

Chapter 1

The Digital Economy Ecosystem in Brunei Darussalam

Muhammad Anshari

This chapter should be cited as:

Anshari, M. (2025), 'The Digital Economy Ecosystem in Brunei Darussalam', in Ing, L.Y. (ed.), *ASEAN Digital Community 2045: Country Perspectives*. ERIA Research Project Report FY2025 No. 13, Jakarta: ERIA, pp.1-14.

Chapter 1

The Digital Economy Ecosystem in Brunei Darussalam

Muhammad Anshari

1. Introduction

The global shift towards a digital economy is reshaping industries, and Brunei Darussalam is keenly participating in this transformation. The government has demonstrated a strong commitment to developing a robust digital economy by investing substantially in digital infrastructure and actively promoting digital technologies across all sectors.

Adopting a digital economy presents significant benefits for Brunei Darussalam, including improved efficiency in public and private services, stimulation of economic growth, and improvements in the standard of living. However, this transition also presents challenges that must be addressed to fully realise the benefits. Key challenges include the development of a comprehensive digital economy ecosystem, enhancement of the regulatory framework, strengthening of digital skills and innovation, and further improvement of digital infrastructure. Successfully navigating these challenges offers substantial opportunities for economic diversification.

Building a digital economy extends beyond the mere development of digital businesses, which constitute just one pillar of the broader digital economic ecosystem. Brunei Darussalam is committed to fostering a sustainable digital economy by developing an ecosystem based on four key pillars: smart government and governance, smart society, smart business, and smart environment. This policy paper aims to lay a solid foundation for the growth of Brunei Darussalam's digital economy by analysing the current digital landscape, identifying challenges, defining opportunities, and proposing policy recommendations to accelerate progress. By fostering digital innovation, expanding digital infrastructure, and nurturing digital skills, Brunei Darussalam can seize the opportunities of the digital economy and create a sustainable digital business ecosystem that promotes prosperity and inclusivity, in line with the goals of Wawasan Brunei 2035. The proposed measures in this policy paper are designed to support Brunei Darussalam's goal of becoming a leading digital economy in the region.

2. Background

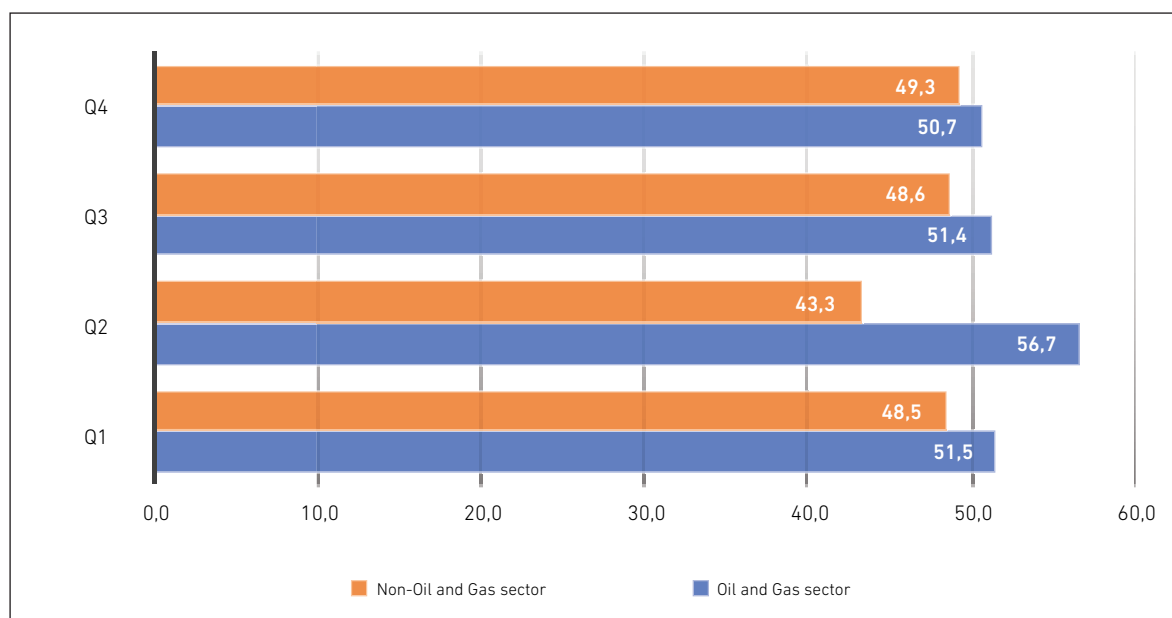
Brunei Darussalam, a small Southeast Asian country, is known for its oil and gas production. Located on the island of Borneo and a member state of the Association of Southeast Asian Nations (ASEAN), Brunei is celebrated for its dense forests and well-preserved natural environment. The country's commitment to a low-carbon future underscores its recognition of the importance of addressing climate change.

A significant portion of Brunei Darussalam's territory is covered by highly biodiverse tropical rainforests, earning it the titles 'Heart of Borneo' and 'Heart of the World' in the context of environmental conservation and biodiversity.

