ICT Initiatives to Realise the Long Term National Development Plan in Brunei Darussalam

Yeoul Hwangbo
Hjh Syamimi binti Hj Md Ariff Lim

Abstract
The national vision known as Wawasan Brunei 2035 aims to make Brunei Darussalam by 2035, a nation which will be widely recognised for (i) the accomplishment of its educated and highly skilled people as measured by the highest international standards; (ii) quality of life that is among the top 10 nations; and (iii) a dynamic and sustainable economy with income per capita within the top 10 countries in the world, without having to rely on natural resources. Knowledge based economy (KBE) is required to be established to lay the foundation of Wawasan 2035. In the context of KBE, the researchers reviewed the 8th, 9th, and 10th National Development Plans between 2001 and 2017 and examined enabling ICTs to realise Wawasan 2035. Against this backdrop, a qualitative analysis is conducted and three major ICT thrusts are identified as (i) innovating the Government, (ii) economic diversification, and (iii) promoting ICT industry. The corporate structure is proposed so that three ICT pillars - initiated by the EGNC, the BEDB, and the AITI - can be closely linked to create the maximum synergy effects. In order to manage ICT experience and knowledge from overseas experts in an effective way, it is needed to establish knowledge management system (KMS) with focus on facilitating knowledge transfer to the Brunei Darussalam.

(Key Words) Brunei, Economic Diversification, ICT, National Development Plan

I. Introduction

Brunei Darussalam\(^1\) is one of the highest GDP per capita among Asian countries and
has already achieved most of the targets in the UN Millennium Development goals.\(^2\) The economy of the country has been maintained by fossils fuel such as oil and natural gas, which account for around 90% of exports and 54% of GDP. The oil and gas industry has been the mainstay of the economy in Brunei Darussalam but can only provide 3% of job opportunities for the whole population. In addition, the public sectors including the Government which account for more than half of domestic employment are unlikely to come up with the population growth of Brunei Darussalam in the near-future and private sector cannot create job opportunities due to its weakness. Furthermore, fossil fuels are not renewable energy and are supposed to be exhausted over the long haul. The Government of Brunei Darussalam accordingly recognise the above-mentioned possible risks due to too much reliance on natural resources and drive the economic diversification in the Wawasan 2035, the long-term national development plan, in an attempt to formulate the future industry structure. In this aspect, Info-Communication Technology (ICT) has been identified not only as one of the key catalysts for sustainable socio-economic development, but also as a major industry for economic diversification. ICT sector was included for the first time in the 8th National Development Plan (2001-2005), continued to be expedited in the 9th National Development Plan (2007-2012), and will be given top priority in the 10th National Development Plan (2013-2017). This study (i) explores the government efforts in developing ICT as part of the national development; (ii) analyses ICT initiatives for realising Wawasan 2035; and (iii) attempts to build a corporate architecture to incorporate various ICT initiatives into a comprehensive framework.

1) The country is on north coast of the South China sea in Borneo island and bordered by the Malaysian state of Sarawak. The country with 5,765 sq km, has a tropical climate and is more or less hot and humidity throughout much of the year with average temperature ranging from 24 oC and 30 oC, http://www.mapsofworld.com/brunei/geography/climate.html

2) The millennium goals include (i) end poverty and hunger, (ii) universal education, (iii) gender equality, (iv) maternal health, (v) combat HIV/AIDS, (vi) environmental sustainability, and (vii) global partnership. http://www.un.org/millenniumgoals/
II. Wawasan 2035 to Overcome its Challenges

1. Challenges

As seen in Table 1, Brunei Darussalam, today enjoys one of the highest standards of living in Asia. The table shows (i) the highest macroeconomic stability in the world, (ii) one of highest per capita income in ASEAN, (iii) 4th largest oil producer in ASEAN, (iv) 9th largest LNG exporter in the world, and (v) one of the lowest inflation rates in the world – 2.7%.

In the context of national wealth, its per capita income is one of the highest in Asia. Its standards of education and health are among the highest in the developing world. Nonetheless, Brunei Darussalam achieved only 2.6% economic growth in 2010 and remains a low growth country, which is due to the global economic downturn triggered by the U.S., and European countries. The recent economic situation is likely to be caused by external but endogenous factors. Likewise, the country has been categorised as a high income country by World Bank and OECD, owing to fossil resources accounting for two thirds in the GDP and 97% of whole export products. Owing to economic richness, the government manages surplus budget originated from corporate tax and dividend, not levying income and consumption taxes. However, this oil and gas industry has not contributed to increasing employment in Brunei Darussalam and private sectors excluding the oil and gas industry account only for 20% of GDP, showing their weakness, which is a continuing challenge. Moreover, excessive reliance on a single sector might not be desirable for a long term economic development.

5) WTO, op., cit.
6) WEF, op., cit.
### Table 1 Overall Indicators of Brunei Darussalam

