Catalysing Inclusive and Sustainable Development: A UK-Sarawak Sectoral Partnership Study

November 2025

British High Commission Kuala Lumpur

UK International Development
Partnership | Progress | Prosperity

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ACKNOWLEDGEMENT

This report, "*Catalysing Inclusive and Sustainable Development: A UK-Sarawak Sectoral Partnership Study*," was prepared by Vriens & Partners. The team members of the study were Amelia Hew, Megan Ooi, Nazhif Yusoff, and Venessa Sambai Usek.

Vriens & Partners would like to express sincere appreciation to the Foreign, Commonwealth & Development Office (FCDO) for commissioning this study. The study was supported by the South and Southeast Asia Research Innovation Hub (SSEARIH), FCDO, Government of the United Kingdom. However, the views expressed herein do not necessarily reflect the official policies of the Government of the United Kingdom.

Appreciation is also extended to the government agencies, industry representatives, academic institutions, and other key stakeholders who generously contributed their insights through key informant interviews (KIIs) and focus group discussions (FGDs). Their diverse perspectives were instrumental in informing the findings and recommendations presented in the report.

Special thanks to the officers in the British High Commission Kuala Lumpur, the Foreign, Commonwealth & Development Office, and the Economic Planning Unit (EPU) Sarawak for their invaluable support throughout the study process, including stakeholder engagement, validation of key findings, and co-development of the validation workshop. We appreciate the valuable contributions of Mildred Voon, Redzra Redzuan, Ludhiya Johnson, Tom Shephard, Pamela Victor, and Adelene Teo.

Vriens & Partners affirms that ethical standards were upheld throughout the research process, including source validation, transparent data handling, and appropriate attribution, to ensure the credibility and integrity of the study.

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List of Abbreviations

ADC	Aviation Design Centre
AI	Artificial Intelligence
AMP	Advanced Manufacturing Park
ART	Autonomous Rapid Transit
ASEAN	Association of Southeast Asian Nations
ASICs	Application-specific integrated circuits
BSI	British Standards Institution
B2G	Business-to-Government
BESS	Battery energy storage system
C4 Sarawak	Chitose Carbon Capture Central Sarawak
CCS	Carbon Capture and Storage
CCUS	Carbon Capture, Utilisation, and Storage
CENTEXS	Centre for Technology Excellence Sarawak
CNC	Computer numerical control
CO2	Carbon dioxide
CPD	Continuing Professional Development
CREST	Centre for Renewable Energy Systems Technology
CSA Catapult	Compound Semiconductor Applications Catapult

CST	Council for Science and Technology
DBOS	Development Bank of Sarawak Berhad
DBT	Department for Business and Trade
DCC	Digital Community Centres
DiVA	Digital Village Accelerator
DLP	Dual Language Programme
DSIT	Department for Science, Innovation and Technology
E&E	Electrical and electronics
EPU	Economic Planning Unit
ESG	Environment, Social, and Governance
EV	Electric Vehicles
FCDO	Foreign, Commonwealth & Development Office
FGDs	Focus group discussions
G2G	Government-to-Government
GDP	Gross Domestic Product
GDS	Government Digital Service
GHG	Greenhouse gas
HETR	Hydrogen Economy and Technology Roadmap

IC	Integrated circuit
iCPD	Industry Continuous Professional Development
ICT	Information and Communication Technology
IfATE	Institute for Apprenticeships and Technical Education
IGCSE	International General Certificate of Secondary Education (Cambridge)
IoT	Internet of Things
IP	Intellectual property
IPMC	Industrial Park Management Committee
IPMS	Integrated Project Monitoring System
IPPs	Independent Power Producers
ISuRE	Institute of Sustainable and Renewable Energy
IT	Information Technology
JENDELA	Jalinan Digital Negara initiative
KIIs	Key informant interviews
KUTS	Kuching Urban Transportation System
M&E	Monitoring and evaluation
MA63	Malaysia Agreement 1963
MCH	Methylcyclohexane

MDEC	Malaysia Digital Economy Corporation
MEASAT	Malaysia East Asia Satellite
MEESty	Ministry of Energy and Environmental Sustainability Sarawak
MEITD	Ministry of Education, Innovation and Talent Development Sarawak
MINTRED	Ministry of International Trade, Industry and Investment Sarawak
MIPD	Ministry of Infrastructure and Port Development Sarawak
MITI	Ministry of Investment, Trade and Industry
MOSTI	Ministry of Science, Technology and Innovation
MoU	Memorandum of Understanding
MRO	Maintenance, repair and overhaul
MSME	Micro, small, and medium-sized enterprises
MUT	Ministry of Utility and Telecommunication
MW	Megawatt
MySBRN	Sarawak Rural Broadband Network
NADI	National Information Dissemination Centre
NAIO	National AI Office

