATION VISION

### 2.1. Introduction

The ITU Focus Group on Sustainable Cities<sup>1</sup> is assessing the standardization requirements of cities aiming to boost their social, economic and environmental sustainability through the integration of information and communication technologies (ICTs) in their infrastructures and operations. By leveraging the work of the ITU, an international standard based framework in which to further develop a national smart vision could be formulated.

The ITU Sustainable Cities based framework is supported by six pillars:

- Smart Government
- Smart Economy
- Smart People
- Smart Environment
- Smart Living
- Smart Mobility

Each of these pillars relate to specific focus areas that are highlighted in the existing initiatives such as Economic Transformation Program (ETP), Government Transformation Program (GTP), the 11th Malaysian Plan (11MP) etc which are Smart Digital Nation-centric and leverage ICT to accelerate the implementation and achievement of Vision 2020 and beyond.

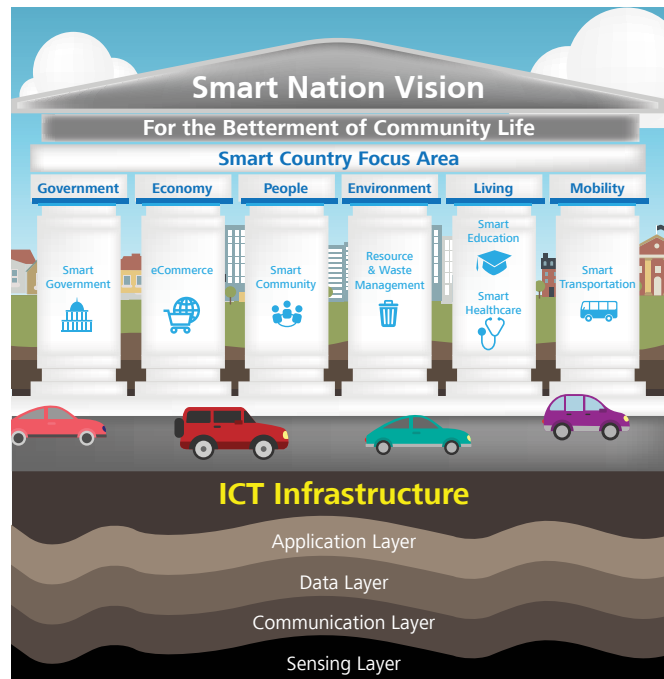


Figure 1 – Smart Country Focus Areas

### 2.2. Huawei's Global Connectivity Index

Information & Communication Technology (ICT) plays a vital role in addressing the transformation journey of the Malaysian government, cities, communities and villages.

Huawei released its 2015 Global Connectivity Index (GCI) that benchmarked 50 economies in terms of connectivity, ICT usage, and digital transformation, providing an indicator of which countries are best poised for development and growth, and an ICT planning reference for policy-makers looking to embrace the digital economy.

Overall, the 2015 GCI shows that 20% growth in ICT investment will grow a country's GDP by 1%. It also identifies five enablers of digital transformation – Data Centers, Cloud Services, Big Data, Broadband, and the Internet of Things (IoT). These technologies represent the targets that stakeholders should focus their investments on in order to most efficiently transform their economies for the digital age.

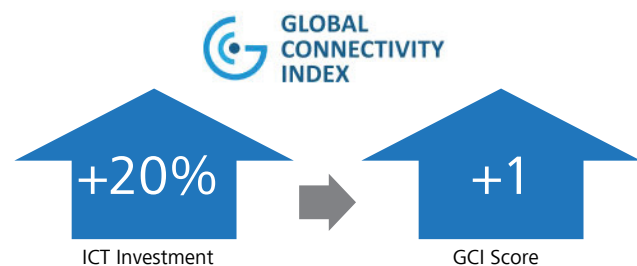
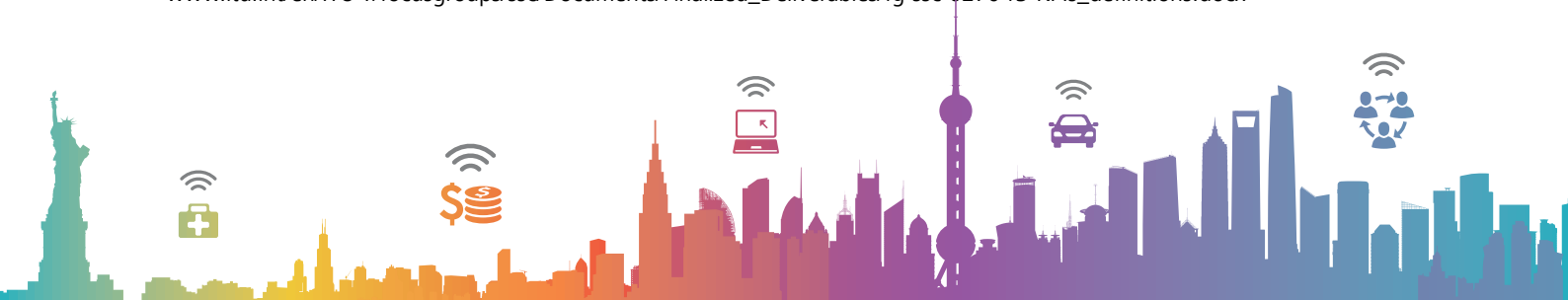


Figure 2 – The Huawei GCI

The GCI scoring model consists of thirty eight variables divided across four Cornerstones of connectivity (Supply, Demand, Experience, and Potential) were measured, analyzed, and intersected for fifty countries.

<sup>1</sup> [www.itu.int/en/ITU-T/focusgroups/ssc/Documents/Finalized\\_Deliverables/fg-ssc-0270-r3-KPIs\\_definitions.docx](http://www.itu.int/en/ITU-T/focusgroups/ssc/Documents/Finalized_Deliverables/fg-ssc-0270-r3-KPIs_definitions.docx)



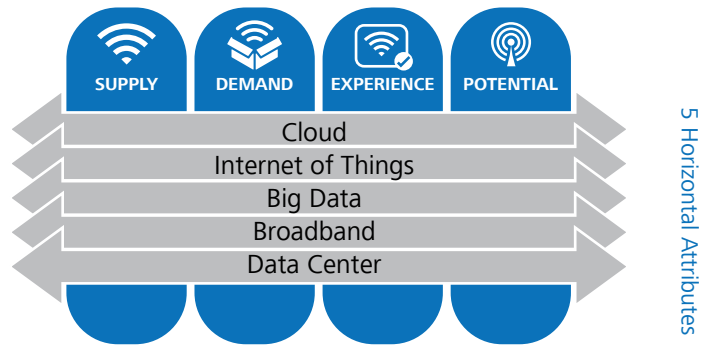


Figure 3 – GCI Scoring Model

When comparing the GCI performance with GDP per capita, we can see three clusters of countries based on their GCI and GDP performances. The resulting graph reveals three layers or clusters of countries that can be identified as countries that are Leaders, Followers, and Beginners. For the overall GCI scoring, Malaysia ranks 28th in the list and falls in the Follower category as shown below.

GCI Ranking Table					
Leaders		Followers		Beginners	
1	United States	85	17	Spain	55
2	Sweden	82	18	Italy	51
3	Singapore	81	19	Portugal	49
4	Switzerland	78	20	Chile	48
5	United Kingdom	78	21	Czech Republic	48
6	Netherlands	74	22	UAE	47
7	Denmark	72	23	China	47
8	South Korea	72	24	Qatar	47
9	Japan	71	25	Russia	46
10	Norway	71	26	Brazil	44
11	Germany	71	27	Poland	44
12	Australia	66	28	Malaysia	42
13	Belgium	66	29	Saudi Arabia	42
14	France	66	30	Romania	42
15	New Zealand	65	31	Thailand	42
16	Canada	65	32	Mexico	41
			33	South Africa	41
			34	Peru	40
			35	Venezuela	40
			36	Egypt	40
			37	Colombia	39
			38	Turkey	39
			39	Argentina	39
			40	Philippines	35
			41	Indonesia	34
			42	Morocco	33
			43	Algeria	33
			44	India	33
			45	Vietnam	33
			46	Kenya	33
			47	Nigeria	31
			48	Ghana	30
			49	Bangladesh	26
			50	Pakistan	26

Figure 4 – GCI Ranking Table

With the strong correlation between the GCI and GDP per capita, it is clear that investment in global connectivity has a direct and tangible impact on economic growth and performance. A well planned approach in Supply, Demand and Experience accelerates the digital and smart transformation and leads to higher growth and economical potential. From GCI SEDP perspective, the largest gaps between Leaders and Followers lie in “Experience” and “Demand”. A balanced supply of center core and edge network connectivity supports the transformative technologies of Cloud, Big Data analytics and IOT. The Experience factor is affected by broadband affordability, datacenter quality, eGovernment experience and the availability of IOT analytics. These can impact the level of demand creation for mobile broadband, cloud migration, data analytics and eCommerce amongst others.