<table>
<thead>
<tr>
<th>Geographic</th>
<th>Land Size</th>
<th>5,765 km²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coastline</td>
<td>161 km</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>Over 70% of total land area</td>
</tr>
<tr>
<td>Climate</td>
<td>Tropical</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Population</td>
<td>401,890 (July 2011)</td>
</tr>
<tr>
<td>Language</td>
<td>Malay/English</td>
<td></td>
</tr>
<tr>
<td>Labour Force</td>
<td>198,800</td>
<td></td>
</tr>
<tr>
<td>Unemployment</td>
<td>2.7% (2008)</td>
<td></td>
</tr>
<tr>
<td>Main Religion</td>
<td>Muslim (67%), Buddhist (13%), Christian (10%)</td>
<td></td>
</tr>
<tr>
<td>Economic</td>
<td>GDP</td>
<td>16,291 million USD (2010, IMF)</td>
</tr>
<tr>
<td></td>
<td>GDP per capita</td>
<td>40,536 USD (2010, IMF)</td>
</tr>
<tr>
<td></td>
<td>GDP growth rate</td>
<td>2.6% (2010, The Government Statistics)</td>
</tr>
<tr>
<td></td>
<td>Consumer Price Index</td>
<td>2.1% (2008), 1.0% (2009), 0.4% (2010) The Government Statistics</td>
</tr>
<tr>
<td>Oil and Gas</td>
<td>Oil production</td>
<td>170,000 barrels per day (2010)</td>
</tr>
<tr>
<td></td>
<td>Oil Exports</td>
<td>144,315 barrels per day (2010)</td>
</tr>
<tr>
<td></td>
<td>Gas Production</td>
<td>1,208 MMscf per day (2010)</td>
</tr>
<tr>
<td></td>
<td>LNG Exports</td>
<td>934,860 MMbtu per day (2010)</td>
</tr>
<tr>
<td></td>
<td>Methanol Export</td>
<td>128,489,853 tpa</td>
</tr>
</tbody>
</table>

*Source* International Monetary Fund, IMF Country Report No.10/134, May 2010 and Oxford Business Group, the report of Brunei Darussalam

### 2. WAWASAN 2035

In order to overcome the above-mentioned challenges, a new long-term development framework was formulated for a 30-year period which begins in 2007, consisting of the national vision, the outline of strategies and policies for development and national development plan (RKN). The national vision known as Wawasan Brunei 2035, aims to make Brunei Darussalam, by 2035, a nation which will be widely recognised for (i) the accomplishment of its educated and highly skilled people as measured by the highest international standards; (ii) quality of life that is among the top 10 nations; and (iii) a dynamic and sustainable economy with income per capita within the top 10 countries in the world, without having to rely on natural resources. In order to ensure the accomplishment of the above three main goals -qualified human resource, high quality of life, and
sustainable economy and implement all aspect of development in systematic and effective way, the Government has recognised the importance of knowledge and mapped out the multi-dimensional development and the cross-cutting policies and programmes in the long term development plan.

\[\text{Widening the economic base and strengthening the foundation for a knowledge-based economy (KBE), where knowledge, creativity, and innovation play key roles in generating and sustaining growth. Knowledge based economy will be used as the vehicle to push the economic diversification agenda forward.}^8\]

III. ICT initiatives in the National Development Plan

ICT can be harnessed not just for innovating the Government, but for achieving national development purposes. The Government has accordingly implemented various ICT projects, with particular emphasis on e-Government projects while implementing the 8th, 9th, and 10th National Development Plan, taking into account that ICT is one of the most effective tools to establish the knowledge based economy that the Wawasan 2035 pursues.

1. The 8th National Development Plan (2001-2005)

In 2000, The government set out the national IT strategic plan IT for facilitating ICT utilisation. The strategic plan addressed ICT initiatives\(^9\) comprising (i) e-Government, (ii) e-Business, and (iii) e-Brunei.

In order for the country to enter into Knowledge Based Economy (KBE), ICT was given top priority in the 8th National Development Plan (8th NDP) with a total scheme

---

8) Prime Minister’s Office, Long-Term Development Plan, 2007
9) Despite all the ICT initiatives, only e-Government is more highlighted than e-Business and e-Brunei.
value of about 900 million USD or about 15.3 per cent of the total development allocation where the major bulk of the allocation around 777 million USD or 86 per cent was for programmes and projects under the e-Government initiatives, with aim to enhance productivity and efficiency in the public administration.

In February 2001, the Government has formed e-Government Program Executive Committee (EGPEC) to function in an advisory and consultative capacity to the Brunei Info-communication Technology (BIT) Council for the development and implementation of the e-Government initiatives. In addition, the e-Government Policy, Strategic and Coordinating Working Group (EgSPEC) was formed in Jun 2002 to assist EgSPEC and coordinate policies and strategies in implementing e-Government projects.

In an effort to create a more conducive environment for the development of ICT related industries, 3 new legislations were enacted during the 8th NDP namely: (i) Telecommunication Successor Company Order, 2001; (ii) Authority for Info-Communication Technology Industry of Brunei Darussalam (AITI) Order, 2001; and (iii) Telecommunication Order, 2001.

Brunei National Computer Emergency Response Team (BruCERT) was established on 1st January 2001. The Info-Communication Technology Protection and Security Services (ITPSS) Sdn Bhd is tasked to carry out the functions of BruCERT. Among the functions are to serve as the nation’s point of reference for coordination, collaboration, and communication with other international Computer Emergency Response Team (CERT), and to increase public awareness and understanding of information security through seminar, workshop, and training.

SME innovation Centre was established in August 2006 for the development of ICT industry in the country. Brunei Economic Development Board (BEDB) initiated the centre, which aimed to: (i) identify and support high potential ICT starts-up; (ii) nurture innovative technology ideas into commercial successes; (iii) facilitate growth in employment revenue and exports of the ICT start-ups; and (iv) assist ICT start-ups to secure finance and other supports from third parties including venture capitalists and private investor.

However, the implementation of the ICT programmes and projects was constrained by both human resource and institutional capacity in the public and private sectors. The
shortage of skilled and qualified local ICT workers causes heavy reliance on foreign IT companies and experts.


Subsequent to the 8th NDP, ICT related projects are further developed, focusing on the following in the 9th National Development Plan (9th NDP) between 2007 and 2012:

• **ICT integration/Online Services.** The e-Government programmes aimed to fully integrate ICT into the overall business processes including the provisions of citizen centric online services.