NCSC	National Cyber Security Centre
NESO	National Energy System Operator
NIMP	New Industrial Master Plan
NMIS	National Manufacturing Institute Scotland
NREB	National Resources and Environmental Board
NSTA	North Sea Transition Authority
Ofgem	Office of Gas and Electricity Markets
PCDS 2030	Post COVID-19 Development Strategy 2030
PETROS	Petroleum Sarawak Berhad
PHES	Pumped hydro energy storage
PMR	Penilaian Menengah Rendah (Lower Secondary Assessment)
PPKS	Sarawak Skills Development Centre
PV	Photovoltaic
R&D	Research and development
RE	Renewable energy
RECODA	Regional Corridor Development Authority
SAF	Sustainable aviation fuel
SAGE	Supporting the Advancement of Girls' Education

SAIC	Sarawak Artificial Intelligence Centre
SAIDI	System Average Interruption Duration Index
SAINS	Sarawak Information Systems
SALURAN	Sarawak Linking Urban, Rural and Nation programme
SBC	Sarawak Biodiversity Centre
SCORE	Sarawak Corridor of Renewable Energy
SCSDU	Sarawak Centre of Service Delivery Unit
SDEC	Sarawak Digital Economy Corporation
SDGs	Sustainable Development Goals
SEA-DF	Sarawak Electrolyser Assembly-Distribution Facility
SEB	Sarawak Energy Berhad
SEDC	Sarawak Economic Development Corporation
SEEP	Sarawak Education Enhancement Programme
SHER	Sarawak Hydrogen Economy Roadmap
SIDC	Sarawak Infectious Disease Centre
SIOC	Sarawak Integrated Operation Centre

SIP	Samalaju Industrial Park
SMA	Sarawak Multimedia Authority
SMART	Sarawak Multimedia Authority Rural Telecommunication
SMEs	Small and medium-sized enterprises
SPM	Sijil Pelajaran Malaysia (Malaysia Certificate of Education)
STEM	Science, Technology, Engineering, and Mathematics
STIDC	Sarawak Timber Industry Development Corporation
SWIS	Sarawak Workforce Information System
TVET	Technical and Vocational Education and Training
UiTM	Universiti Teknologi MARA
UK	United Kingdom
UK PACT	UK Partnering for Accelerated Climate Transitions
UKAS	Sarawak Public Communication Unit
UKERC	UK Energy Research Centre
UKRI	UK Research and Innovation
UKSPA	UK Science Parks Association
UNIMAS	University Malaysia Sarawak
UP-DLP	Ujian Penilaian Dual Language Programme (DLP Assessment Test)
UPM Sarawak	Universiti Putra Malaysia Sarawak
UPSR	Primary School Assessment Test
US	United States
UTS	University of Technology Sarawak
VSAT	Very Small Aperture Terminal
VUCA	Volatility, Uncertainty, Complexity, and Ambiguity

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EXECUTIVE SUMMARY

Sarawak, situated on the Malaysian side of Borneo, joined North Borneo (Sabah) and Malaya in 1963 to form Malaysia. In 2023, it was officially recognised as a "region" following constitutional amendments under the Malaysia Agreement 1963 (MA63), the foundational accord that established the nation. Sarawak has abundant natural resources, including extensive river systems, mineral reserves, and forest landscapes, and it holds a strategic advantage in driving low-carbon development and clean energy initiatives.

Sarawak's ambitions go beyond resource-based growth. The region envisions becoming a fully developed state by 2030, where every citizen benefits from economic prosperity, social inclusivity, and environmental sustainability. To realise this vision, Sarawak is undergoing a structural economic transformation, aiming to double the size of its economy through innovation and data-driven strategies.

The objective of this report, *Catalysing Inclusive and Sustainable Development: A UK-Sarawak Sectoral Partnership Study*, is to identify potential collaboration opportunities for mutual growth between the UK and Sarawak. Responsive to the Sarawakian government's Post-COVID Development Strategy (PCDS) 2030 – its guiding development plan – as well as drawing on extensive research and in-depth consultation with public and private stakeholders from both the UK and Sarawak, this study identifies four key sectors of focus: advanced manufacturing, renewable energy, digital transformation, and education and human capital development.

Sarawak's progress is shaped by four persistent, cross-sectoral challenges: fragmented institutional coordination, gaps in talent and skills alignment, unequal access to education and digital infrastructure, and limitations in financing and institutional capacity. These constraints hinder effective policy delivery, slow technology adoption, and limit the scale of innovation intended to meet Sarawak's 2030 development goals.

The Sarawak government has cultivated various international partnerships to accelerate its economic transformation. This includes collaborations with the United Kingdom to develop local capabilities in semiconductor chip design; with Japan and China to advance hydrogen technology and establish clean energy value chains; with Australia to strengthen higher education linkages and public sector digitalisation; and with Singapore to enhance digital government platforms and public sector innovation.