In terms of purchasing power parity, Brunei Darussalam's gross domestic product (GDP) was officially estimated at \$26 billion by the end of 2022 (World Economics, 2022), with an approximate population of 459,500. According to the World Economic Forum's ranking, Brunei is the 56th best country globally in terms of human capital. The country's economic and social growth trajectory has shifted to a new normal, influenced by macroeconomic factors, the volatility of the global oil and gas market, the inevitability of the Fourth Industrial Revolution (4IR), and the impact of the coronavirus disease (COVID-19) pandemic (Noeh et al., 2022).

As shown in Figure 1.1, during the first quarter of 2023 (Q4), GDP contributions were 49.2% from oil and gas and 50.8% from non-oil and gas. Growth in non-oil and gas was driven by subsectors such as air transport, which saw a significant increase of 285.1%. The finance sector also experienced significant growth, with a 71.7% rise, whilst other transport services grew by 33.1%. The upturn in the finance sector aligned with increased income from banking activities, whilst the growth in air transport and other transport services was attributed to a rise in passenger air arrivals and departures following the complete lifting of travel restrictions (Department of Economic Planning and Statistics, 2023).

Figure 1.1. Gross Domestic Product by Kind of Economic Activity, 2022–2023 (%)



Q = quarter.

Source: Department of Economic Planning and Statistics (2023).

Brunei Darussalam is actively developing a digital economy encompassing various sectors, including e-commerce, digital infrastructure, data analytics, artificial intelligence (AI), cyber-physical systems, and the Internet of Things (IoT), as it prepares for 4IR. The digital economy is expected to unlock new market opportunities, boost efficiency, and enhance overall well-being.

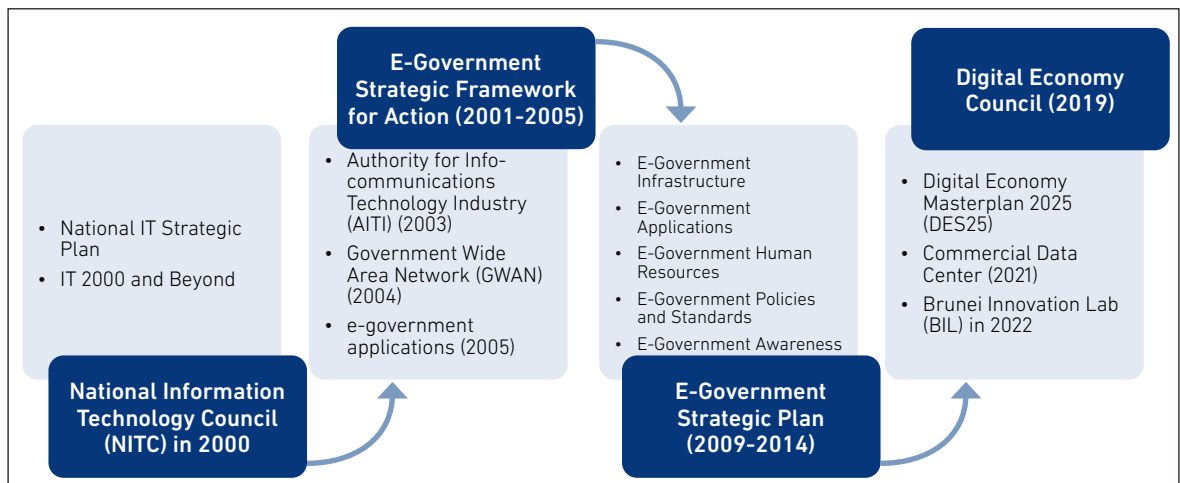
The Brunei Darussalam government has made significant progress in developing the country's information and communication technology (ICT) infrastructure to ensure affordable internet access for its citizens. By 2026, it is expected that 96.4% of the population will have internet access, with 137 mobile phone subscriptions per 100 residents and 16.05 fixed-broadband subscribers per 100 residents. In 2021, e-commerce contributed 19.5% to revenue (Statista, 2021). Furthermore, businesses in Brunei Darussalam are increasingly investing in cutting-edge technology. Since 2008, the government has introduced several top-down initiatives to support local start-ups, including the establishment of business incubators such as the i-Centre, the K-Hub, and the Creative Art Facility (CRAFT) in the Anggerek Desa Technology Park (Purwaningrum, 2017). Currently, 20 start-ups are active, with 9 based at the iCenter (Noeh et al., 2022).

The following section highlights the major milestones in Brunei Darussalam's digital transformation journey since 2000.

3. Development of the Digital Economy

The digital economy is a key enabler in Brunei Darussalam's journey towards becoming a smart nation. The smart nation initiative, driven by digital government, digital economy, and digital society, is a national endeavour aligned with the vision of Wawasan Brunei 2035, aiming to transform the country by 2035 (MTIC, 2020). Figure 1.2 shows the milestones in the development and transformation of Brunei Darussalam's digital economy.

Figure 1.2. Gross Domestic Product by Kind of Economic Activity, 2022–2023 (%)



Source: Author.