• **Human and Industrial Capacity Building.** About 185 million USD had been allocated to further enhance the human capacity building for organizing IT professional courses; and ICT competency programs. In addition, all the government schools in the country were to be connected to the Internet facilities. To further enhance the institutional capacity, a review and formulation of e-Commerce policy, legislative framework and regulations were undertaken. This included: (i) reviewing existing e-Business related laws including Electronic Transaction Order 2001 and Intellectual Property Rights; and (ii) formulating a framework of law and regulation for the knowledge based economy.

• **e-Business to enhance local Small and Medium Enterprises (SMEs).** A total of 185 million USD had been allocated under e-Business programs to further develop SMEs in the country. The commissioning of a feasibility study for eco-cyber park will help Brunei Darussalam in its efforts to create a strategic cluster of leading IT companies and critical mass of potentials in Brunei Darussalam. This could attract FDI to the country and hence indirectly help in strengthening the private sector.

During this period, the Government was keen to integrate ICT in the provision of e-Services and build human and industrial capacity and achieved the goals successfully in
certain areas, but e-Business could not be viewed as successful due to the relatively small market size as inferred from small population amounting to 401,890 as of July 2011 (refer to <Table 1>).


Like the 8th NDP and 9th NDP, ICT and e-Government continues to be highlighted and will be on-going tasks in the 10th National Development Plan (NDP) between 2013 and 2017. In order to ensure fast network speed and broad bandwidth in the country, it is emphasised that existing cable will be replaced by optical fibre.  

*His majesty the Sultan and Yang Di-Perturan of Brunei Darussalam called on relevant groups to step up their efforts in ensuring that the Internet and other ICT facilities in the country are used in the right way. The monarchy said that he has consented to a budget allocation of $230 million, under the latest 10th National Development Plan (RKN10), for the Ministry of Communications to implement the nationwide fibre-to-the-home (FTTH) project, which will provide the country with comprehensive bandwidth infrastructure. “Undoubtedly, this will lead to the development of better quality Internet (that will be) affordable to the public.” His majesty said, adding that it will also increase Brunei’s competitiveness in attracting foreign direct investment (FDI). His majesty pointed out that the RKN10 was the second national development plan to help Brunei realize Wawasan 2035 (Vision 2035) and thus, stressed the importance of completing RKN10 projects on time.*


11) Brunei is committed to developing the ICT sectors, as the technical infrastructure that Brunei has invested in and development. The SEA-ME-WE3 submarine cable system is diversified and backed up through a land based transmission system, namely the Trans-Borneo Optical Fibre System as well as the Intelsat Satellite Network and a New TelePort at Telisai Earth Station. Network capacity is further enhanced by the Asia America Gateway (AAS) Submarine Cable System, which would be the first direct terabit submarine cable network between Southeast Asia and the United States spanning over 20,000 km. In addition to providing full network diversity from the existing SEA-ME-WE#, Trans-Borneo Cable as well as the satellite system, AAG would provide a seamless direct link between Brunei and the United States as well as other Asian countries via one single cable.
The 10th NDP will continue to implement e-Government related projects for streamlining the government processes. One of the initiatives is the e-Darussalam portal as the government portal for citizens and business in the country. The portal aims to integrate all e-government services online so that all parties can access information quickly and accurately.

Forthcoming ICT projects are expected to be implemented during the 10th NDP as shown in Table 2.

**Table 2** Forthcoming ICT Projects during the 10th National Development Plan

<table>
<thead>
<tr>
<th>Ministries</th>
<th>Forthcoming projects</th>
</tr>
</thead>
</table>
| Prime Minister’ Office (PMO) | -Capacity and services information centre  
-Expansion of PMONET Infrastructure for Royal Brunei Police Force, Phase II  
-E-Government Services Agency (EGAS)  
-E-Forensics and Cyber Supervision of the Royal Brunei Police Force  
-Narcotics Information System  
-Performance Management Information System  
-National Invitation Management System |
| Ministry of Defence (MINDEF) | -E-Defence Infrastructure  
-E-Government Services Agency (EGAS) |
| Ministry of Finance (MOF) | -E-Government Services Agency (EGAS) |
| Ministry of Foreign Affairs and Trade (MOFAT) | -E-Government Services Agency (EGAS)  
-e-Consular system |
| Ministry of Home Affairs (MOHA) | -E-Government Services Agency (EGAS)  
-Labour Market Information System |
| Ministry of Education (MOE) | -E-Service Infrastructure Phase II-Replacement Computer Hardware for Primary and All Secondary Schools  
-Interactive White Board for Teaching and Learning II  
-ICT and Training Laboratory  
-ICT hardware and software devices for the Ministry of Education of New Headquarters  
-E-Government Services Agency (EGAS)  
-ICT projects Institute of Technology Brunei  
-College ICT projects Seri Begawan Religious Teachers University  
-Co-Curriculum Management System II |
| Ministry of Industry and Primary Resource (MIPR) | -E-Government Services Agency (EGAS)  
-Fishing Vessel Monitoring System |

12) The Brunei Times, 16 July 2012
### IV. Three Pillars of ICT initiatives for National Development