Yet, Sarawak presents significant opportunities for UK institutions, businesses, and development actors to collaborate in governance, education, innovation, and commercial engagement. This study outlines a partnership model centred on four strategic themes:

- **Policy and regulatory support** – strengthening governance, digital standards, and investment frameworks to enable coordinated and efficient sectoral development.

- **Institutional partnerships and capacity building** – developing civil service digital skills, higher education, and TVET systems to develop a skilled, industry-ready workforce.

- **Joint research and innovation** – co-designing and co-funding applied research initiatives in advanced manufacturing, renewable energy, and digital technologies to accelerate knowledge exchange and commercialisation.

- **Business linkages and ecosystem development** – connecting UK firms with Sarawakian agencies, universities, and SMEs to enable integrated supply chains, promote market access, and foster inclusive economic growth.

Growing engagement by countries such as Japan, South Korea, Australia, and Singapore highlights the intensifying competition for strategic partnerships with Sarawak, underscoring the urgency for the UK to act. While the UK enjoys a comparative advantage due to its historical ties with Sarawak - rooted in shared legal, administrative, and educational legacies – this lead could weaken without targeted and sustained engagement.

Early and focused UK engagement, particularly in areas where the UK has proven expertise, can convert goodwill into strategic partnerships. This will not only allow the advancement of Sarawak's development goals but also reinforce the UK's strategic objectives in digital governance, green growth, and global science diplomacy. Sarawak is both a timely and high-value opportunity for the UK to expand its influence in Southeast Asia's emerging economies.

Advanced Manufacturing

Advanced manufacturing is recognised as a catalyst for elevating industries up the value chain and promoting sustainability. Although Sarawak's manufacturing gross output currently lags behind Malaysia's manufacturing hubs such as Selangor, Johor, and Penang, it aims to raise its manufacturing sector's contribution to reach a gross domestic product of 30 per cent by 2030, underpinned by MYR 10 billion (GBP 1.8 billion) in annual private investment and a 40 per cent increase in SMEs participation (Department of Statistics Malaysia, 2024a; MITI, 2023a).

Sarawak is implementing a comprehensive strategy focused on enhancing connectivity and infrastructure, improving regulatory frameworks and industry park management, and empowering the workforce and local businesses. The government is also keen to expand into high-value sectors such as semiconductors and aerospace. Its 22 industrial parks, hosting a mix of light to medium industries, high-tech electronics, and energy-intensive manufacturing, demonstrate the breadth of its industrial

base. This foundation has positioned semiconductors as a central pillar of Sarawak's manufacturing ambition, underpinning broader moves into advanced and high-value production. This is evidenced by the establishment of Sarawak-owned SMD Semiconductor and the presence of international firms, such as X-Fab (Germany), Taiyo Yuden (Japan), and Western Digital (United States).

While aerospace was not listed in the PCDS 2030, which was released in 2021, the Premier has since expressed Sarawak's interest in the sector as a strategic focus area for Sarawak's industrial upgrading. The government's acquisition and rebranding of MASWings and AirBorneo underscores a broader ambition that extends from providing aviation services to developing local capabilities across the aerospace value chain. This includes aircraft maintenance, repair, and overhaul (MRO), component manufacturing, and advanced materials engineering – positioning aerospace as a key proponent of Sarawak's advanced manufacturing agenda.

This study suggests three key potential avenues for UK-Sarawak collaboration, aligning the UK's strengths with Sarawak's industrial development demands.

RECOMMENDATION 1: CAPACITY BUILDING ON INDUSTRIAL POLICY AND ECOSYSTEM PLANNING

Despite Sarawak's progress in developing specialised industrial parks, the industrial ecosystem remains fragmented, with limited integration between manufacturing operations, academic research, and workforce development. Establishing a more integrated industrial ecosystem while synergising manufacturing operations, R&D centres, and workforce training would significantly enhance Sarawak's innovation capacity and economic resilience.

The UK's extensive experience in fostering integrated clusters, as demonstrated by models like the Cambridge Science Park, the Advanced Manufacturing Park, and the Catapult network, offers valuable governance models to Sarawak. These initiatives show how the alignment of research, enterprise, and infrastructure, supported by strong public-private collaboration, can drive innovation, boost supply chain resilience and support inclusive growth. Notably, Sarawak has expressed interest in adapting UK models like the National Manufacturing Institute Scotland (NMIS) and Catapult Centres to support its development objectives. It also piloted the establishment of the Industrial Park Management Committee to strengthen public-private partnerships in industrial development.