The first significant step was the establishment of the National Information Technology Council (NITC) of Brunei Darussalam in October 2000. The NITC was tasked with overseeing and coordinating the implementation of the National IT Strategic Plan, titled 'IT 2000 and Beyond'. This plan focused on three key areas: 1) driving the nation towards a paperless society, 2) promoting electronic government in the public sector, and 3) encouraging electronic business in the private sector. The National IT Strategic Plan represented the first wave of Brunei Darussalam's e-government strategy.

The second wave was marked by the E-Government Strategic Framework for Action, which spanned from 2001 to 2005. This framework outlined the key initiatives and projects required to implement e-government services and systems across various sectors. The framework encompassed four primary areas: e-government infrastructure, e-government applications, e-government human resources, and e-government policies and standards. Achievements during this period included the establishment of the Authority for Info-communications Technology Industry (AITI) in 2003 as the ICT industry regulator and promoter, the development of the Government Wide Area Network (GWAN) in 2004 for inter-agency communication, and the launch of various e-government applications (e-Customs, e-Pelita, e-TAFIS, e-Exams, e-Company Register) from 2005 onwards, which provided efficient, effective, and customer-centric services to citizens, businesses, and civil servants. Additionally, ICT policies and standards, such as the Government Computer Usage Policy, Government Email Usage Policy, Internet Access and Usage Policy, and Government Web Interface Standard Guideline, were formulated from 2006 onwards. The enhancement of ICT literacy and skills amongst civil servants and citizens was also a focus, with various training programmes and initiatives introduced from 2007 onwards, including the National ICT Competency Framework (NICF), the ICT Literacy Programme (ICTLP), and the ICT Scholarship Programme (ICTSP).

The third wave was the launch of the E-Government Strategic Plan launched on 30 May 2009, which spanned from 2009 to 2014. This plan comprised five key programmes: E-Government Infrastructure, E-Government Applications, E-Government Human Resources, E-Government Policies and Standards, and E-Government Awareness. The objectives of these programmes were to establish secure ICT infrastructure, develop e-government services, enhance ICT skills, enforce standards, and promote the use of e-government services amongst citizens, businesses, and civil servants.

In 2019, following His Majesty Sultan Haji Hassanal Bolkiah's titah (royal order) on his 73rd birthday, the Digital Economy Council (DEC) was established. The DEC was tasked with exploring the economic potential of the digital industry and providing strategic direction and leadership for digital policies and initiatives at the national level. Succeeding the NITC and the e-Government Leadership Forum (EGLF), the DEC has been instrumental in steering Brunei Darussalam's digital economy initiatives. The DEC launched its 5-year masterplan, the Digital Economy Masterplan 2025 (DE25), which aims to transform Brunei Darussalam into a smart nation, supporting the objectives of Brunei Darussalam's Vision 2035. These objectives include a high quality of life, a highly educated and skilled workforce, and a sustainable and dynamic economy.

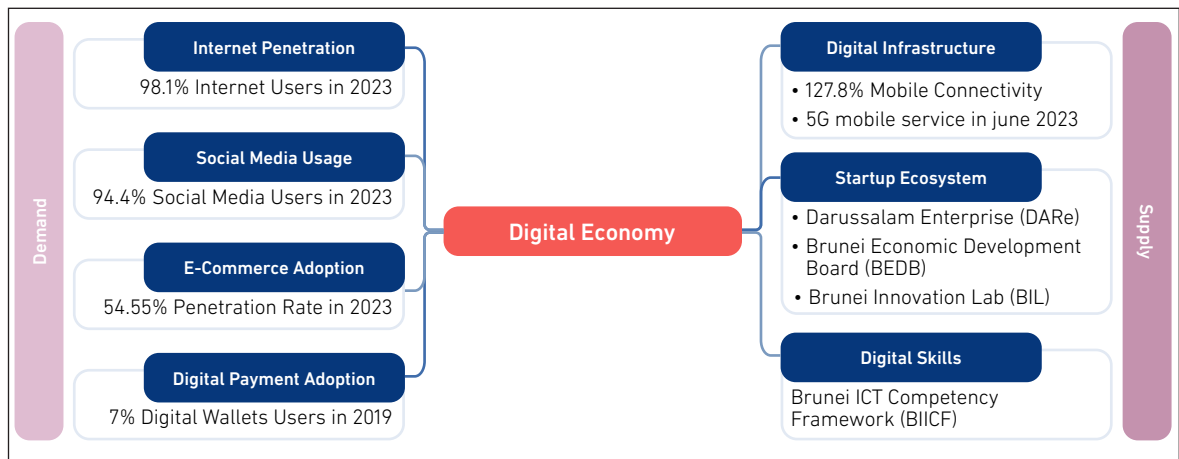
Further advancements include the establishment of a commercial data centre in 2021, which aims to provide innovative services to enhance productivity. In 2022, the Brunei Innovation Lab (BIL) was launched to spur the growth of tech businesses and their solutions through development programmes, funding, market access, and community building (The Scoop, 2020).