It is worth noting that ICT has continuously been developed and implemented in the 8th, 9th, and 10th National Development Plans. In order to know how the ICT has been positioned as part of national development plan, the researchers examined the national development plans and ensuing implementations through reviewing the government

| Ministry of Religious Affairs (MORA) | E-Government Services Agency (EGAS) |
| Ministry of Culture, Youth, and Sports (MCYS) | E-Government Services Agency (EGAS) |
| Ministry of Health (MOH) | E-Government Services Agency (EGAS) |
| Ministry of Communication (MOC) | ICT Infrastructure in Rural New Representative and Extension System - Phase II of the IT Network Infrastructure, Data Collection and Monitoring System for Road Safety, E-Government Services Agency (EGAS) - Ministry of Communications, Marine Protected Areas Management System |
| Court | Use of Audio Visual Technology in Civil Court and Syariah Court, Electronic Case Management System of the Judiciary, Court Management System |
| EGNC | Remote Disaster Recovery Facility, Data Information Storage Installation Planning (Phase II), IT hardware and software device - Phase IV, Disaster Recovery Centre at the National Centre with Hardware, Software and Related Accessories |
| AITI | ICT Business Development in Brunei Darussalam-Provision of Public Key Infrastructure, ICT and the Scheme of Control program Its development of e-Business Industry, Development Programme of Radio Frequency Identification Technology|
| BEDB | Multimedia Development |

(Source: Jabatan Perancangan dan Kemajuan Ekonomi, Rancangan Kemajuan Negara Ke Sepuluh, 2012)
documents and interviews with the related agencies.

As a result, the following three pillars of ICT initiatives can be identified: (i) innovating and modernising the government, (ii) economic diversification, and (iii) promoting ICT industry. These different initiatives have overlapped scope and tasks to some extent and separate approach therefore may neglect mutual interactions among the three pillars, making it difficult for the country to reap the synergy benefits from the national-wide perspective.

1. Innovating the Government through e-Government Initiatives

In the e-government readiness index, Brunei Darussalam has been ranked 55th, 63rd, 73rd, 87th, 68th, and 54th, respectively in 2003, 2004, 2005, 2008, 2010, and 2012 (refer to Table 1) and currently positioned as the upper middle countries among UN members countries. Human capital index has relatively high figures while web measure is low. When examining the factors affecting the country ranking and e-Government in Brunei has continuously been improved since 2008 as shown in <Table 3>.

<table>
<thead>
<tr>
<th>Year</th>
<th>Rank/Countries</th>
<th>Web Measure or Online Service (Rank/Countries)</th>
<th>Telecom Index (Rank/Countries)</th>
<th>Human Capital Index (Rank/Countries) e-Gov't</th>
<th>Development Index(EGDI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>55/191</td>
<td>0.266</td>
<td>0.250</td>
<td>0.860</td>
<td>0.459</td>
</tr>
<tr>
<td>2004</td>
<td>63/191</td>
<td>0.266</td>
<td>0.233</td>
<td>0.890</td>
<td>0.463</td>
</tr>
<tr>
<td>2005</td>
<td>73/191</td>
<td>0.246</td>
<td>0.226</td>
<td>0.870</td>
<td>0.448</td>
</tr>
<tr>
<td>2008</td>
<td>87/192</td>
<td>0.264</td>
<td>0.256</td>
<td>0.876</td>
<td>0.467</td>
</tr>
<tr>
<td>2010</td>
<td>68/192</td>
<td>(88/192)(^a)</td>
<td>(67/192)(^a)</td>
<td>(63/192)(^a)</td>
<td>0.479</td>
</tr>
<tr>
<td>2012</td>
<td>54/190</td>
<td>(0.5948)(^a)</td>
<td>0.455</td>
<td>0.825</td>
<td>0.625</td>
</tr>
</tbody>
</table>

\(^a\): Ranking, \(^b\): Online Service
(Source: Data obtained from UN E-Government Surveys between 2003 and 2012)

14) The interviews have been conducted with AITI, BEDB, and EGNC.
The vision of Wawasan Brunei 2035 is to achieve dynamic and sustainable economy to bring the highest quality of life in the world with highly educated and skilled people. The country is being shifted to a knowledge-based economy (KBE) through developing and implementing e-Government projects. To meet the requirements of KBE, e-Government has been exploited and utilised to modernize the Government by ensuring efficiency and transparency, and providing citizen oriented e-services. Recognizing the importance of e-Government, the Government has spearheaded e-Government initiatives to establish KBE in the 8th, 9th, and 10th National Development Plan between 2001 and 2017. The implementation strategies and programmes during the 8th NDP were modest due to the fact that ICT sector is relatively new. However, efforts were further intensified in the 9th NDP (2007-2012) to accelerate the development of this sector. The focus is not only the provision of basic ICT infrastructure, but also sophisticated e-services for the citizens (e.g., e-Brunei Darussalam was launched as a citizen portal in 2011). Likewise, considerable achievements have been made and the Government started rolling out of e-services under the constantly changing ICT environment.

Meantime, the Government set ‘the e-Government strategic plan 2009 and 2014’ with strategic priorities including (i) developing capabilities and capacities (strategic priority 1); (ii) enhancing governance (strategic priority 2); (iii) strengthening security and trust (strategic priority 3); (iv) integrating the Government (strategic priority 4); and (v) delivering integrated, accessible and convenient e-Services (strategic priority 5). <Table 4>.
ICT Initiatives to Realise the Long Term National Development Plan in Brunei Darussalam