Potential areas of collaboration could include:

- **High-level advanced manufacturing dialogues** would help the UK to identify gaps in Sarawak's industrial policy, co-develop strategies to enhance Sarawak's innovation ecosystems, while creating commercial and partnership opportunities for UK firms and research institutions across advanced manufacturing, semiconductor design, and low-

carbon technologies. Key stakeholders involved in these discussions could include the Industrial Strategy Advisory Council (ISAC) and the Department for Business and Trade (DBT), alongside the Economic Planning Unit (EPU) of Sarawak, the Ministry of International Trade, Industry and Investment (MINTRED), the Sarawak Economic Development Corporation (SEDC), the Industrial Park Management Committee (IPMC), the Regional Corridor Development Authority (RECODA), and InvestSarawak.

- **Joint technical workshops and capacity building programmes** between UK institutions, such as the National Manufacturing Institute Scotland (NMIS) and Cambridge Science Park, and Sarawak counterparts like Ministry of International Trade & Industry, Industrial Terminal & Entrepreneur Development Sarawak (MINTRED), Industrial Park Management Committee (IPMC), and Regional Corridor Development Authority (RECODA), to exchange best practices in industrial park governance, digital transformation, and supply chain integration. These workshops would also explore marketing support and connecting businesses with investors.

Such partnerships would enhance Sarawak's industrial policies and governance frameworks, ultimately improving coordination between manufacturing, research, and skills development. By embedding UK expertise, Sarawak will accelerate its transition to pursue greater innovation and commercialisation to support long-term industrial growth.

Apart from gaining direct insights into Sarawak's industrial framework, this engagement will allow the UK to shape Sarawak's policies and industrial norms, aligning them to its operating models. This enables UK firms to mitigate operational risks such as environmental and social compliance, intellectual property protection, licensing and permitting, and tax policies, while taking advantage of emerging opportunities in sectors like semiconductor design, aerospace, and low-carbon manufacturing. Leveraging Sarawak's abundant clean hydropower, UK firms can participate in energy-intensive manufacturing within a low-carbon ecosystem, gaining access to sustainable supply chains while pursuing the UK's industrial decarbonisation goals. Deeper investment could also provide UK firms with a greater role in shaping Sarawak's renewable energy strategy, creating additional opportunities to deploy innovative UK clean energy solutions for industrial development (Department for Energy Security & Net Zero & Department for Business, Energy & Industrial Strategy, 2022).

RECOMMENDATION 2: BUILDING INTEGRATED TALENT PIPELINES AND EMPOWERING WORKFORCE THROUGH TECHNICAL TRAINING AND RESEARCH-INDUSTRY LINKAGES

Persistent challenges in Sarawak's industrial landscape, such as skills mismatches, weak university-industry linkages, and limited research commercialisation, underscore the need for long-term, large-scale industry–academia partnerships. While existing efforts, such as the collaboration between SMD

Semiconductor and the Centre for Technology Excellence Sarawak (CENTEXS), represent positive early steps, they remain small in scale and lack strategic direction. Moving beyond ad-hoc initiatives towards institutionalised, demand-driven partnerships will be critical in developing a workforce that supports Sarawak's ambitions in advanced manufacturing.

The UK is well-positioned to support this agenda, drawing on its globally recognised universities, industry-facing research institutions, and advanced manufacturing firms operating in frontier sectors. The UK's Advanced Manufacturing Sector Plan prioritises areas such as aerospace and advanced materials – sectors that align closely with Sarawak's industrial priorities under PCDS 2030.

Key initiatives to strengthen Sarawak's workforce could include:

- **Co-development of industry-aligned curricula, micro-credentialing programmes, and upskilling initiatives** between UK institutions such as Advanced Manufacturing Research Centre (AMRC), Compound Semiconductor Applications Catapult, and University of Nottingham, with Sarawak institutions like Universiti Malaysia Sarawak (UNIMAS), Centre for Technology Excellence Sarawak (CENTEXS), and SMD Semiconductor, to design technical programs in line with market demands.

- **Integration of international industry standards** into Sarawak's technical and vocational education coordinated through the Ministry of Education, Innovation and Talent Development (MEITD), the Sarawak Skills Development Centre (PPKS), with UK advisory inputs from certification authorities such as the British Standards Institution (BSI) and Engineering Council.

This partnership would equip Sarawak with a highly skilled, industry-ready workforce with internationally recognised qualifications, meeting the demands of global value chains. Strengthening university-industry linkages and expanding research commercialisation will support Sarawak's ambition to advance up the value chain, benefitting local SMEs and foreign investors.

By engaging in talent development in Sarawak, the UK will strategically align Sarawak's workforce capabilities with UK industry standards, developing a pipeline of professionals trained to operate according to internationally recognised technical and operational practices. This alignment will position Sarawak as a trusted partner for UK firms, reducing operational and compliance risks while facilitating smoother integration into high-value supply chains in sectors like semiconductors and aerospace. Access to Sarawak's talent pool means UK firms and research institutions will be able to recruit skilled, industry-ready personnel locally, shortening onboarding times, lowering training costs, and accelerating project execution. Beyond the immediate commercial benefits, this collaboration will enhance the UK's global reputation for excellence in industrial standards and technical education,

reinforcing leadership in frontier industries and fostering long-term, high-impact collaboration and impactful partnerships.