Digital Economy Components: Demand and Supply

Figure 1.3 shows the demand and supply dynamics that support Brunei Darussalam's digital economy. On the demand side, Brunei Darussalam is experiencing a strong momentum towards digital transformation. As of January 2023, internet penetration reached an impressive 98.1% of the population, with 442,200 internet users (Datareportal, 2023). Social media usage is similarly widespread, with 94.5% of the population actively engaging on social media platforms (Datareportal, 2023). E-commerce adoption has been steadily increasing, boasting a penetration rate of 54.55% in 2023 (Statista, 2023). The increasing demand for e-commerce is driven by the public's growing preference for online shopping, spurred by factors such as convenience, accessibility, and the widespread use of mobile devices. The emergence of mobile commerce and social commerce has further accelerated the growth of the digital economy, with businesses increasingly leveraging social media platforms and personalised shopping experiences to meet the evolving preferences of consumers.

However, despite the high rates of internet and mobile device penetration and the growing acceptance of online business platforms, a significant portion of the population still prefer cash payments over digital payment methods. A survey conducted by the Authority for Info-communications Technology Industry (AITI) in 2019 revealed that 39% of customers preferred cash payments, whilst only 22% opted for credit cards, 18% for debit cards, and a mere 7% chose third-party payment providers or digital wallets (AITI, 2019).

Figure 1.3. Digital Economy: Demand and Supply Side in Brunei Darussalam



Source: Author.

On the supply side, Brunei Darussalam benefits from a relatively well-developed digital infrastructure, with high-speed internet networks and extensive mobile phone coverage. According to the International Telecommunication Union (2022), the country had 576,000 active cellular mobile connections by early 2023, translating to 127.8% of the population (Datareportal, 2023). Brunei Darussalam recently launched its 5G mobile service, offering ultra-high-speed internet access with speeds of up to 300 MB per second, a significant improvement compared to the 20 MB–80 MB per second speeds available on the 4G network (The Scoop, 2023).

The government has introduced several initiatives to foster a conducive environment for the digital economy and encourage entrepreneurship. Darussalam Enterprise (DARE), for instance, provides funding, mentoring, and business development services to start-ups, whilst the Brunei Economic Development Board (BEDB) focuses on economic diversification and fostering innovation. The Brunei Innovation Lab (BIL) also facilitates collaboration amongst local and international start-ups, industry experts, investors, and other stakeholders, thereby fostering an ecosystem of innovation.

Whilst Brunei Darussalam has made progress in developing digital skills, there remains a need for more comprehensive training and education programmes to meet the demands of the digital economy. The Brunei ICT Competency Framework (BIICF) serves as a guide for ICT professionals, but further efforts are required to upskill and reskill the workforce, ensuring they possess the necessary digital competencies to thrive in the rapidly evolving digital landscape. By leveraging its robust digital infrastructure, government initiatives, and continued emphasis on skill development, Brunei Darussalam can strengthen the supply side of its digital economy, creating an environment conducive to innovation, entrepreneurship, and economic growth (BIICF, 2023).

4. Key Projects for the Digital Economy

The Digital Economy Masterplan 2025 (DE2025) serves as a comprehensive road map for Brunei Darussalam's transition to a digital economy. The master plan outlines strategic thrusts focused on industry digitalisation, government digitalisation, fostering a thriving digital industry, and the development of manpower and talent. It prioritises projects across nine priority clusters: logistics and transport, energy, business services, tourism, financial services, health, agri-food, education, and halal (Figure 1.4).

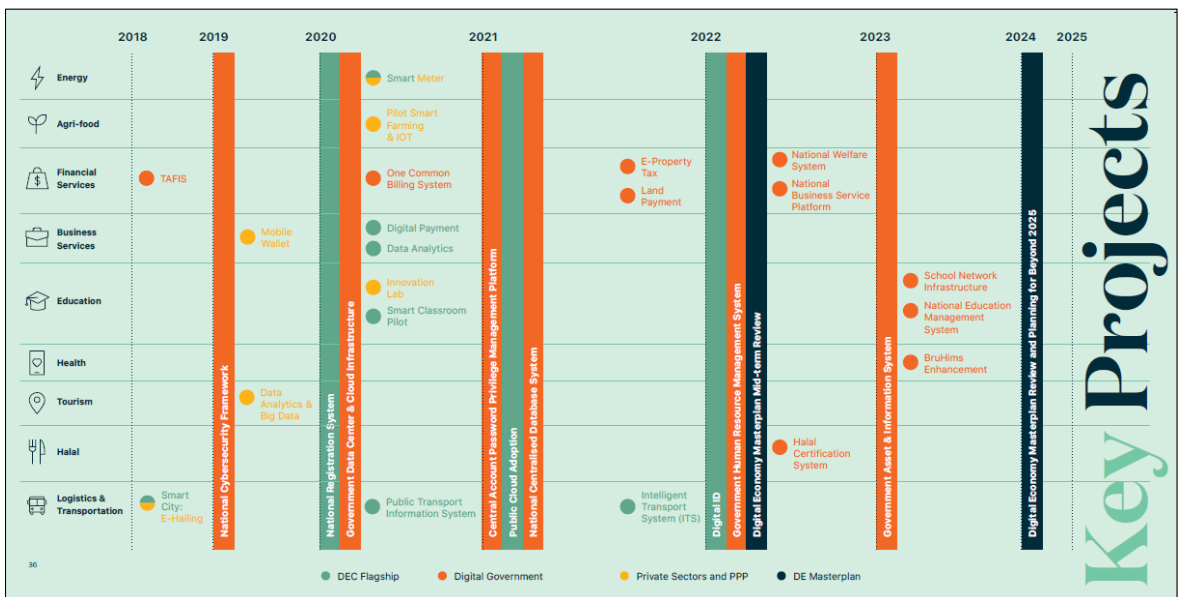
DE2025 identifies 17 key projects designed to advance these strategic thrusts and enablers. In the energy sector, initiatives are centred on optimising energy production, distribution, and consumption through smart grid systems and the integration of renewable energy. The agri-food project aims to enhance the agricultural sector by implementing precision farming, optimising supply chains, and promoting sustainability.