〈Table 4〉 Key Strategic Priorities

<table>
<thead>
<tr>
<th>Strategic Priorities</th>
<th>SP1 Developing Capabilities and Capacity</th>
<th>SP2 Enhancing Governance</th>
<th>SP3 Strengthening Security and Trust</th>
<th>SP4 Integrating the Government</th>
<th>SP5 Delivering Integrated Accessible and Convenient e-Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programmes</td>
<td>SP 1.1 ICT Skills Development and Accreditation</td>
<td>SP 2.1 ICT Governance</td>
<td>SP 3.1 ICT Security</td>
<td>SP 4.1 Collaborative Environment</td>
<td>SP 5.1 Government e-Services Delivery</td>
</tr>
<tr>
<td></td>
<td>SP 1.2 ICT Human Resource Development</td>
<td>SP 2.2 ICT Management</td>
<td>SP 3.2 ICT Security Awareness</td>
<td>SP 4.2 Common Applications</td>
<td>SP 5.2 Outreach and Awareness</td>
</tr>
<tr>
<td></td>
<td>SP 1.3 Awareness Programme for Civil Service</td>
<td>SP 2.3 Legal Framework</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SP 4.3 e-Government Infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SP 4.4 Information Hubs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SP 4.5 Shared e-Services Initiatives</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

So as to implement e-Government from the government wide perspective, multi agencies or stakeholders are involved in the e-Government initiatives as shown in <Figure 1>. These include prime minister’s office (PMO), e-Government leadership forum, e-Government National Centre (EGNC), ministries, e-Government innovation centre (eG.InC), and CIO dialogue.
There are major stakeholders involved in ICT governance and e-Government initiatives in Brunei Darussalam as shown in Figure 1.

From the perspective of supreme decision makers in initiating e-Government, Prime minister’s office (PMO) is positioned to initiate, lead, and harmonise with other ministries and has acted as a centralised coordination unit in initiating e-Government. All the
ministries have to follow overall guidance from PMO that acts as the coordination unit in developing e-Government, while e-Government Leadership Forum (EGLF) has been the steering committee of e-Government in the country and continues to function as the major decision maker associated with e-Government initiatives. These include to: (i) make policy and map out plan on e-Government; (ii) approve e-Government projects proposed by ministries; and (iii) approve e-Government guideline, manual, and practices. Energy minister of PMO is the chairman of the EGLF. PMO is given the lead so that e-Government can be given high level support. The members are Permanent Secretaries (Perm Sec) from all the ministries and the committee is held four times a year on a regular basis, but ad-hoc meeting is allowed if special issues occur. There are 12 ministries including prime minister’s office. Ministries identify the e-Government projects and submit proposals to the EGNC for approval and the EGNC subsequently review and adjust the e-Government proposals from the perspective of the whole government. The ministries will also conduct tender processing for award of projects.

In the level of implementing e-Government, e-Government National Centre (EGNC) under PMO, plays various key roles in implementing e-Government. These include: (i) e-Government policy implementation, (ii) e-Government project management, (iii) ICT human resource management, (iv) providing common platform and services, and (v) Training ICT government employees. In association with e-Government project management, the EGNC has conducted major tasks comprising (i) reviewing e-Government projects proposed by respective ministries, (ii) examining request for proposal (RFP), (iii) processing invitation to tender, and (iv) contracting with tender awardee. As cross-ministries projects are recently highlighted, back-office integration is being established for facilitating inter-operability and common services. However, some tasks requiring expertise and specialty in certain area have been or being outsourced to foreign agency if/when necessary. Added to this, the CIO Dialogue is the regular meeting for sharing experiences and acquiring knowledge on

emerging ICT issues.

For Building ICT human capacities and capabilities, e-Government Innovation Centre (eG.InC) was established in June 2011 under Universiti Brunei Darussalam (UBD) and has played the role in training the government employees, conducting the research, and organising forum associated with e-Government and emerging ICT issues. Additionally, the eG.InC has acted as a think tank and advised the Government on e-Government policy, technology, and practices. There have been two batches of e-Government executive training for CIO and CTO, and another round of e-Government awareness programme for permanent and deputy permanent secretary in 2011. As of 2012, the eG.InC expedites the plan to conduct the training for general senior and middle managers working in the front-office to be equipped with relevant knowledge and skills for fulfilling their responsibility in the provision of e-services in an effective way.

In order to identify key stakeholders involved in e-Government project management, it is worth noting the interactions of the above mentioned e-Government stakeholders. Bottom-up approach has been put in practice in selecting e-Government projects and the EGNC function as a coordination unit empowered by PMO, resulting in decentralized e-Government implementation in the level of ministry. Recognising the importance of common services, the EGNC now takes leading role in initiating e-Government projects, and decentralized project management has been changed into more centralized project management. In this regard, the EGNC identified flagship projects requiring the involvement of multi-agencies. The flagship projects include: (i) e-Darussalam, (ii) e-Payment, (iii) online business licensing (BLS), (iv) Government Employee Management System (GEMS), and (v) Treasury Administration Fiscal Information System (TAFIS). As a result, the existing bottom approach has been supplemented by a top-down approach.

The processes of e-Government project management comprised of (i) project planning through consorted efforts between the EGNC and the respective ministries, (ii) contracting with vendors and implementation to be completed by respective ministries, (iii) payment to be conducted by the ministry of finance (MOF), and (iv) management of deliverables.
2. ICT for Economic Diversification initiated by the Brunei Economic Development Board (BEDB)

The BEDB was established in 2001, with the objective to diversify Brunei’s economy in an effort to break away from oil and gas industry. As the lead economic development agency in the country, the BEDB is to attract inward foreign direct investment (FDI) and to develop new and sustainable economic opportunities.\(^\text{16}\)

The BEDB set high value on the export-oriented manufacturing and services sectors that have the potentials to bring value added activities to Brunei and create spin-off opportunities. The BEDB has sorted out several key industry clusters, considering specific conditions in the country, particularly its location, its resources and existing competitive industries.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|l|}
\hline
\textbf{Classification} & \textbf{Cluster} & \textbf{Industry} \\
\hline
Manufacturing & Non Oil and Gas & Pharmaceuticals, Component Manufacturing and Assembly \\
& Oil and Gas & Petrochemicals, Integrated Petrochemical Refinery, Renewable Energy \\
Services & ICT & Datacentre and Disaster Recovery Centre \\
& Supporting Industries & Logistics \\
\hline
\end{tabular}
\caption{Industry clusters for economic diversification}
\end{table}