RECOMMENDATION 3: SMALL AND MEDIUM-SIZED ENTERPRISE CAPACITY BUILDING AND READINESS PROGRAMMES

Sarawak's ambition to deepen Small and Medium-sized Enterprise (SME) participation in advanced manufacturing remains constrained by structural barriers. While multinational firms such as X-FAB and Taiyo Yuden operate in Sarawak's semiconductor industry, local supplier networks remain nascent. In the emerging aerospace industry, SME participation remains limited due to the nascent industrial ecosystem, limited integration with global supply chains, and talent gaps, with only a few firms involved in key support segments like maintenance, repair and overhaul (MRO), precision tooling, and materials processing. To strengthen its position in high-value sectors, the Sarawak government aims to enhance SME participation in component manufacturing and specialised services, a goal that aligns closely with its broader industrial transformation strategy.

The UK's advanced industrial ecosystem and its extensive experience in developing frontier industries position it well to support Sarawak's SME development agenda, while simultaneously fostering new business opportunities for both parties. The UK's Advanced Manufacturing Sector Plan prioritises frontier sectors such as aerospace and semiconductors, which align closely with Sarawak's industrial ambition. Furthermore, the UK's semiconductor sector demonstrates the importance of complementary partnerships, with the UK's strong R&D and design capabilities but limited large-scale manufacturing capacity, creating opportunities to collaborate with trusted regions like Sarawak that offer compatible industrial capacities.

Key initiatives for collaboration could include:

- **High-level business matching discussions** between UK's Department for Business and Trade (DBT), and Sarawak's trade and investment agencies and organisations, including the Ministry of International Trade, Industry and Investment (MINTRED), Invest Sarawak, the Sarawak Economic Development Corporation (SEDC), the Sarawak Business Federation (SBF), the SME Association of Sarawak, and the Sarawak Digital Economy Corporation (SDEC). These conversations could support strategic business scoping through SME capability mapping and technical readiness assessments, aimed at identifying opportunities for business collaborations and industrial partnerships.

- **Targeted business-to-business (B2B) engagement discussion** between leading UK companies and institutions in semiconductors and aerospace industries – such as ADS Group, Rolls-Royce, IQE, and Arm Holdings – and Sarawakian SMEs in component manufacturing, MRO, and materials processing to explore opportunities for supply chain integration and collaborative growth.

- **Technical showcase and industry sharing sessions** through business associations to promote knowledge exchange on technology adoption, certification processes, and supplier development best practices. UK institutions like TechWorks (semiconductors) and ADS Group (aerospace) can partner with the Sarawak Business Federation and the SME Association of Sarawak to facilitate these sessions.

Through these initiatives, Sarawak will accelerate the modernisation and internationalisation of its SME ecosystem by facilitating technology transfer, improving production standards, and expanding access to global supply chains. Enhancing SMEs' capabilities in high-value sectors such as semiconductors and aerospace will enable Sarawak to promote inclusive industrial growth and transition into a stronger socio-economic status.

For the UK, deeper engagement with Sarawak's SME sector provides a strategic opportunity to reinforce its supply-chain resilience across key frontier industries. By partnering with Sarawakian enterprises in component manufacturing and specialised services, the UK can diversify sourcing networks, reduce dependency on high-risk regions, and accelerate the commercialisation of UK-designed intellectual property. This partnership will reinforce the UK's long-term economic and development commitment in the Southeast Asia region.

Renewable Energy

Sarawak is leading Malaysia's renewable energy transition, leveraging its devolved authority over energy matters under the Malaysia Agreement 1963 (MA63). Having surpassed its 2030 target by achieving a 62 per cent renewable energy share, primarily from hydropower, Sarawak aims to triple its total generation capacity to 15 gigawatts by 2035. This ambition underpins its vision to become the "Battery of ASEAN," positioning it as a major clean energy exporter while diversifying its domestic energy mix and decarbonising its economy.

To accelerate this transition, Sarawak is actively collaborating with international partners. Key collaborations include working with the UK on carbon trading and emissions policy, the UK and Japan on early-stage Carbon Capture, Utilisation, and Storage (CCUS) projects, and South Korea and Japan on hydrogen export infrastructure. Further partnerships with Singapore, China, and Australia are focused on advancing solutions for energy diversification and cross-border energy trade.

Despite its strong resource potential, Sarawak's energy sector faces challenges, which include fragmented governance, limited long-term financing, and talent shortages. These issues present a clear opportunity for deeper UK-Sarawak collaboration, where the UK could offer its strong comparative expertise in energy governance, regulatory practices, and green financing mechanisms to unlock Sarawak's renewable energy potential.