In the financial services sector, digital transformation initiatives include the development of digital banking, fintech innovations, and e-payment systems to enhance financial inclusion and operational efficiency. The business services project focuses on digitalising service sectors, fostering entrepreneurship, and improving competitiveness through e-commerce platforms and digital marketing solutions.

In the education sector, digital technologies are being leveraged through e-learning platforms, digital content development, and skills training to enhance access to quality education and develop a digitally literate workforce. The health project utilises telemedicine, health data analytics, and digital health applications to enhance healthcare accessibility and outcomes.

In the tourism industry, digital technologies are employed through digital marketing campaigns and smart tourism solutions. Looking ahead, Brunei Darussalam could explore virtual reality experiences to attract visitors and improve tourism. The halal project, aimed at developing Brunei Darussalam as a regional and global halal hub for goods and services, should be supported by robust digital solutions such as halal certification, traceability, and marketing, thereby enhancing the global competitiveness of the halal industry. In logistics and transport, Brunei Darussalam's strategic location in Borneo should be leveraged to optimise logistics operations and improve transport systems through smart logistics solutions and real-time tracking technologies. This would allow Brunei Darussalam to capitalise on the significant market opportunities in Borneo, provide innovative services and goods, and potentially emerge as a high-tech hub for the region.

Figure 1.4. Key Projects for Digital Economy



Source: Ministry of Transport and Infocommunications (2020).

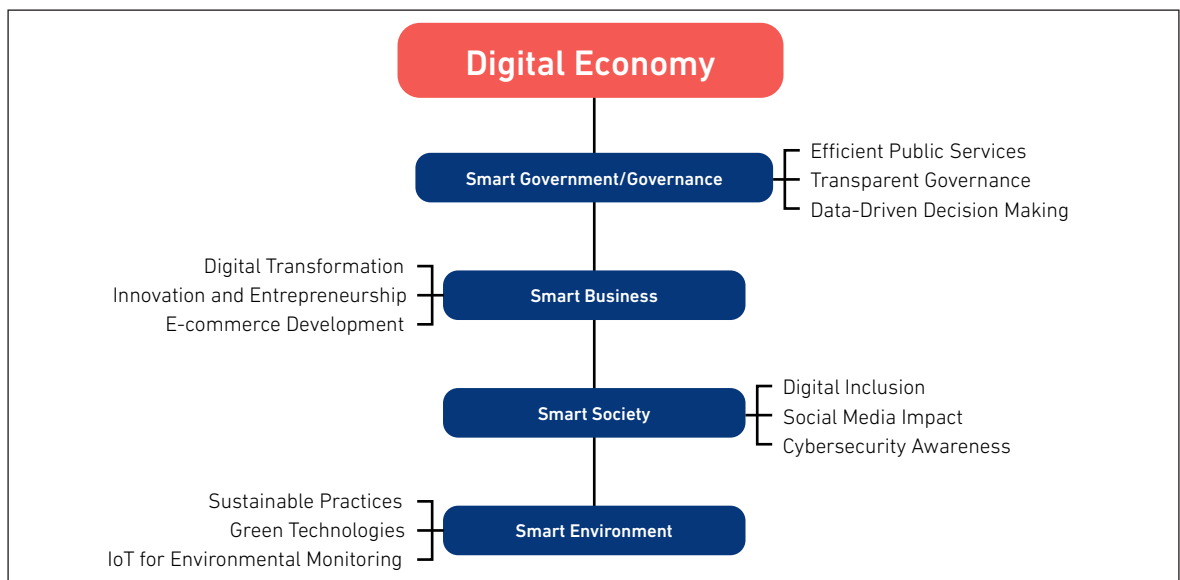
5. Policy Recommendations

Brunei Darussalam's abundant oil and gas reserves have long been its main sources of income, exports, and government revenue. However, this dependence also leaves the country vulnerable to global commodity price fluctuations and the risk of resource depletion. Diversifying the economy is, therefore, essential to building resilience and achieving sustainable development. The following policy recommendations are intended to guide economic diversification, supported by the digital economy initiatives outlined in the Digital Economy Masterplan 2025 (DE2025). These recommendations include developing a digital economy ecosystem, enhancing the regulatory framework, strengthening digital skills and innovation, and advancing digital infrastructure.