The government has highlighted data centre as a regional ICT hub. For this reason, Brunei, strategically located within Asia Pacific and the Bimp-Eaga\(^\text{17}\) region, is considered

\[\text{Footnotes:}
\begin{enumerate}
\item[16] The Brunei Economic Development Board (BEDB), Presentation: Business Opportunities in Brunei, 12 May 2012.
\item[17] BIMP-EAGA was formally launched on March 24, 1994 as the expansion of economic cooperation among the border areas of Brunei Darussalam, Indonesia, Malaysia and the Philippines. Covering a land area of 1.54 million square kilometers and a population of some 70 million, BIMP-EAGA is perhaps Southeast Asia’s last frontier. Its focus areas have not yet fully participated in the rapid growth which has taken place in many other areas of Southeast Asia, and its potential for further development in trade, investments, and tourism remains vast and varied, http://www.bimp-eaga.org/Pages/Content.aspx?cid=16
\end{enumerate}\]
as a stable, secure, and safe country in terms of natural disasters and political security. Thus, driving the industry forward continues to be a top priority. Leveraging on its strategic and secure spot within the region, the country has expedited various ICT projects such as data and disaster recovery centre, software development, wireless communication, and multimedia operators. Likewise, the ICT programme has also kicked into gear and the BEDB has been working to upgrade the country’s infrastructure to keep pace with the growing demand for bandwidth.\(^{18}\) Table 6 shows the national data centre outline.

### Table 6 National Data Centre to be built

<table>
<thead>
<tr>
<th>Classification</th>
<th>Proposed Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Name</td>
<td>Rimba</td>
</tr>
<tr>
<td>Location/Address (Street, City, District)</td>
<td>Adjacent to Tungku Link Highway in the capital city, Bandar Seri Begawan in the Brunei Muara District.</td>
</tr>
<tr>
<td>Owner name</td>
<td>The Government of Brunei Darussalam</td>
</tr>
<tr>
<td>Total Area of Site (hectares)</td>
<td>Approx. 32 hectares</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Approx. 900m x 400m</td>
</tr>
<tr>
<td>Adjacent/Surrounding Uses/Tenants</td>
<td>Residential</td>
</tr>
<tr>
<td>High Bandwidth Fibre</td>
<td>2km away from Tungku Submarine landing station where SEA ME 3 cable and AAG cable lands.</td>
</tr>
</tbody>
</table>

The justifications can be given for companies to wish to establish a data centre or disaster recovery centre in the country as follows:

Firstly, Brunei Darussalam has enjoyed a long history of political stability which is led by a monarchy system over the last 600 years. Likewise, this political stability is coupled with financial stability which is another key factor for establishing an ICT hub as the World Economic Forum has recognised Brunei Darussalam as the world’s most stable macro-economy.\(^ {19}\) The country continues to pursue a neutral nation in the level of ASEAN and global.

Secondly, the country located at the heart of South East Asia that acts as a hub to

---


\[18\] Journal of Korean Association for Regional Information Society
connect the economies within the region, has been blessed with stable environment and climate. As such, Brunei is well recognised for its rich biodiversity and it is part of a conservation initiative called the ‘Heart of Borneo’ whereby Brunei has preserved 58% of its total land area. Brunei’s clean environment, low crime rates, and high standard of living make it a peaceful and favourable environment for doing ICT business. The country has not experience major environmental disaster so far. In the context of free from natural disaster, ICT resources can be protected from the danger of flooding, fire, and other type of natural disaster, so that the country pushes ahead with building the main ICT hub including global datacentre and disaster recovery centre, which ensure ICT resources to be managed in secure, safe, and trust worthy manner. For ICT infrastructure, Brunei Darussalam has a web of international submarine cables that have abundance of capacity and a state of art telecommunication infrastructure. Brunei is connected to Asia-America Gateway (AAG) and Southeast Asia-Middle East-Western Europe (SEA-ME-WE3) and third cable ready for service by 2013 is the Southeast Asia-Japan Cable (SJ).  

Thirdly, the country has developed and is investing in more ready-to-use industrial parks, ideal for various types of industries and its supporting activities in line with Wawasnam 2035 aiming to provide Brunei Darussalam with world class infrastructure towards a knowledge economy. This will provide strong support in the development and operation of an efficient and reliable ICT services. Moreover, Brunei has one of the most liberal tax regimes in the region (no sales, payroll, capital gains, export, manufacturing, and personal income tax) and signed numerous Bilateral Investment Treaty, Double Taxation Agreements and Free Trade Agreements. The country continues to improve economic relations with many country to facilitate cross border trade movement. Companies eligible for Pioneer status may be exempted from corporate tax for up to 11 years. Furthermore, the country is able to offer reputable companies who would like to set up a presence in Brunei, credible financial support and partnership through means of co-investment from both government and private investors.
3. Promoting ICT industry initiated by the AITI