RECOMMENDATION 1: STRENGTHENING ENERGY GOVERNANCE AND REGULATORY PLANNING TO SUPPORT RENEWABLE ENERGY DEVELOPMENT AND EMERGING MARKETS

Sarawak's energy governance is fragmented across multiple institutions, including the Economic Planning Unit (EPU) Sarawak, the Ministry of Energy and Environmental Sustainability (MEESty), and the Ministry of Utility and Telecommunications (MUT), with overlapping responsibilities and limited coordination. While Sarawak has strategic plans to drive its renewable energy sector, the core challenge is to modernise its energy governance before it can effectively unlock new sectors such as independent power producers (IPPs), grid modernisation, and the carbon market.

The UK can be a strong partner in supporting Sarawak's efforts to strengthen energy governance, leveraging its robust regulatory architecture and deep expertise in energy market liberalisation. The similarities between Sarawak and Scotland's devolved energy governance system serve as a relevant model. Sarawak stakeholders have expressed interest in the UK-Scotland carbon revenue sharing model as a potential reference for shaping its carbon market framework.

Recommended activities could include:

- **High-level energy governance discussions** between UK agencies (e.g. the Scottish Government and the United Kingdom Partnering for Accelerated Climate Transitions (UK PACT)) and Sarawak authorities such as the Economic Planning Unit (EPU) of Sarawak, the Ministry of Energy and Environmental Sustainability (MEESty), and the Ministry of Utility and Telecommunications (MUT). These discussions would aim to share institutional models and best practices for managing regulatory coherence and coordination bottlenecks, as well as legal and fiscal analyses on carbon revenue sharing.

- **Technical studies and policy dialogues** between UK energy regulators such as the Department for Energy Security and Net Zero (DESNZ) and the Office of Gas and Electricity Markets (Ofgem), and Sarawak's Ministry of Energy and Environmental Sustainability (MEESty), the Ministry of Utility and Telecommunications (MUT), and Sarawak Energy Berhad (SEB). These engagements would focus on practical regulatory issues such as tariff-setting, emissions accounting, power purchase agreements, and independent power producer (IPP) licensing frameworks.

- **Institutional secondments and twinning arrangements,** funded by Sarawak, to enable two-way capacity sharing between UK energy authorities such as the Office of Gas and Electricity Markets (Ofgem), the Department for Energy Security and Net Zero (DESNZ), the National Energy System Operator (NESO), and their Sarawak counterparts, including the Ministry of Energy and Environmental Sustainability (MEESty), the Ministry of Utility and Telecommunications (MUT), and Sarawak Energy

Berhad (SEB). These collaborations could focus on shared priority areas between the UK and Sarawak, particularly biomass and CCUS, providing the UK with the opportunities to assess and adapt its best practices in emerging markets.

Such collaborations would strengthen Sarawak's regulatory and institutional capacity to manage an increasingly diversified energy system. A robust energy governance system will subsequently lead to a more predictable and stable investment environment, unlocking domestic and international capital to pursue innovative, environmentally sustainable projects.

Through this partnership, the UK will have the opportunity to help shape Sarawak's emerging energy regulatory landscape and ensure compatibility with UK standards, thus creating a favourable climate for UK firms to venture into this untapped market. Strategically, this partnership reinforces the UK's leadership in climate actions, demonstrating its commitment to driving climate resilience in emerging economies.

RECOMMENDATION 2: MOBILISING FINANCE TO SUPPORT RENEWABLE ENERGY ECOSYSTEM DEVELOPMENT

Sarawak faces challenges in mobilising sufficient and diversified financing for large-scale renewable energy projects. Local banks like RHB Bank and the Development Bank of Sarawak often have limited capacity due to capital constraints, risk appetite, and a preference for smaller-scale projects. As a result, transformative projects, such as floating solar farms and green hydrogen production facilities, struggle to attract adequate financing.

The UK is positioning itself as a proactive player in the future of global green trade, creating opportunities in the renewable energy sector. Through UK Export Finance (UKEF), the UK supports international clean energy projects by providing financing and loan guarantees to overseas buyers. This model not only addresses financial barriers in recipient markets but also aligns with UKEF's Sustainability Strategy, which aims to place UK suppliers at the forefront of the global low-carbon transition. This strategy supports both the UK's economic growth and its ambition to lead in clean energy innovation worldwide. Beyond direct financing, Sarawak seeks to develop a robust policy mechanism to institutionalise the process for attracting and structuring blended finance.

Here, the UK could play a catalytic role by leveraging its leadership in green finance:

- **Co-designing blended financing models** by leveraging expertise from UK PACT, UKEF, and the National Wealth Fund to map funding sources, identify development priorities, and design a framework to pool concessional loans, government guarantees, and private capital for renewable energy projects.