Therefore the following process can accelerate the connectivity journey in Malaysia: increasing ICT investment for ubiquitous supply by building solid ICT infrastructure at the core and edge, so as to elevate the QOS and experience factor, which would lead to larger digital demand creation.



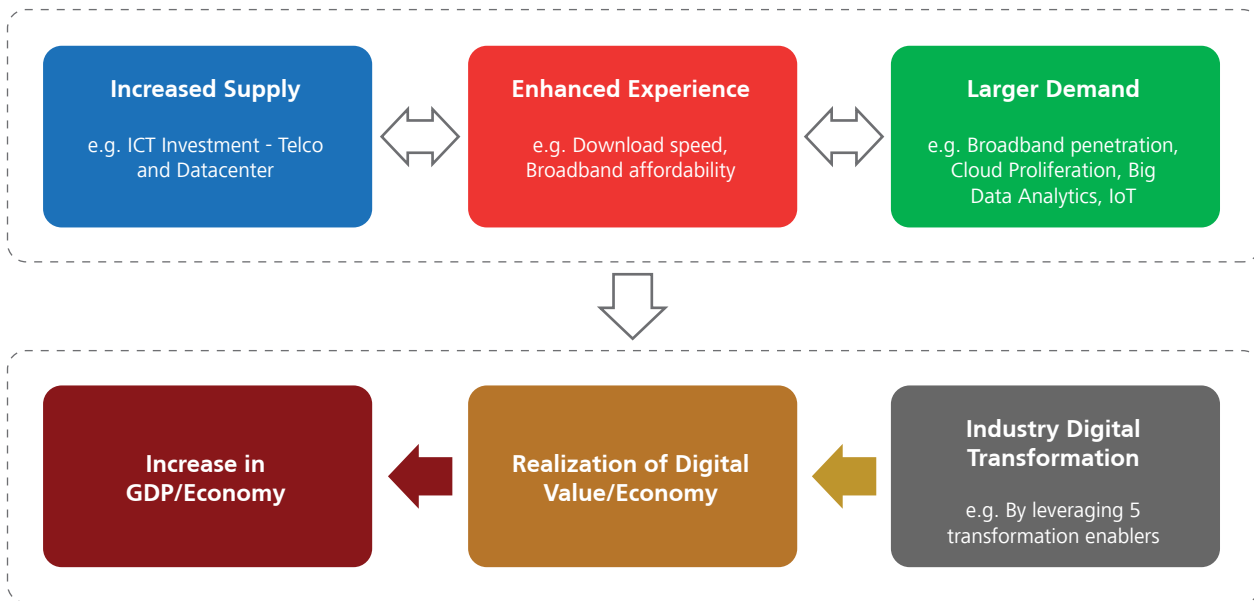


Figure 5 – Balanced ICT Investment accelerates Digital Transformation

## 2.3. Examples of Digital Economy Strategy

### 2.3.1. China's Internet Plus

To fuel economic growth, China's "Internet Plus" action plan was unveiled in July 2015. This plan aims to integrate mobile Internet, cloud computing, big data and the Internet of Things with modern manufacturing, to encourage the healthy development of e-commerce, industrial networks and Internet banking.

The key action plans for Internet Plus include:

- Integration of Internet and traditional industries, fueling expansion from consumption industries to manufacturing
- Map development targets and supportive measures for key sectors such as manufacturing, agriculture, energy, finance, public services, logistics, e-commerce, traffic, biology and artificial intelligence
- Promote technological progress, efficiency improvement and organizational reform
- Enhancing economy growth and productivity

It is envisioned that by the year 2025<sup>2</sup>, Internet Plus will become a new economic model and an important driving force for economic and social innovation and development.

### 2.3.2. U-Korea Master Plan

The vision of the 'u-KOREA Master Plan' is to achieve an advanced Korea by realizing the world's first u-Society based on the world's best u-Infrastructure<sup>3</sup>. The plan provides advancement goals for five areas - government, land, economy, social environment, and individual life; and optimization goals for four engines - globalization, industrial, infrastructure, social infrastructure, and technology development.

The ultimate goal of the 'u-KOREA Master Plan' is to achieve a society where all people can benefit from a safer ubiquitous society through advancement of the five areas and optimization of the four engines, namely the 4Us: universal, usable, unisonous and upgraded<sup>4</sup>.

The Master plan is currently in Stabilization phase (2011~2015) whereby the goal is universalizing ubiquitous services. Within 3 years from the inception of the plan in 2006, Korea has ranked top 5 in Digital Opportunity Index, National Informatization Index and e-Government readiness globally.

<sup>2</sup> english.gov.cn

<sup>3</sup> www.unapcict.org

<sup>4</sup> Korea Informatized - progress and status overview



## 3. AN ICT BLUEPRINT – MALAYSIA AS A BETTER CONNECTED SMART DIGITAL NATION

### 3.1. ICT Blueprint Overview

ICT infrastructure is essential to achieving a Smart Digital Nation – it integrates each of the elements into a holistic whole orchestrating all the different interactions between the various applications, services, resources and physical infrastructure.

As seen in the figure below, this integrated ICT framework based upon an ICT Vision for a Smart Digital Nation will enable all participants to move in the same direction, avoid duplication and wastage in infrastructure planning and ensure collaboration, coordination and solid integration among all stakeholders in order to embrace the digital economy.

In this section of the whitepaper we will look at each of the layers which make up a Smart Digital Nation, describe the elements within the layers and discuss their importance in a Malaysian context.

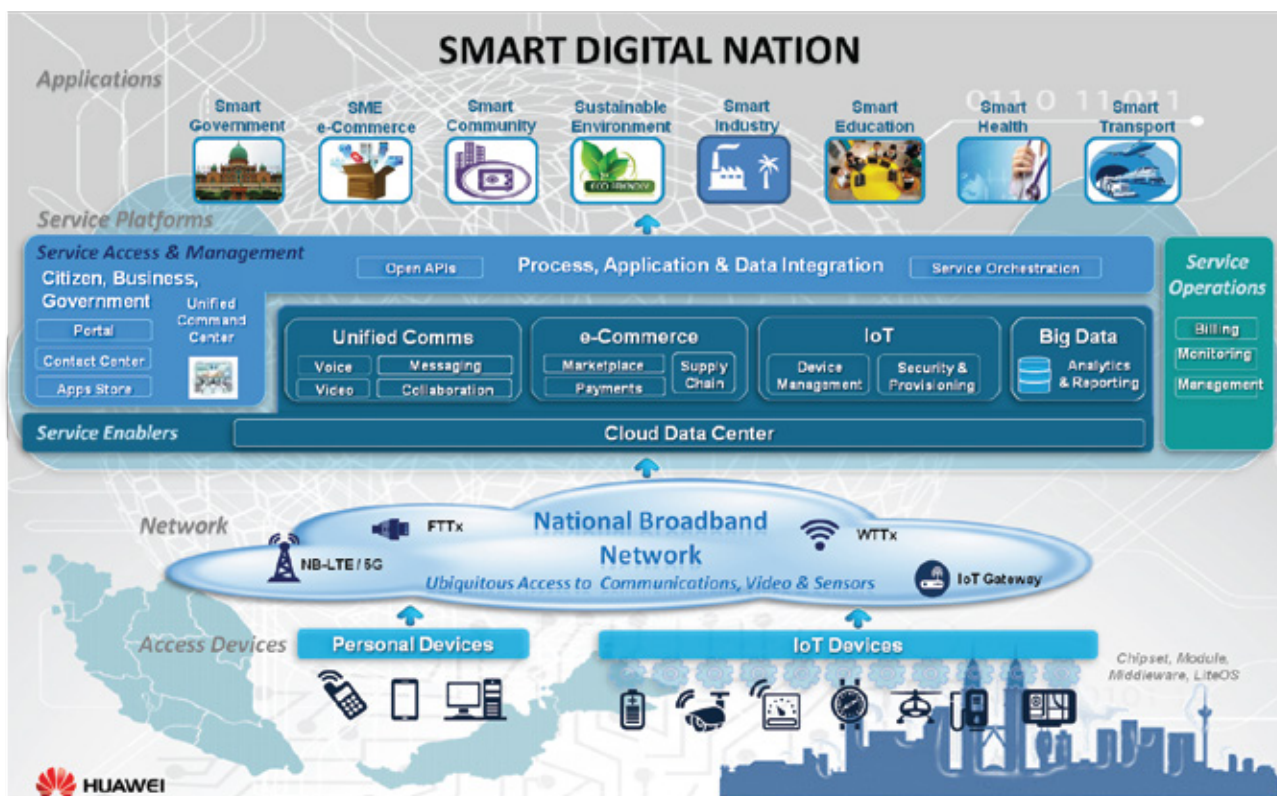


Figure 6 – Overview Blueprint for a Smart Digital Nation.