Policy 1: Developing a Digital Economy Ecosystem

Brunei Darussalam faces three main challenges in developing its digital economy. First, whilst internet penetration is high at 95%, digital activities have not yet reached their full potential in creating value-added services, employment, and innovation. Second, the relatively small scale of the economy requires the optimisation of larger market opportunities. Third, there is a need for robust legal frameworks, particularly in data protection and security, to foster the growth of the creative industry and digital market. Therefore, developing a comprehensive digital economy ecosystem is highly important, as it will integrate all digital potential into a unified and cohesive structure.

Figure 1.5. Policy Recommendations for a Digital Economy Ecosystem



Source: Author.

The digital economy ecosystem is expected to significantly impact economic diversification. It is defined as an integrative approach to fostering a sustainable digital economy, necessitating the development of four key supporting factors: smart government and governance, smart business, smart society, and smart environment (Figure 1.5). Through this ecosystem, Brunei Darussalam can create a more focused business digital environment, such as a digital ecosystem within the halal hub or a smart eco-health and tourism digital ecosystem, thereby expanding new demands by increasing economic scale. The digital economy ecosystem is a key enabler of innovation, automation, and the development of a smart and resilient economy.

Brunei Darussalam must develop interconnected networks of organisations, individuals, and technologies that collaborate and interact within digital business ecosystems. These ecosystems are characterised by the exchange of data, services, and resources, enabling participants to create value, drive innovation, and expand markets. One way to expand the digital economy is to develop a multi-sided market where all actors (public, service providers, businesses) play the role of ecosystem leaders or keystones (Almunawar and Anshari, 2020).

To become a key player in the global halal hub and Islamic finance sector, targeting the global Muslim market, which is expected to reach around 2.2 billion by 2030, Brunei Darussalam requires a robust digital ecosystem (Allied Market Research, 2022). The digital ecosystem for the halal hub model comprises several key components. A halal certification platform streamlines the process for businesses to obtain halal certifications, ensuring compliance with standards. A digital marketplace connects halal producers, suppliers, and buyers, expanding market reach. Supply chain traceability employs technologies for end-to-end product traceability. Digital marketing and branding utilise digital platforms for targeted advertising and content marketing. Digital logistic management optimises supply chain operations, including inventory management and delivery. Digital payment systems facilitate secure and seamless transactions for halal products. Lastly, a collaboration and partnership network fosters collaboration amongst stakeholders, enabling knowledge sharing and joint projects to strengthen the halal product ecosystem. These components create a comprehensive digital ecosystem that supports Brunei Darussalam's position as a halal hub, promoting the growth and trade of halal products within Borneo, ASEAN, and the global Muslim population.

Another example is the digital ecosystem of smart eco-health and tourism. Brunei Darussalam is renowned for its ecotourism, which can be enhanced or combined with strategies to develop health tourism. Brunei Darussalam's natural resources, such as rainforests, hot springs, and beaches, offer significant health benefits. These resources can be utilised to promote Brunei Darussalam as a destination for health tourism, a sector focused on improving health and well-being. Health tourism packages can be developed that combine ecotourism activities with health-promoting activities. Brunei Darussalam could support the digital economy in the region by investing in medical tourism infrastructure, promoting itself as a medical tourism destination, and improving digital health technologies. Health tourism could create new healthcare jobs, attract foreign investment, and boost the tourism industry whilst advancing the country's healthcare system and facilities. By developing health tourism, Brunei Darussalam can become a major hub for digital innovation in healthcare. This would create new opportunities for businesses and consumers, driving economic growth. Moreover, developing health tourism could also improve Brunei Darussalam's healthcare system, benefiting both residents and tourists. Developing health tourism is a strategic pathway to economic diversification, offering the potential for job creation, foreign investment, and improved healthcare facilities.

Policy 2: Enhancing the Regulatory Framework

Brunei Darussalam has established several rules and regulations pertaining to digital and IT sectors. Key examples include the following:

- **Personal Data Protection Order.** This proposed legislation aims to establish a comprehensive data protection regime, safeguarding individuals' personal data from misuse by private sector organisations. It also facilitates cross-border data flows, thereby supporting the growth of the digital economy.
- **Authority for Info-communications Technology Industry of Brunei Darussalam Act (AITI Act).** This act establishes AITI as the regulator and promoter of the ICT industry. AITI is empowered to issue licenses, impose fees and charges, conduct investigations, and ensure compliance with relevant laws and regulations.
- **Telecommunications Order.** This order regulates the provision of telecommunications services and facilities in Brunei Darussalam. It outlines the duties and obligations of telecommunications service providers and users and defines the powers and functions of AITI as the telecommunications authority.
- **Electronic Transactions Order.** This order provides the legal framework for electronic transactions in Brunei Darussalam, recognising the validity and enforceability of electronic records, signatures, and contracts.
- **Computer Misuse Order.** This order protects digital activities from offences such as unauthorised access, modification, interception, or impairment of computer data or systems. It also addresses the possession or distribution of hacking tools or devices.