- **Technical assistance on the design and structuring of innovative financing instruments** aligned with international standards, such as green bonds and sustainability-linked loans, utilising the UK's expertise in developing credible green finance frameworks through institutions such as the UK Export Finance (UKEF) and the National Wealth Fund.

- **Financing instruments**, such as guarantees, concessional loans, and insurance instruments, through UKEF and UK commercial and investment banks specialising in international project finance, can help de-risk private investments in Sarawak, particularly in renewable energy, emerging technologies, and infrastructure**.**

- **Business matching discussions** facilitated jointly by UK and Sarawak trade authorities, such as the Department for Business and Trade (DBT) and Invest Sarawak, bridging UK investors and companies with clean energy opportunities in Sarawak across biomass, solar, and hydrogen supply chains.

Such initiatives can accelerate Sarawak's energy transition by mobilising greater capital to unlock large-scale renewable energy infrastructure development. They will strengthen Sarawak's institutional capacity to manage complex financing structures and create a favourable investment climate for renewable energy investors. Collaborating directly with UK investors will also allow Sarawak to unlock additional private capital and diversify financing channels.

Simultaneously, this partnership provides UK financial service providers and exporters with early exposure to Southeast Asia's growing clean energy markets, creating greater revenue streams and strengthening the UK's commercial presence in Southeast Asia. This, in turn, will solidify the UK's position as a credible partner in green finance, strengthen its influence in the region's green economy, and reinforce its global reputation as a leader in clean growth.

Digital Transformation

Digital transformation is central to Sarawak's ambition of nearly doubling its GDP from MYR 148.2 billion (GBP 26.3 billion) in 2024 to MYR 282 billion (GBP 50.1 billion) by 2030. Framed as both an economic repositioning strategy and a driver for inclusive growth, Sarawak's digital strategy is anchored in the Sarawak Digital Economy Blueprint 2023-2030 and with the federal government's Malaysia Digital Economy (MyDIGITAL) Blueprint. Targets include achieving 100 per cent online government service delivery and raising the digital economy's contribution to 20 per cent of GDP by 2030 (Economic Planning Unit Sarawak, 2023b).

Sarawak has actively engaged international partners to implement an integrated digital strategy, focusing on public sector modernisation, the adoption of frontier technologies, and bridging urban-rural divides through connectivity. Its Sarawak ID system, modelled on Singapore's Singpass, provides secure digital access to over 200

government services (Economic Planning Unit Sarawak, 2023b). Collaborations with Huawei, Microsoft, and AWS have enhanced 5G rollout, cloud adoption, cybersecurity, and workforce upskilling (The Rakyat Post, 2024; Microsoft Malaysia, 2022; Ling, 2025c). In the academic space, the University of Melbourne works with the Sarawak Digital Economy Corporation (SDEC) on research in digital governance and artificial intelligence (Sarawak Digital Economy Corporation Berhad, 2024a). These partnerships demonstrate Sarawak's commitment to adopting global best practices to enhance public service delivery and drive digital innovation.

Sarawak's digital ambitions are underpinned by two priorities: building a future-ready public sector and cultivating a vibrant digital ecosystem. On the public sector front, the government is driving infrastructure modernisation, improving service delivery, and prioritising civil service upskilling. While ecosystem-building remains essential to Sarawak's broader transformation, this report centres on strengthening the public sector – recognising that an integrated, citizen-centric government is the foundation for scaling digital innovation across Sarawak's state-led economy.

RECOMMENDATION 1: SUPPORTING DIGITAL SKILLS DEVELOPMENT FOR SARAWAK CIVIL SERVICE

Sarawak's digital transformation hinges on its civil service, particularly senior leaders and policymakers, having the digital competencies to design, steer, and sustain the government's digital agenda. The pace of technological change makes continuous upskilling essential; without it, Sarawak might risk lagging in adopting emerging technologies and realising the full value of its digital economy agenda.

The UK's experience in large-scale civil service upskilling offers a strategic partnership opportunity. Its Government Digital and Data profession, now accounting for around 6 per cent of the UK civil service workforce, demonstrates how sustained investment builds digital expertise at scale (Government Digital Service, 2025a). The UK's one-stop training platform integrates general awareness modules with specialised pathways in artificial intelligence, data innovation, and digital leadership, providing a flexible, export-ready model that Sarawak can adapt (Government Skills, 2025).

A Sarawak–UK partnership would be delivered through:

- **Technical workshops** on assessing digital capabilities**,** including frameworks and tools to measure digital maturity, identify skills gaps, and design targeted interventions for the civil service**.** The Sarawak Civil Service Digitalisation Unit (SCSDU) and the Leadership Institute of Sarawak Civil Service could lead locally, in collaboration with UK counterparts such as the Government Digital Service (GDS), Government Skills, and the Civil Service College.