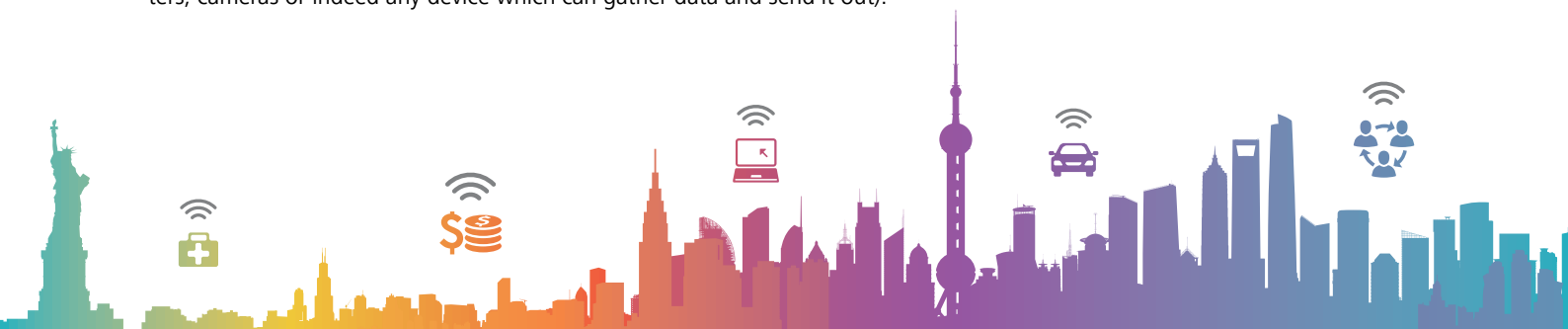
### 3.2. Access Device Layer

A better connected nation has the potential to be a smarter nation and it is at the Access Device Layer that many of the key connections take place. In a smart nation context, this layer is intertwined with the Internet of Things (IOT).

#### What is an Access Device?

There are two categories of Access Device:

1. Any device which is used to access data within the Smart Nation infrastructure (examples – Smart phones, tablets, PCs).
2. Those devices which measure, monitor and output data to Smart Nation infrastructure (IOT devices such as meters, thermometers, cameras or indeed any device which can gather data and send it out).





### *Access Devices are Proliferating*

The world in which we live, is rapidly becoming a more instrumented world. From the cars we drive, the homes we live in, the parks in which we play and the buildings use for work right down to the toothbrushes we use we are being surrounded by devices which measure, monitor and report on the environment around them. It is estimated that by 2020, 50-100 billion devices will be electronically connected.

Now, visualize such a world where billions of Smart phone and connected objects can sense, communicate and share information with connected networks through smart phones, PC, Servers etc. These sensors are collecting personalized data such as blood pressure, sugar levels, temperature etc. Systems can then take appropriate actions (both proactive and reactive). This has huge implications for those nations and societies which are successfully able to grasp the opportunities which this data offers.

### *What advantages does a strong Access Device Layer bring to Malaysia?*

Having a well developed Access Device ecosystem will also enable Malaysia to:

1. Revolutionize the provision of Public Services. For example, rubbish collection can be provided as and when needed using real time data and predictive analytics rather than a fixed schedule. Water usage can be tracked in real time with wastage quickly identified and proactive maintenance reducing water loss incidents.
2. Build a more responsive transport system through analytical tracking of both goods and people across the nation allowing for the identification of bottlenecks and spending priorities.
3. Become more competitive. With millions of data sensors providing information across the nation, there are enormous opportunities to enhance Malaysia's competitiveness in a number of key verticals. Examples of this include:
  - **Agriculture.** Sensors will allow crop and livestock production to be optimized, reducing the cost of inputs (weed spray, fertilizer etc.) needed.
  - **Public Safety.** Real time response to incidents identified automatically by sensors using facial recognition etc.
  - **Public and Private Transport.** Movement statistics will enable Malaysia to proactively plan infrastructure spending and allocate resources. Private car users will know where to park in advance, how to reroute around any traffic issues and when their time limit is up for their parking.
  - **eCommerce.** Ubiquitous access to services and goods being offered as well as the ability to pay online and ship quickly will allow Malaysia to develop an eCommerce ecosystem which will drive economic growth both online and in the physical world. Such a local eCommerce ecosystem will be a massive boon to the many SME which make up a majority of the Malaysian economy enabling them to expand their potential markets and reach an equal footing with international competitors.
  - **eHealth.** Health monitoring devices for chronic conditions such as diabetes and blood pressure can be combined with data tracking lifestyle activities levels and diet to generate an overall picture of patient health and proactively manage medical events before they occur. Such an approach has the potential to save tens of millions each year in catastrophic event avoidance and loss of productivity.

So, Malaysia will soon have millions if not billions of devices generating data; given this, the requirement then becomes how to transfer that data from its source to a location in which it may be used productively. To that end, we must now look at the Network Layer and demands placed upon that by the proliferation of devices.

### **3.3. Network Layer**

The communication layer represents various networks provided by telecommunication operators, as well as other networks provided by city stakeholders or enterprise private communication networks. This layer is responsible for carrying all the data produced by the sensors as well the communications between each of the elements of the ICT infrastructure such as – the data centers, platforms, end user devices and applications. In addition, it has Fixed and Wireless components, each delivering parts of the data which underlies a Smart Digital Nation.



### 3.3.1. Fixed Broadband (FBB)

#### *What is Fixed Broadband(FBB)?*

At its most basic, FBB represents that network infrastructure which delivers data to the end user through a wire. FBB forms an important part of a Smart Digital Nation given its ability to supply large amounts of data very quickly with low latency and high availability.

#### *What is the value to Malaysia of a well developed FBB network?*

Support for key services. In the information explosion age in which we live, videos are a key carrier of information and demands for video services are rising around the world. Nowadays, more and more internet services are based on video in forms such as, remote education, telemedicine, etc. The following statistics outline why videos will become an integral part of many Smart Digital Nation applications.

It is estimated that by the year 2019:

- Internet video traffic will increase four times in volume over levels five years ago.
- Internet video traffic (commercial and consumption) will make up 77% of all Internet traffic and has increased significantly given it made up 59% of traffic in 2014.
- Advanced Internet (HD and ultra-HD) video traffic is expected to grow 8.5 times current levels.

#### *Delivering on the promise of video and the services video enables*

With video being such an important part of so many important services (Telemedicine etc.) one must ensure that the User Experience delivered will encourage the adoption and use of these services. In addition, User experience requirements will be one of the key factors in determining broadband network planning and deployment. To ensure this experience implementing the right user experience monitoring and management model and tools is crucial to give stakeholders more visibility and control of the network performance as shown below:

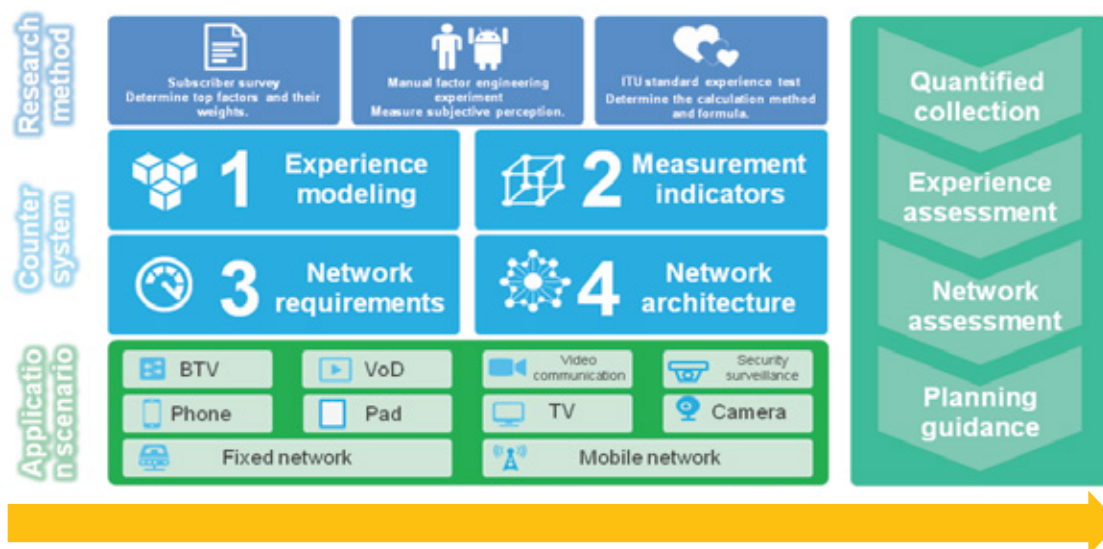


Figure 7 - Ensuring FBB User Experience

The process includes collecting a set of quantifiable parameters that can be used for experience assessment at the service layer which translate to network quality assessment at the infrastructure layer. The assessment outcome will then form the basis for planning guidelines for network optimization and expansion. The key counter systems involved are:

- Experience Modeling
- Measurement Indicators
- Network requirements
- Network architecture



### 3.3.2. Mobile Broadband (MBB)

#### *What is Mobile Broadband (MBB)?*

Mobile Broadband (MBB) can be thought of as the equipment, infrastructure and services needed to transfer data wirelessly. It typically involves the ability to access the Internet and other network services from user devices such as mobile phones or tablets and IoT devices such as metering and monitoring sensors.

#### *What is the value to Malaysia of a well developed MBB network?*

A well developed MBB network is essential to Smarter Malaysia. We have already seen how MBB has reshaped people's lifestyles around the world. People and businesses are accessing services in real time when and where needed. In addition to this, IoT sensors are delivering information related to everything from parking to pollution.

**Access Anywhere at Anytime.** A well developed MBB supports the development of an "access anywhere at anytime" approach to both gathering data and accessing the service platforms which use that data and make it available.

**Increased Adoption Rates for New Services.** With MBB in place, increased adoption of mobile services can take place as users can more easily access services which may be based within the cloud. As with FBB, ensuring a good user experience is crucial to achieving high rates of adoption.

**Increases the ability to make IoT elements ever more ubiquitous.** MBB ensures that the millions of sensors which are being emplaced around the nation have the means to communicate their data effectively into the Service Platforms.

**Drives new innovative services.** A well developed MBB ensures that an ecosystem is in place to enable new and innovative service providers in delivering mobile applications to the marketplace.

#### 3.3.2.1. Wireless Network Considerations

**Spectrum.** Demands upon the mobile network have grown exponentially over the last few years. Based on a study by Huawei mLab, a total of 300MHz spectrum will be required to meet the demands on MBB for top operators in the industry by the year 2020. Spectrum alone has no inherent value; rather, its value is derived from the economic and social engagements which it supports. Many countries consider wireless spectrum to be a crucial element of a Smart Digital Nation along with Big Data and IoT. There are also many LTE/LTE Advanced technologies which can further increase the MBB spectrum efficiency, capacity and performance such as - Carrier Aggregation, HetNet, higher order MIMO. These technologies are in early adoption phases of adoption in Malaysia and it is the right time to invest in them to stay competitive.

**Site Densification.** Apart from spectrum, site densification is also an important step in enhancing MBB capacity and user experience in key cities. Innovative solutions with macro, micro and in-building small cells are important to increase the site coverage and capacity.

**Technology.** 4.5G (which has now standardized as LTE Advanced-Pro) momentum is building. The vision of 4.5G is to achieve higher speed and capacity, lower latency and more connections of people and things. The enabler technologies for these targets are for example, higher order modulation, MIMO, CA, and NB-IoT. NB-IoT technology in particular, will support various low data rate IoT applications such as utilities metering for water and electricity across a wide coverage range. 4.5G network is expected to commercialize by 2016.

5G is the next frontier of innovation for the wireless industry and the broader ICT ecosystem. 5G will provide the foundational infrastructure for building smart cities, which will push mobile network performance and capability requirements further. Low latency and high reliability will also be essential requirements for the likes of IoT applications such as vehicular connectivity, mobile industrial automation etc.



### 3.4. Service Platform Layer

#### 3.4.1. Service Platforms

##### 3.4.1.1. Internet of Things (IoT) Service Platform

###### *What is an IoT Service Platform?*

An IoT Service Platform is made up of those components which are able to receive the incoming data from the many sensors and devices which reside in the Access Device Layer. This platform also provides mechanisms to manage, maintain and operate the remote sensors where necessary.

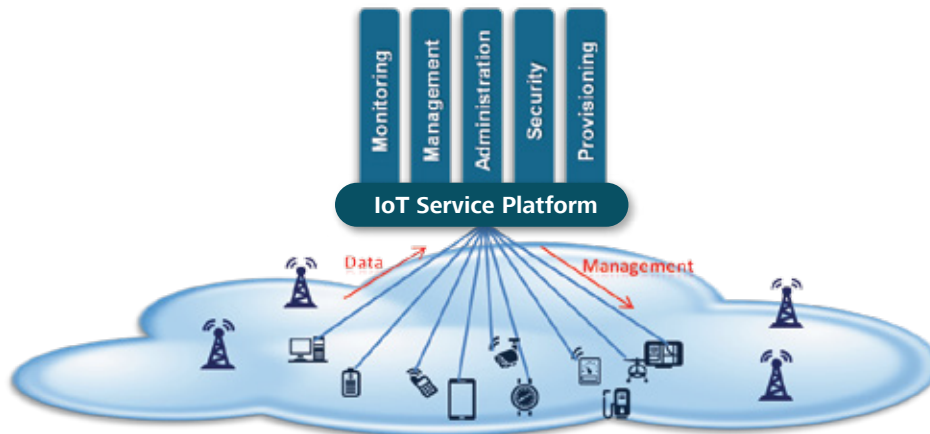


Figure 8 - IoT Service Platform

The core capabilities expected from the IoT Service Platform are:

1. Scalability and Flexibility. The platform must be able to cope with the masses of data generated by the many sensors within the sensor network. It must also be flexible in its approach to this data. For example, sometimes the data will need to be collated closer to the source and in more or less frequent intervals.
2. Openness. The platform must be flexible enough to easily interface with a wide variety of sensor data and devices and make this available using a standards based approach.
3. Security. Mechanisms and processes must be in place to securely deal with potentially sensitive information.
4. Intelligent. Intelligence with respect to the IoT network must be able to reside within different elements of the network. It can be closer to the source, centralized or a variation of the two.

##### 3.4.1.2. Big Data and Analytics Service Platform

###### **Big Data (Smart Cities and Smart Nations produce BIG Data)**

With IoT sensors collecting various city related data - everything from a leaking water pipe to a traffic pile-up, vast amounts of data on city functions such as transportation, healthcare, public safety, utilities and governance are being collected every millisecond of every moment. In IoT applications, the information being produced is vast. Some estimates predict that by the year 2016 we will generate 4.1 terabytes of information per day per square km of urbanized land area – the equivalent of more than four average home computer hard drives.

###### *What are Big Data and the Big Data Service Platform?*

Big Data refers to the extremely large data sets produced by the generation, collection and storage of data like that described above. Thus, an IoT ecosystem built across a nation like Malaysia will by its very nature, produce Big Data. The Big Data Service Platform takes the information collected by the IoT Devices, transmitted through the network to the IoT platform and stores, transforms that data making it available for use by applications and user stakeholders.



## Key Big Data considerations for a Smart Digital Nation

**Data Management Plan.** The types of data which will be produced across Malaysia will be broad, ranging from structured data and semi-structured data from sensors to video feeds from cameras. In addition, data is often collected from sources that will almost always have different structures and standards and will be arriving at varying levels of speed and granularity. This incoming mass of unstructured and semi-structured data into the Big Data Data Centers will require a management plan and framework to be established for the nation.

**Data Policy Establishment.** Data will need to be classified, for example - strategic, operational etc. and an authority or committee of important stakeholders needs to setup policies around the handling of that data. Who has access, how they access, how long data is to be kept etc. Laws and regulations will need to be introduced to enforce and regulate these policies.