Recommendations

1. **Regulation of emerging technologies.** Clear ethical guidelines and principles should be incorporated into the regulatory framework for emerging technologies such as AI, Big Data, and IoT. These guidelines must align with national values and international standards. Reinforcing data protection and privacy regulations is crucial to ensure responsible use of data collected through IoT devices, giving individuals control over their data. Furthermore, innovation incentives should be implemented to encourage companies and start-ups to develop AI, Big Data, and IoT solutions that address societal or business challenges whilst adhering to regulatory requirements.
2. **Cross-border regulatory framework.** Brunei Darussalam, along with Indonesia and Malaysia, shares Borneo, the world's third-largest island, home to 23 million people. The island's strategic location presents an opportunity to create cross-border digital platforms that can connect businesses and consumers across the region. Digital payments offer a simple and low-cost alternative for those without access to traditional banking services. Additionally, the logistics and supply chain infrastructure in Borneo needs development to support the digital economy. Digital freight platforms can connect businesses with transport providers and track goods, improving efficiency and transparency. Enhancing transport infrastructure, such as roads, railways, and ports, is essential for more efficient movement of goods and services.

Enhancing digital cross-border connectivity would greatly benefit the digital economies of Brunei Darussalam, Indonesia, and Malaysia. This would open new opportunities for trade and investment, contributing to economic growth. Improved connectivity would enable Brunei Darussalam businesses to access larger markets, diversify revenue streams, and foster collaboration and knowledge sharing amongst entrepreneurs and innovators. It would enhance digital services and infrastructure, such as e-commerce platforms and online payment systems, benefiting businesses and consumers. Moreover, it would create jobs, drive skills development, and nurture a thriving start-up ecosystem. Enhanced connectivity would facilitate tourism promotion, cultural exchange, and government collaboration, fostering economic integration and sustainable growth across the region.

When cross-border digital transactions occur, policies on data privacy and security should address cross-border data transfers, ensuring that data is protected to the same standards regardless of location. Data localisation requirements, which mandate that certain types of data be stored locally, should also be considered to enhance data privacy and security.

Brunei Darussalam has been actively engaged in regional and international cooperation frameworks to promote trade, the digital economy, and cross-border activities. As a member of the ASEAN Free Trade Area and various ASEAN-led free trade agreements, Brunei Darussalam participates in negotiations for the Regional Comprehensive Economic Partnership and is a signatory to the ASEAN Agreement on Electronic Commerce. Brunei Darussalam is involved in negotiations for the ASEAN Digital Economic Framework Agreement and is a founding member of the Digital Economic Partnership Agreement, demonstrating its commitment to fostering a conducive environment for the digital economy.

Policy 3: Strengthening Digital Skills and Innovation

Brunei Darussalam has achieved high internet adoption and a low level of digital divide, providing a solid foundation for national development. The narrow digital divide is characterised by widespread internet access and strong ICT skills across different age groups. Whilst Brunei Darussalam boasts a high level of digital literacy, specific upskilling policies are necessary to meet the demands of emerging technologies such as IoT, AI, cyber-physical systems, machine learning, and Big Data, particularly in response to 4IR.

One policy recommendation is the implementation of Education 4.0. This forward-looking learning strategy aligns with the demands of the upcoming 4IR (QS, 2019). To bridge the digital gap and prepare students for the future, the education system, from primary to higher education, needs to develop curricula that meet the requirements of Education 4.0 (Samiha et al., 2022). Curriculum redesign is crucial to prepare Brunei Darussalam's future workforce (Anshari et al., 2022). Whilst Education 4.0 will require the current workforce to enhance their ICT skills and knowledge, the full potential of digital technology cannot be realised without adequate education and skill training.

To promote innovation in digital skills, specific policy measures can be adopted:

1. **Develop a national digital skills strategy.** Identify the key digital skills required to sustain the digital economy.
2. **Allocate funds for digital skills programmes.** Government funding should support digital skills initiatives.
3. **Collaborate with the private sector.** Governments should partner with private companies to co-develop and deliver digital skills programmes.
4. **Encourage research and innovation in digital skills education.** Continuous innovation in education and training is essential to keep pace with the rapidly evolving digital landscape.

These measures collectively contribute to fostering innovation in digital skills and ensuring that the workforce is well-prepared for the challenges and opportunities presented by 4IR.

Policy 4: Digital Infrastructure Development

All the above policy recommendations require a solid foundation of digital infrastructure. Fast and affordable internet connectivity is a necessity. Digital data and service providers must expand access to internet work connections, especially in rural or remote areas, by providing reliable mobile data infrastructure. Affordable internet services should be a priority, improving broadband affordability across Brunei Darussalam to encourage broader participation in the digital economy. The business sector should invest in developing digital infrastructure initiatives, such as fintech (digital payment, crowdfunding, peer-to-peer lending) and digital marketplaces. Enhanced digital infrastructure will enable businesses to extend their market reach beyond Brunei Darussalam, whether regionally or internationally.