The AITI was established on 1 January 2003 by the AITI Order 2001 to function as telecommunications industry regulator, national radiofrequency spectrum manager and developer of Brunei Darussalam’s ICT industry. Its vision is to provide conducive ICT environment to promote innovative and vibrant ICT industry that will enrich quality of life and propel the nation forward. In order to realise its visions, the mission is to (i) provide license and regulate telecommunications and radio-communications system and services, and manage the national radiofrequency spectrum in Brunei Darussalam, (ii) promote the development and growth of the ICT industry, (iii) represent the country at international forum in order to keep pace of international changes and development. With regards to promoting ICT industry, the AITI play the roles\(^{20}\) in (i) promoting the efficiency and international competitiveness of the information and communications industry in Brunei Darussalam; (ii) promoting the effective participation of all sectors of the Brunei Darussalam information and communications industry in the local and international markets; (iii) acting internationally as the national body representative of Brunei Darussalam in respect of ICT matters; (iv) conducting further the advancement of technology and research and development relating to ICT; (v) encouraging and facilitating the greatest practicable use of industry self-regulation by the information and communications industry in Brunei Darussalam; (vi) providing facilities for the training of and do anything for the purpose of advancing the skills and knowledge of persons for any purpose connected with the information and communications industry in Brunei Darussalam; (vii) advising on the development and implementation of ICT systems and services for Government ministries, departments and agencies; (viii) establishing and maintaining, to the extent permitted by any law, standards and codes for the monitoring and regulation of such aspects of the ICT data privacy and protection; and (ix) promoting the use of the Internet and electronic commerce and to establish regulatory frameworks for the purpose, consultancy and advisory services relating to ICT, and the acceptance and use the ICT in Brunei Darussalam.

\(^{20}\) http://www.aiti.gov.bn/about/about_function.html
Added to these, the AITI has grant programme for development of local ICT and digital media industries.\(^{21}\) The GRANT has been set up for the following objectives: (i) to encourage and establish Research and Development (R&D) activities by local businesses in Brunei Darussalam, leading to innovative products that possess significant commercial potential; (ii) to strengthen R&D capabilities of Bruneians; (iii) to encourage the development of more innovative and competitive local content developers in Brunei Darussalam; and, (iv) to develop “Brunei-Made” and local contents of ICT and digital media products. There are four (4) types of GRANT available for the local businesses in the ICT and digital media industries in Brunei Darussalam. These grants cover the basic standard cycle of any product development. This includes: (i) Grant 1 – Development, (ii) Grant 2 – Enhancement, (iii) Grant 3 - Ownership; and (iv) Grant 4 – Marketing.

V. Corporate Structure for Sustainable ICT development

1. Information and Communication Technology for Development (ICT4D)

One of Millennium Development Goals of UN in 2001 is to the benefit of new technologies. As the effect of ICT on national innovation system becomes significant, ICT as part of new technologies can play crucial role in carrying out the national development. ICT for development (ICT4D) can be justified to assist developing countries both conceptually and practically under certain circumstances in the context of developing countries and its concept has already been taken up widely by forward-thinking ICT initiatives as one of effective measures for economic development. According to Heeks, ICT4D 1.0 was introduced in the 1990s to bring new technologies into the development initiatives, while as ICT4D 2.0 has moved to a more exploitation approach on how

\(^{21}\) AITI, Grant Manual, 2011
technologies are applied for developing countries. Regardless of ICT4D 1.0 and 2.0, central argument is how to interrelate economic development with ICT enabler.

ICT is the bedrock upon which Brunei Darussalam achieves the goals of the national development and the economic diversification. Nothing substantive would be made without utilisation of ICT in the modern society. Additionally, e-Government and development may position the public sector as a driver of demand for ICT infrastructure and applications in the broader economy. The effect will be more pronounced in cases where government programme constitutes a significant proportion of a country’s GDP and where the regulatory environment is conductive to expansion of ICT industry, and related services.

Brunei Darussalam have not benefited fully from ICT enabler, although ICTs are expected to contribute to the economic development as well as modernizing the Government, given plausible assumption about the potential of new technology. ICT initiatives for developing countries need to be deployed in different way from developed countries with fully fledged technologies. The major difference is that ICT for developing countries has been implemented in line with developing issues initiated by governments, while at the same time private sectors have spearheaded ICT initiatives. The Brunei Darussalam has been included in developing countries in terms of e-Government development index comprising web measure, online service, telecom, and human capital and therefore needs to adopt basic principle and concepts of ICT4D to extend practicability of ICTs and roll out related services and recognize constraints and challenges posed by the Government.

In the context of ICT4D, Brunei Darussalam poses crucial challenges over sustainable

24) UN DESA, United Nations E-Government Survey 2012
ICT Initiatives to Realise the Long Term National Development Plan in Brunei Darussalam

ICT development. For example, the country has relied on most foreign consultants, experts, and vendors so as to develop e-Government and ICT projects, but does not seem to have any robust mechanism on how to maximize knowledge transfer - even programming source codes have not been managed -, which might result to serious problems facing sustainable ICT development. The remaining challenges are related to the weakness of private sector and ICT industry has bogged down and unstable ICT market which become more complex and multifaceted in nature. In order for the country to get benefits from adopting ICT4D, the focus will be on enhancing the ICT capacity building through facilitating knowledge transfer from overseas experts and establishing proper knowledge sharing framework to be suited for knowledge based economy (KBE) in the Wawasan 2035.

2. Corporate Structure

It is worthy of noting that Brunei Darussalam has prioritised ICT and e-Government in the 8th and 9th NDPs and subsequently the ICT endeavours will be continuous in the 10th NDP to achieve the goals of Wawasan 2035.

Different agencies have been involved in ICT and e-Government initiatives with different objective and schemes: (i) the EGNC develop e-Government, (ii) BEDB identifies ICT as an enabler for the economic diversification, and (iii) AITI promote ICT industry. Likewise, the above three agencies have been implementing ICT independently and the outcome may be marginal: the lack of knowledge sharing framework for these agencies has been caused by different missions pursued by different agencies as mentioned above, which might resultantly make them have difficulties in sharing information needed to implement a national-wide ICT programmes and projects.