## Big Data Analytics

Analytics is the visualization, conceptualization and presentation of data to allow for sensible decision making by the user. The Big Data analytics function is a key element of the infrastructure which will transform Malaysia from being a connected nation to a Smart Digital Nation. This platform delivers several key functions:

- Makes the underlying data accessible to interested stakeholders.
- Delivers meaningful analytics across past, present and future trends.
- Improves understanding of the Smart Digital Nation ecosystem.
- Provide enhanced predictive capabilities.

It enables this infrastructure to make meaningful changes to the quality of life of residents and delivers the ability to perform informed decision making to those who interact with it on a daily basis.

## The key Benefit of Big Data Analytics - Delivering Informed Decision Making

Informed decision making will transform how Malaysians live, work and govern themselves. This decision making will take place within 3 main user stakeholder groups – Citizen, Businesses and Government.

- **Citizen.** Citizens can make rapid and well informed decisions about aspects of their daily lives. One example of this could be that of a resident being able to know exactly where they can park a car at their destination and the best route to take to that location in real time. This scenario alone has the potential to reduce traffic by 30% in most urban areas given that up to 30% of traffic is made up of cars looking for a parking spot.
- **Business.** For a business it means that investment decisions can be driven by hard information in relation to the market-place. For example, a retail store operator can know in advance how much foot traffic will occur outside a location, at what times and potentially what kinds of customer demographic are available.
- **Government.** For a Government, one key benefit of having Big Data analytics means that it will know exactly how much infrastructure is required in a particular location – Water, Sewerage, Power, Rubbish Collection etc. Governments will also be able to reactively and proactively manage Public Safety through the allocation of scarce resource to crime hotspots and the identification of crime trends in advance.



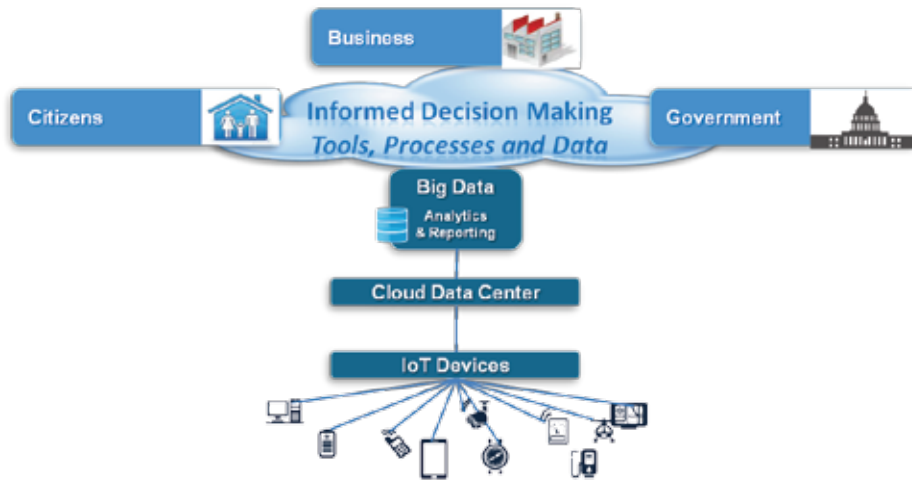


Figure 9 - Big Data Analytics - Delivers Informed Decision Making

#### 3.4.1.3. Unified Command Centre (UCC) Service Platform

##### *What is a UCC?*

At the heart of Smart Digital Nation lies a centralized command and control centre. The Smart Digital Nation Command Center integrates a wide range of services on a single unified platform, including Telepresence (Video Conferencing), Intelligent Video Surveillance (IVS), and Emergency Command Center (ECC) systems.

##### *What benefits does the UCC deliver to a Smart Digital Malaysia?*

##### **Unification of Operations, Elimination of Silos and Cost Reductions**

The integration of services in a single platform allows resource scheduling with multimedia assistance (voice and live video) that improves collaboration between departments and interoperates with existing communications systems. These systems integrate smart community, governance, city-management, healthcare, commerce, and other functions that are connected with the centralized platform for efficient access across interoperating systems.

The UCC will utilize an urban data exchange which maps heterogeneous data onto a uniform standard. This mapping enables free data exchange between heterogeneous systems across city departments and sectors. The result is city-wide interoperability that helps urban authorities eliminate isolated "information silos". Operations and administration costs across government are reduced and operational response across government first responder and emergency services is dramatically improved.

##### **Reduction of Economic Loss from Incidents and Natural Disasters**

In the case of emergency situations and incidents, the UCC functions as a unified incident receiving and processing center incorporated with a visual command and dispatch system, intelligent decision-making assistance system, and incident response system. The emergency command center and onsite processing personnel can efficiently communicate and collaborate, supporting timely incident processing and minimizing casualties and economic loss caused by incidents.