Businesses should adopt new approaches and technologies associated with 4IR, such as 5G networks, Big Data, 3D printing, IoT, AI, and expert systems. These technologies will support optimisation and provide a competitive advantage in the local market whilst expanding market opportunities across Borneo, ASEAN, and Asia.

6. Conclusion

The oil and gas sector remains the main contributor to Brunei Darussalam's economy, but the government is taking steps towards developing a digital economy to achieve economic diversification. Central to this effort is the creation of a digital economy ecosystem, which will transform extensive digital activities into thriving digital business activities. The digital economy ecosystem will drive progress in various niche areas where Brunei Darussalam can excel, such as the halal hub and the Islamic financial hub. This will stimulate the movement of goods, people, and services; encourage new investments; create jobs; and further diversify the economy. Brunei Darussalam can position itself as a leading destination for health tourism, empower its population with digital skills, foster regional collaboration, and ensure a resilient digital infrastructure. These policy recommendations will enable Brunei Darussalam to fully harness the potential of the digital economy.

References

- Allied Market Research (2022), *Halal Cosmetics Market Expected to Reach \$144.8 Billion by 2031*. <https://www.alliedmarketresearch.com/press-release/halal-cosmetics-market.html> (accessed 14 September 2023).
- Almunawar, M.N. and M. Anshari (2020), 'Multi-sided networks of digital platform ecosystem: The case of ride-hailing in Indonesia', *Asia Pacific Journal of Information Systems*, 30(4), pp.808–31.
- Anshari, M., M. Syafrudin, and N.L. Fitriyani (2022), 'Fourth industrial revolution between knowledge management and digital humanities', *Information*, 13(6), p.292.
- Authority for Info-communications Technology Industry (2019), *Brunei Darussalam Household Report*, 2019. <https://www.aiti.gov.bn/surveys/brunei-darussalam-ict-household-report-2019/> (accessed 24 July 2023).
- Authority for Info-communications Technology Industry (2019), *Brunei Darussalam ICT Business Report*. <https://www.aiti.gov.bn/surveys/brunei-darussalam-ict-business-report-2019/> (accessed 24 March 2024).
- Brunei ICT Industry Competency Framework (2023), *Brunei ICT Competency Framework*. <https://www.biicf.bn/> (accessed 24 March 2024)
- Datereportal (2023), *Digital 2023: Brunei Darussalam*. <https://datereportal.com/reports/digital-2023-brunei-darussalam#:~:text=The%20number%20of%20social%20media,on%20data%20to%20learn%20why> (accessed 24 March 2024).
- Department of Economic Planning and Statistics (2023), *Brunei Darussalam's Gross Domestic Product (GDP) Q1 2023*. <https://deps.mofe.gov.bn/SitePages/National%20Accounts.aspx> (accessed 25 October 2023).
- Ministry of Transport and Infocommunications (2020), *Digital Economy Master Plan 2025*. <https://www.mtic.gov.bn/DE2025/documents/Digital%20Economy%20Masterplan%202025.pdf> (accessed 19 October 2023).
- Noeh, A.S., P.S.R.P. Idris, and M. Anshari (2022), 'Developing a National Innovation System in Small States: A Case for Brunei Darussalam's Economic Development – A Catalyst for Digitalization Catch-Up and Economic Growth', *Handbook of research on green, circular, and digital economies as tools for recovery and sustainability: IGI Global*, pp.107–22.
- Purwaningrum, F. (2017), 'Knowledge flow in the ICT sector: Case study of Anggerek Desa Technology Park in Negara Brunei Darussalam', *South East Asia Research*, 25(2), pp.157–74. doi:10.1177/0967828X17706568.
- Samiha, Y.T., T. Handayani, A. Razaq, M. Fithriyah, A. Fitri, and M. Anshari (2022), 'Implementation of Education 4.0 as sustainable decisions for a sustainable development', *2022 International Conference on Decision Aid Sciences and Applications (DASA)*: pp.846–50.

The Scoop (2023), *Brunei Launches 5G Network*. <https://thescoop.co/2023/06/23/brunei-launches-5g-network-hopes-to-spur-digital-transformation/> (accessed 24 March 2023).

Statista (2023), *Digital Commerce—Brunei Darussalam*. <https://www.statista.com/outlook/dmo/fintech/digital-payments/digital-commerce/brunei-darussalam#users> (accessed 24 March 2024).

Statista (2021), *Digital Economy—Brunei Darussalam*. <https://www.statista.com/outlook/co/digital-economy/brunei-darussalam> (accessed 13 May 2023).

World Economics (2022), *Brunei Darussalam's Gross Domestic Product (GDP)*. <https://www.worlddeconomics.com/Country-Size/Brunei%20Darussalam.aspx> (accessed 14 Sept 2023).