26) When examining ICT projects completed by the Government, most consultants have come from Singapore, Malaysia and Republic of Korea.
These three agencies comprising the EGNC, the BEDB, and the AITI should be correlated with each other in initiating ICT and e-Government and the synergy effects are accordingly expected to contribute to the long-term national development, called as Wawasan 2035. In this regard, silo mechanism is required to be changed in a way to facilitate knowledge sharing with a virtual circle as shown in Figure 2.

For example, the EGNC can act as a leading-edge user who used to consume ICT goods and services in initiating e-Government with relevant ICT policies and standards for the local ICT industry, while the businesses promoted by the AITI and the BEDB have broader chances to expand their products and services in accordance with the corporate structure. In order to get more benefits with less efforts, knowledge management system (KMS) dealing with intangible information would be effective to facilitate knowledge sharing, with particular emphasis on ICT knowledge transfer.

(Figure 2) Silo Structure vs Corporate Structure for ICT development

![Diagram of Silo Structure vs Corporate Structure](image)

transfer has the functions to (i) balance the innovations of the strategy and processes, (ii) share core knowledge, and (iii) establish a network for providing the right information and knowledge at the right times.

VI. Conclusions

In conclusion, the research put forward the following answers to the research questions addressed in the introduction section as follows.

Firstly, recognising the importance that ICT and e-Government as an enabler not just for knowledge based society, but for effective tools to facilitate the economic diversification, the government set a high priority on ICT during the national development plans. The salient features appearing in the respective national development plans can be viewed as: (i) ICT thrusts comprising of e-Government, e-Business, and e-Brunei were identified and e-Government projects were launched through decentralised approach initiated by individual ministries in the 8th NDP, (ii) for the 9th NDP, the PMO was positioned to initiate e-Government from the perspective of the whole ministries and the EGNC took the responsibility of implementing e-Government as a coordination unit and thereby identified the flagship projects involved by multi-ministries and agencies. On the other hand, the AITI was promoting ICT industry and the BEDB conduct various ICT tasks where the national datacentre was most significant, (iii) the 10th NDP seems to set a focus on network infrastructure to meet broadband requirements, while at the same time, continuously provide citizen oriented e-services.

Secondly, ICT has given the foundation for realising knowledge based economy (KBE) aimed by Wawasan 2035. Against this backdrop, three major ICT thrusts are identified as (i) innovating the Government, (ii) economic diversification, and (iii) promoting ICT industry. However, the three ICT pillars have been conducted separately by different agencies such as the EGNC, the BEDB, and the AITI. These silo initiatives do not seem to be harmonised.

29) These are obtained from the consultation of KMS expert from Knowledge Cube company in Korea.
and coordinated, resultantly having a difficulty in achieving KBE in an effective manner.

Thirdly, the corporate structure is proposed so that these three ICT pillars can be closely linked to reap the benefits from synergy effects. In order to activate the corporate structure, knowledge management system (KMS) is required to be built for managing and accumulating ICT experiences and knowledge from overseas experts in a systematic way. Best practices, which can be found in Korea e-Government\(^{30}\) and ICT initiatives, can reduce implementation cost through learning the lessons from its experiences. In order to avoid the negative consequences of excessive ICT resource reliance on overseas country, the Government will have to be able to intelligently fine tune the best practices and tailor them to fit into the Brunei situation, not to the extent of sacrificing and disrupting the endeavour of Brunei Darussalam to implement ICT on its own.

Lastly, an appropriate ICT monitoring and evaluation should be put in practice. Brunei Shell had conducted an evaluation as ad-hoc base and provided a set of recommendations on August 2006, but unfortunately e-Government had not been evaluated on a regular basis. Despite the importance of evaluation and monitoring, specific budget for e-Government evaluation has not been allocated. Without ICT evaluation framework, the Government has a difficulty in identifying and managing projects, which might possibly result in the failure of e-Government initiatives.

References

AITI, Grant Manual, 2011

ICT Initiatives to Realise the Long Term National Development Plan in Brunei Darussalam


Prime Minister’s Office, Long-Term Development Plan, 2007


The Brunei Economic Development Board (BEBD), Presentation: Business Opportunities in Brunei, 12 May 2012.

The Brunei Times, 16 July 2012
The data of the Government of Brunei Darussalam
http://www.aiti.gov.bn/about/about_us.html
http://www.aiti.gov.bn/about/about_function.html
http://brn.mofat.go.kr/korean/as/brn/policy/relation/index.jsp
http://www.bimp-eaga.org/Pages/Content.aspx?cid=16

Hjh Syamimi binti Hj Md Ariff Lim: Deputy Director of the e-Government Innovation Centre (eG.InC) and a lecturer at the Faculty of Business, Economics and Policy Studies (FBEPS) of Universiti Brunei Darussalam. She has conducted several research projects some of which include Implicit Leadership Theory (ILT), and M-Learning for Current and Future Generation Research Grant. She is currently engaged in research on “An Evaluation of Webcasting Effectiveness as a Marketing Medium in Institutes of Higher Education (IHE): Universiti Brunei Darussalam as a Case Study.” Dr. Hjh Syamimi has published several journals, including “Exploring Implicit Leadership Theories of Bruneians” (Journal of Asia-Pacific Business, 2012, 2012) and “Personality traits and implicit leadership theories of Bruneians” (International Journal of Strategy and Management, 2010).

논문접수일: 2012.8.29 / 게재확정일: 2012.11.13