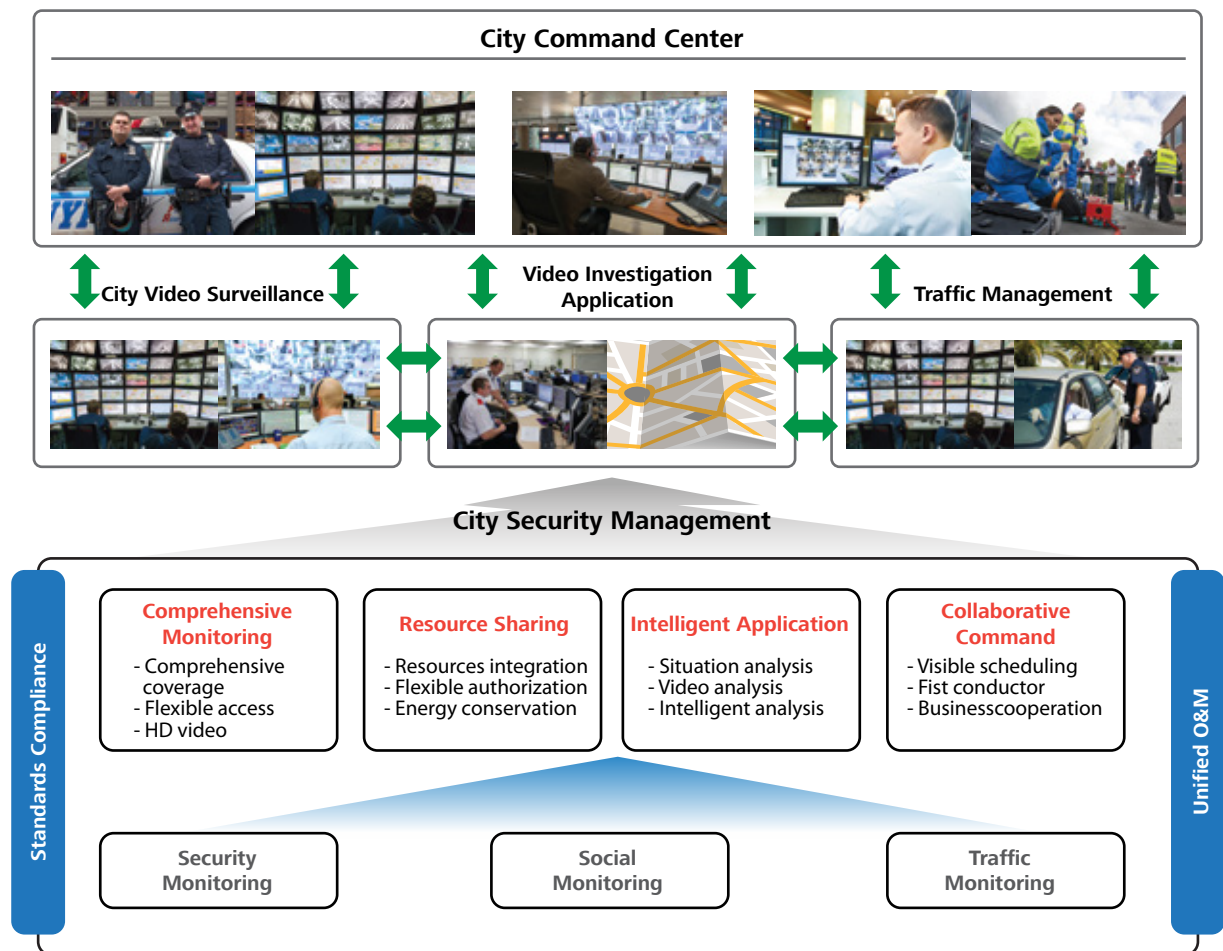


Figure 10 – Unified Command Center Service Platform

#### 3.4.1.4. eCommerce Service Platform

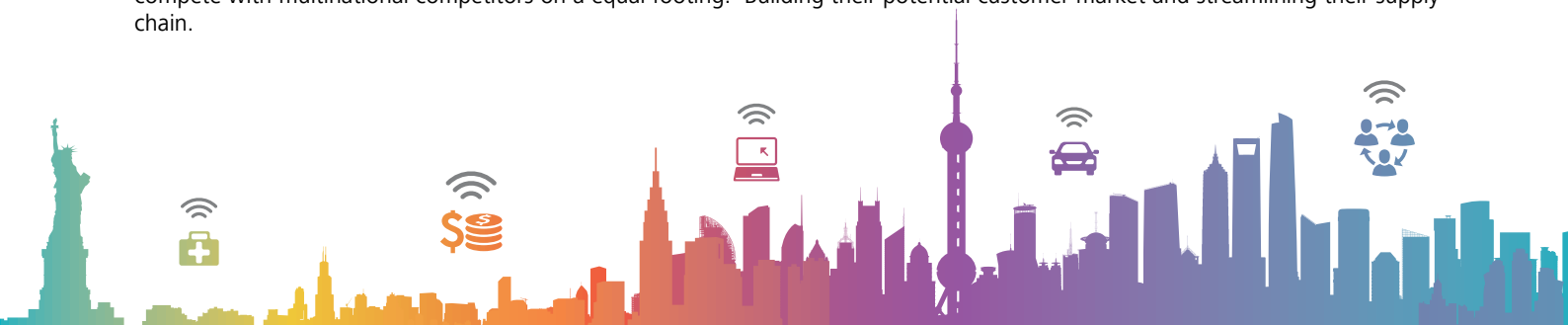
##### What is the eCommerce Service Platform?

The eCommerce service platform provides the infrastructure to allow stakeholders to build and host digital storefronts. In the context of a Smart Digital Nation, it also provides the infrastructure to support an integrated supply chain across the nation and enablement of key industries across the nation. The complete eCommerce business model is enabled by:

1. An Online Marketplace – An online store front where sellers present their goods and services for sale and buyers can browse and compare products
2. Online Payment – Various payment mechanisms to support the sale of goods and services i.e. mobile payments, electronic funds transfer, links to banking and financial institutions
3. An Integrated Supply Chain – The warehousing, dispatch, and tracking of goods from the seller to the buyer; involving transportation companies, and warehousing and distribution centers
4. Seller Enablement - The enablement Small and Medium Enterprise to conduct their business online e.g. SME training for online marketing programs or SME loans to inject capital to build their Online Business.

##### What benefits does an eCommerce Service Platform deliver to a Smart Digital Malaysia?

Correctly implemented, the eCommerce Service Platform has the potential to massively impact key sectors of the Malaysian economy such as Small and Medium Enterprises (SME). The Malaysian SME sector is expected to contribute 41% to the country's GDP by 2020. It is also estimated that the SME sector comprises 99.2% of Malaysia's total businesses and employs a majority of the Malaysia workforce. The eCommerce Service Platform implemented as a part of a Smart Digital Malaysia will allow Malaysian SMEs to compete with multinational competitors on a equal footing. Building their potential customer market and streamlining their supply chain.



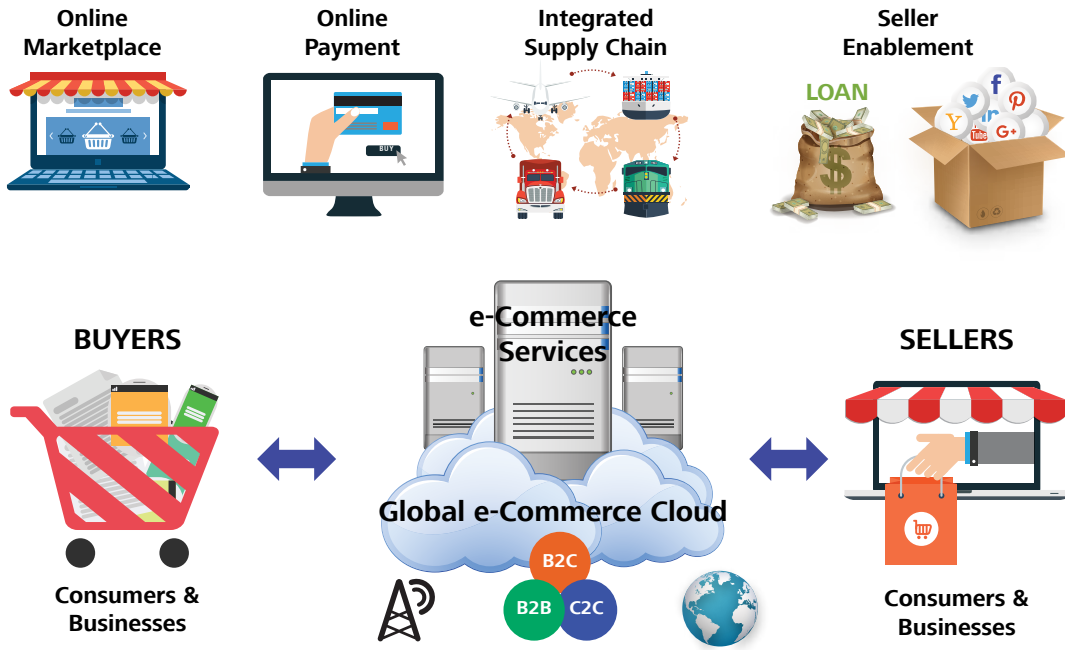


Figure 11 - eCommerce Service Platform

3.4.2. Service Platform Enablers

Underlying many of the processes, applications and Services which a Smart Digital Nation’s Infrastructure provides are Data Centers and Cloud architecture as per the figure below.

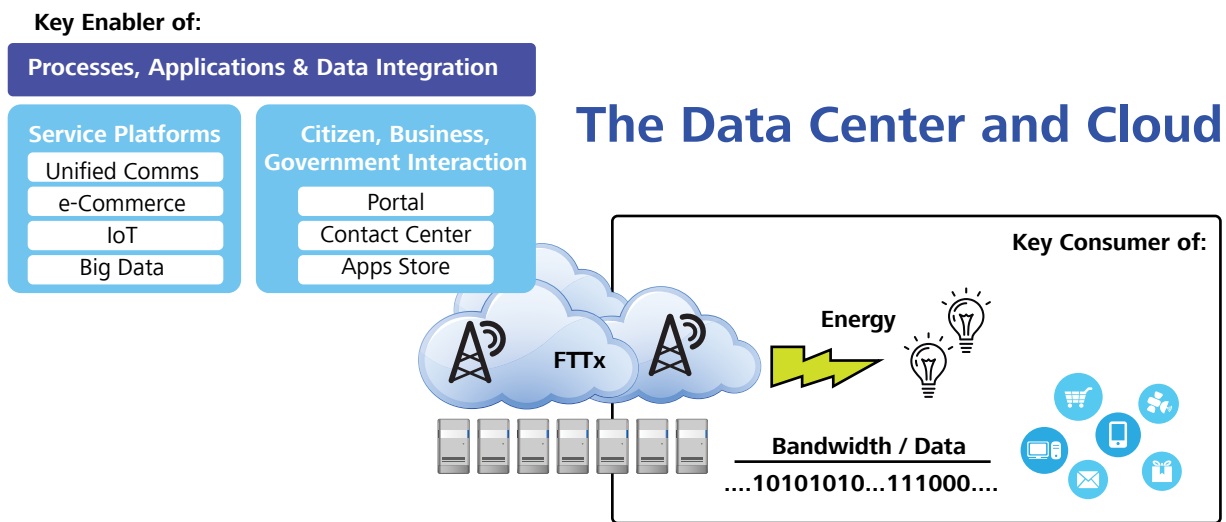


Figure 12 - Data Center and Cloud Service Platform Enablers

3.4.2.1. Data Centers

Data Centers are the physical embodiment of the data generated by Smart Digital Nation infrastructure and services. It is in the Data Center that much of the data is stored and many of the supporting applications, platforms and processes are instantiated. Data Centers also interact with a Smart Digital Nation on a couple of levels.

- **An Enabler.** As the supporting infrastructure enabler for a Smart Digital Nation or City.





- **A Consumer.** Data Centers are a key consumer and user of the Smart Digital Nation infrastructure particularly bandwidth in the form of data and electricity. In this capacity, the potential exists for Data Centers to provide elements of a sustainable energy approach by delivering waste heat to local areas as well as participating actively in the energy demand profile of a region.

#### 3.4.2.2. Cloud Computing

With a strong data center ecosystem established, along with diverse communications and front end access devices the core elements are in place to provide a cloud based architecture to support new products, processes, applications and services wherever and whenever needed. At its simplest, cloud architecture consists of:

- Backend platforms – servers and storage. (The Data Center)
- Frontend platforms (Access Devices)
- The Network (Fixed and Wireless networks)

A cloud architecture as part of an overall Smart Digital Nation approach offers a number of benefits for Malaysia.

- 1. Cost Reduction.** It offers government the potential to achieve massive cost reduction in supporting infrastructure systems, operations and maintenance.
- 2. Improved Accessibility.** It enables business, government and individual stakeholders to offer services in locations and at times that were previously impossible to achieve. For example, 24x7 access to government record renewals etc.
- 3. Economic Expansion.** By enabling an expansion in key sectors of the economy through Smart Nation focus areas such as eCommerce, Transport, Utilities and others; cloud architecture has a significant indirect influence on economic growth and GDP.

### 3.5. Service Access Layer

No Smart Nation infrastructure is complete without the Service Access Layer. It is at this layer that any stakeholders – Users, Business and Government or any application are able to query and access the data provided by the Service Platforms and stored within the Cloud Infrastructure. So, in the context of our Smart Digital Nation, this layer allows diverse information to be accessible by relevant parties for analysis and use. For example, citizens can access up-to-the-minute information via smart devices on everything from local traffic congestion, parking availability or even the pollution index.

#### 3.5.1. Citizen, Business and Government Access

Within a Smart Digital Nation, access to the data is made available to businesses, citizens and government itself. The nature of this access is governed by a number of core requirements:

- **Security.** The data must gathered, stored and released in a secure manner only to those who have rights to that data.
- **Access.** The data must be available when and where needed.
- **Governance.** Access to the data and the formats used to gather, store and retrieve potentially sensitive information must be regulated.

For government this access will provide a Cross Department Data Platform. To eliminate information silos, public ICT platforms will need to consolidate resources across key departments such as, citizen services, transportation, environmental, security, etc. The ability to coordinate across departments is the basis for a significant improvement in overall Smart Digital Nation services efficiency.

#### 3.5.2. Application Access / Service Orchestration

In addition to the access provided to citizens, business and government we must also consider how to provide access for applications to integrate with the generated data and service platforms. Alongside this access there is a need for Service Orchestration which will automate the arrangement, coordination and management of the underlying systems.

In the context of our Smart Digital Nation, an example of Service Orchestration would be analogous to the role of orchestration in cloud computing. In the Cloud Orchestration example a workflow can be created which automates and manages each of the elements needed to bring up a new system or service – it includes all the security policies, server, storage and network elements along with any associated resources. In a Smart Digital Nation a new eGovernment service application could be made live with all of the underlying departmental, processes, ICT resources and approvals automated within the workflow.



## 4. ENABLING THE SMART DIGITAL NATION

In order to deliver on the promise of a Smart Digital Nation, a number of key elements will need to be addressed. Each of these elements combine to assist in the establishment of the common framework which underpins Smart National ICT development. This section of the whitepaper outlines these elements and the role they will play in enabling a Smart Digital Nation.

### 4.1. Policies & Planning

Policy and Planning measures are integral in enabling large scale implementation and roll-out of smart nations. Smart Nations need a structured and executable set of frameworks in order to be able to plan effectively in enabling smart digital transformation. New governance models are required to coordinate and integrate smart nation stakeholders – Authorities, Public & Private Sector Partners, National Service Providers/Carriers, Businesses and citizens. All key Malaysian Smart Nation stakeholders need to collaboratively interwork and learn within this governance and policy framework to achieve the benchmarks of becoming a sustainable Smart Digital Nation.

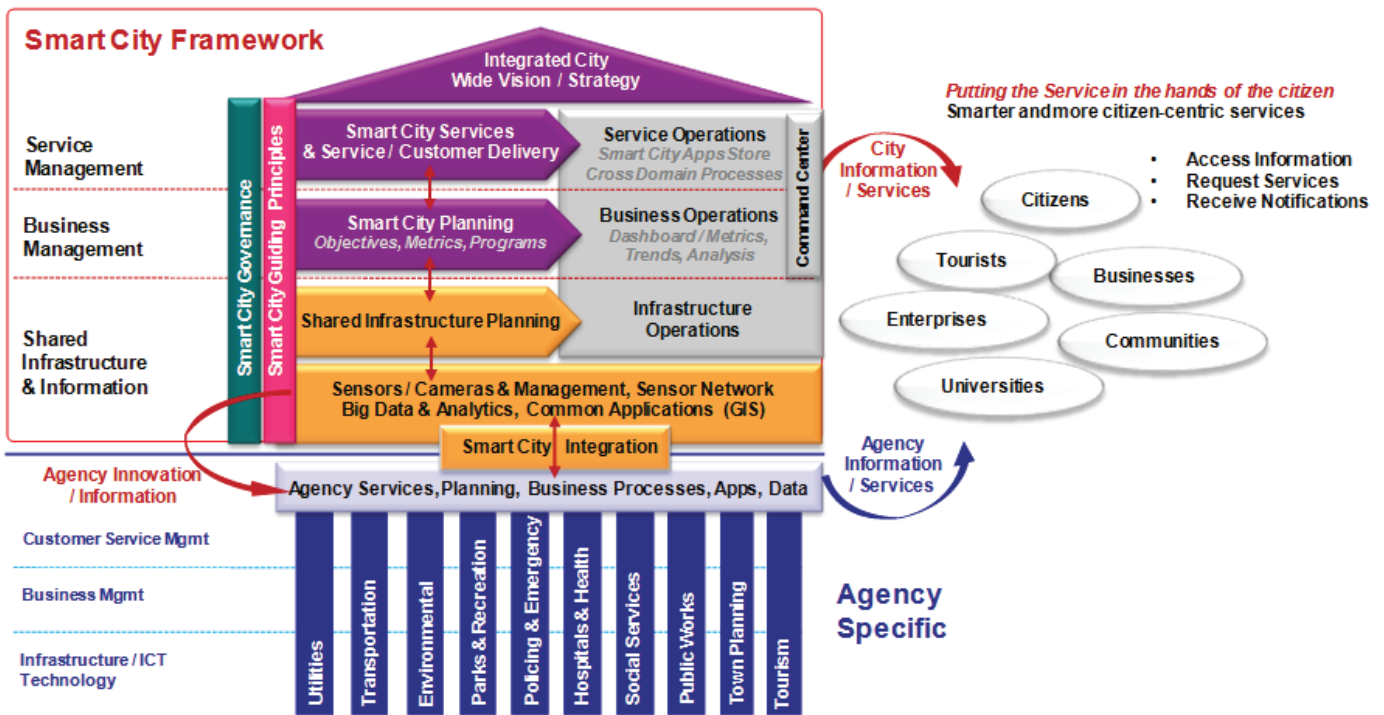


Figure 13 - Smart Nation Policies and Planning

The Smart Nation Policy and Planning Framework supports leadership and governance, business model innovation, and the active role played by all stakeholders in the creation, delivery and use of smart nation services. Its success requires the comprehensive and early involvement of all governmental and non-governmental players, private sector, and citizens. It is particularly challenging as it involves managing long-term planning perspectives and short term actions, addressing domains as diverse as transport, energy, ICT and others.



## 4.2. Organizational Structures

A key step in achieving the vision is establishing a cross domain and cross society organizational authority. This authority is the key to being able to generate and realize a Vision capable of delivering informed decision making, gaining political support and encouraging participation across Government, the Rakyat and private enterprise. There are many different models for such a structure:

- A Steering committee.
- Advisory board.
- Independent committees.
- An appointed authority.
- Executive committees.
- Arbitration bodies.

What each of these organizational structures has in common is that they must be empowered and recognized as acting on behalf of their stakeholders. One of the great challenges for any Smart Digital Nation is that these Stakeholders exist within a wide stratum of society and fall into one of the following categories<sup>5</sup>- Municipalities, City Council and city administration, National and local governments, City services Providers, Utility providers, ICT Companies (Telecom Operators, Start-ups, Software Companies), NGOs, International, Regional and Multilateral Organizations, Industry associations, Academia, research organizations, Citizens and citizen organizations, Urban Planners and Standardization bodies.

## 4.3. Implementation Models

In addition to the Organizational Structure, one must also consider what model of implementation is desired. There are two main approaches – Top Down and Bottom Up. Most successful implementations will use one of these or both in combination. In the figure shown here, you can see the implementation model and its relationship to the various stakeholders.

Top Down approaches are characterized by centralized systems for most Smart Country processes, interactions and initiatives. Top Down approach is characterized by decision making happening at the highest level. Decisions in relation to Smart Country services, processes and participation approaches are then fed down to those below as a fait accompli. The approach typically incorporates many of the infrastructure components which were mentioned above, with the data being fed into a centralized system for use and dispersal amongst accredited users of the data.

Bottom Up approaches on the other hand, tend to embrace citizen or small, nimble, stakeholder led initiatives, processes and projects. By contrast, a bottom up approach embraces citizen led initiatives and data. It is typified by the creation and use of applications and services running upon smart phones and other portable devices to meet needs identified by the user or community groups. The rise and rise of applications and social networks which change the way we live, work and play are prime examples of this approach.

A dual approach combining the organizational structure of a top down method with the nimble nature of the bottom up method is the balanced approach for most scenarios.

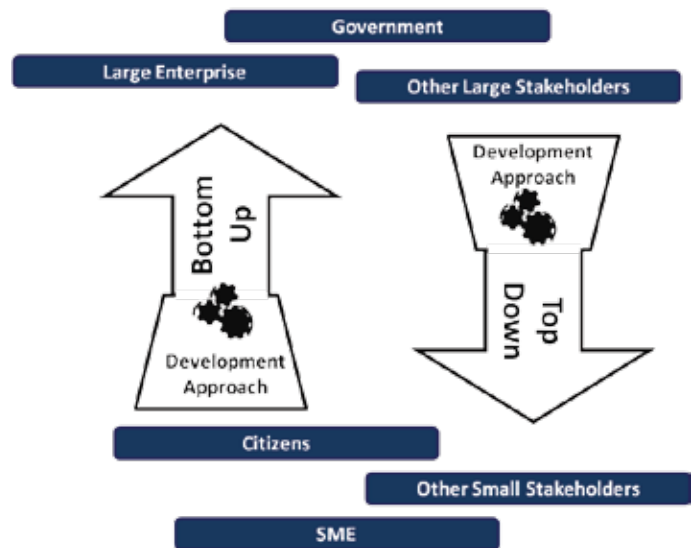


Figure 14 - Top Down and Bottom Up Approaches

<sup>5</sup> ITU-T Focus Group on Smart Sustainable Cities



## 4.4. Governance and Regulation

### 4.4.1. Governance

Smart Digital Nations are, by their very nature, complicated. A Smart Digital Nation involves change, transformation and development across a broad range of Government, private enterprise and community fields. In delivering this change, good governance is absolutely critical. Such governance applies to:

- Governance of the Smart Digital Nation Initiative itself.
- Smart Government and the transformation of governing itself.

Given this, some thought and effort must go into the scope, remit, roles and responsibilities of the organizational authority. Governance issues which must be considered include:

- What powers should be allocated to the authority?
- What are the roles and responsibilities of the authority and other parties?
- What is the scope or remit of each party?
- If pursuing a Bottom Up approach to development, what organizational structure, if any, is to be placed around those activities.
- As outlined above, there may be a need for arbitration of disputes or decision making impasses.

If appropriate governance structures are put in place at an early stage, it will act as a catalyst to the Smart Digital Nation program through the provision of greater certainty and driving investment in the developments. Startups, SMEs and larger enterprises will be empowered to invest money and resources. Individuals and other stakeholders will be empowered to invest their time and Government will see direct political benefit from its involvement.

### 4.4.2. Regulation

There are a number of regulatory considerations with respect to any Smart Digital Nation initiative. Like Governance, Regulation can also act as a catalyst creating certainty and driving investment across stakeholders and participants. In the figure below, we can see the key elements of regulation which must be considered.

**Regulation of Governance.** Once the organizational structures, roles and responsibilities are understood, we need to consider if each party is sufficiently empowered under the law to act in accordance with those responsibilities. In addition, other key considerations are – Decision Making and Authority, Arbitration or Dispute Resolution, Accountability and Enforcement.

- Regulation of Data and Security. Key questions to be answered here include - who owns the data, who, can access the data, how long should the data be held and where.
- Regulation of the Smart Country Ecosystem. Enablement regulation refers to any regulation which supports progress towards specific goals of the Smart Digital Nation initiative. It also refers to regulation put in place to support the financial and operating models of the initiative. Any regulation also needs to conform to the international standards and existing laws. Some best practices may be adapted to the local context.

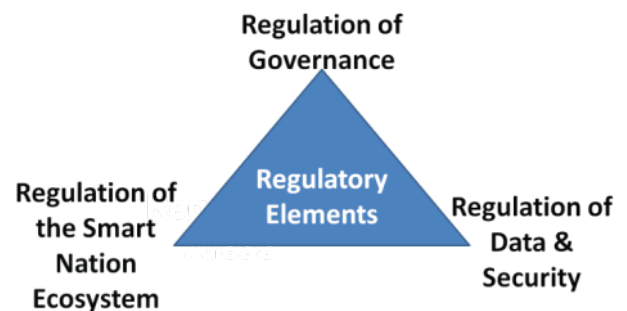


Figure 15 - Regulatory Considerations



#### 4.5. Operational and Financial Models

Having the right financial model or suite of models has an important part to play in encouraging innovative new businesses and thinking. It allows individuals and businesses to make investments with some certainty with regards to evaluating whether a return on investment will be possible. On the operational side, it is also important for stakeholders to understand the model of operations as this has important implications with respect to the implementation of a consistent or at least compatible suite of technologies and services. A variety of financial models exist to meet the needs of any Smart Digital Nation initiative such as:

- **Public Private Partnership** utilizing methods such as - Build Operate Transfer, Build Operate Comply, Municipal Owned Deployment. Public-private partnerships (PPP) are an important mechanism in realizing smart digital nation transformation visions and outcomes. A PPP can enable faster delivery of services to city stakeholders and give Public authorities a guarantee of the quality and reliability of services.
- **Crowdfunding.** Many Smart Digital Nation projects are often niche or point solutions to problems identified by small business, SME or individuals. These types of initiatives are characterized by the rapidity in which they are conceptualized, designed, developed, implemented and terminated. With this life cycle in mind, crowdfunding offers a good model for small project financing.
- **Fiscal Incentives.** Along with the models outlined above, a Smart Digital Nation can also have fiscal incentives put in place to encourage investment within specifically identified areas.

Operational Models include:

- **The Shared Service Model.** A common mode of operations applied across the areas of priority above is the Shared Service Model for government. Within this model, the services, application and infrastructure requirements are shared and operated as a shared service by Government or a partner entity on behalf of Government as part of a broader integrated nationwide vision and strategy. This is one key element in gaining cost efficiencies across Government.
- **ICT Ownership Models.** Given that many of the infrastructure elements are complex and require delivery capabilities across a large area (ie. a nation), it is often advantageous to seek the involvement of partners who may assist in delivering those services. One example of this shared service model is to partner with a telecommunications carrier in the provision of network communications.



## 5. SUMMARY

In summary, the transition of a country into a Better Connected Smart Digital Nation, is one which has immense benefits for the entire populace. It leads to the creation of large numbers of high paying jobs in the new digital economy and the transformation and expansion of existing industries in the old economy. It enhances the quality of life of citizens and ensures that economic benefits are equally shared between rural and urban areas. Finally, it enhances the competitiveness of businesses both small and large. In order to successfully make this transition, one must follow a process which is designed to maximize the potential for success and minimize the risk of failure. In this whitepaper we have outlined such a process, it involves:

- **Evaluating the current situation** using an objective scoring like Huawei Global Connectivity Index.
- **Establishing a blueprint strategy** for ICT in the context of a Smart Digital Nation.
- **Understanding each of the infrastructure layers** which are involved in enabling that ICT strategy. In addition, this understanding must encompass how to implement those layers most effectively and what challenges exist to that implementation.

In conjunction with the ICT blueprint one must also ensure that a broader Vision and framework is in place to enable the technical elements. This broader Vision must include:

- **Policies and Planning** to ensure consistency across Government.
- **Organization Structures** to provide a framework of management.
- **Implementation models** to ensure that the Vision benefits from a combined Top Down and Bottom Up approach -enabling the Vision to be led from the top and enabled by citizens and stakeholders from below.
- **Governance and Regulation** to ensure that the framework can be enforced and giving certainty to investment by business in the new services which will be created.
- **Operational and Financial models** which enable investment and increase acceptance by the citizens, business and Government itself.

With the above elements in place, a Smart Digital Nation can deliver on the promise of the new digital economy resulting in a more prosperous, healthy and happy future for the entire nation and its people.



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