- **Development of an online and blended learning platform** for civil servants**,** modelled after the UK's approach, including centralised access to certified courses

and learning modules tailored to varying levels of technical proficiency. In Sarawak, the Leadership Institute of Sarawak Civil Service would serve as the primary counterpart to the UK's Government Skills and the Civil Service College.

- **Enhancement of existing digital upskilling and leadership modules,** including the creation of new courses for senior leaders and technical staff focused on digital transformation leadership, data governance, AI for public policy, and ethical technology adoption. Key Sarawak partners could include SCSDU and the Leadership Institute of Sarawak Civil Service, working alongside the UK's GDS, Government Skills, and the Civil Service College.

For Sarawak, the partnership would strengthen digital capabilities across the civil service, enabling more effective policy planning, improved service delivery, and the secure adoption of emerging technologies across sectors. Collaboration with the UK would also support the creation of a structured, top-down digital upskilling framework, institutionalise continuous learning and help build a digitally mature civil service.

For the UK, the collaboration enables institutions and vendors to export established digital government learning frameworks, certification programmes, and advisory expertise to a growing market, generating both immediate and long-term revenue opportunities. With the co-development of integrated learning platforms and tailored leadership modules, UK providers can establish early engagement with Sarawak's civil service, shape the design of Sarawak's digital transformation in line with UK standards, and strengthen the UK's competitive position in public sector digital services.

RECOMMENDATION 2: STRENGTHENING INSTITUTIONAL CAPACITY FOR DIGITAL GOVERNMENT ADOPTION

Sarawak's goal of fully integrating digital public services by 2030 is constrained by more than 200 legacy systems operating in isolation. The lack of common digital standards, coordination mechanisms, and interoperable platforms across ministries compounds this fragmentation. Without stronger institutional capacity to set and enforce standardised frameworks, progress will remain piecemeal. Strengthening this capacity would enable Sarawak to deliver more efficient government operations, better citizen services, and higher trust and adoption of digital platforms.

The UK offers a proven reference point through the Government Digital Service (GDS) model. Its digital transition is anchored via centralised governance, enforceable service standards, and unified platforms such as GOV.UK and One Login – ensuring coherence across agencies (Government Digital Service, 2025a). The GDS design system is globally recognised for embedding user-centred service design, enabling cloud adoption, and deploying open-source frameworks to deliver consistent, high-quality services across government (McEvoy, 2020). Importantly, the UK continues to improve this model through continuous review and iteration, ensuring its digital government

approach remains responsive to emerging technologies and evolving citizen needs (Government Digital Service, 2025b).

A UK–Sarawak partnership could focus on strengthening Sarawak's institutional capacity for coordinated digital service adoption. Key activities would include:

- **Technical workshops and advisory support** on digital governance, enterprise architecture, and interoperability frameworks. The UK's Government Digital Service (GDS) and private providers, such as Public Digital Ltd and Thoughtworks UK, could partner with the Sarawak Multimedia Authority (SMA) and the Sarawak Civil Service Digitalisation Unit (SCSDU).

- **Co-development of a "Sarawak Digital Service Standard" and implementation playbook,** adapted from the GDS principles. GDS, together with private sector providers such as Public Digital Ltd and Thoughtworks UK, could collaborate with Sarawak counterparts, including the Sarawak Multimedia Authority (SMA) and SCSDU (Public Digital Ltd, n.d.; Thoughtworks, Inc., n.d.).

- **Advisory support on the design of a centralised digital procurement marketplace,** enabling government entities to source approved digital services, infrastructure, and tools through a single platform. This would involve collaboration between the UK's GDS and private firms such as Public Digital Ltd and Thoughtworks UK, working alongside Sarawak agencies like SMA and SCSDU.

For Sarawak, this partnership would enable a strategic shift from fragmented, siloed digital initiatives toward a unified, standards-based governance model. It would enhance service delivery, ensure interoperability across ministries, and deliver significant cost efficiencies and scalability through standardised governance, shared frameworks, and coordinated digital procurement – reducing duplication and enabling faster, more consistent digital rollouts.

For the UK, the partnership provides direct commercial access to Sarawak's growing GovTech market, generating immediate opportunities and sustained demand for UK digital solutions and advisory services. Aligning Sarawak's digital governance standards with the proven UK GDS model would also support the internationalisation of UK GovTech providers and consultancies, showcasing the adaptability of their frameworks in emerging market contexts. This reinforces the UK's global credibility in digital government reform and positions UK firms as credible partners for scalable, standards-based digital transformation in developing economies.

Education and Human Capital Development

Sarawak recognises that a workforce with the appropriate skills and capabilities is fundamental to its long-term growth ambitions in energy transition, advanced manufacturing, and digital technology (Economic Planning Unit Sarawak, 2023a).

This ambition rests on two interconnected fronts: strengthening foundational education (ages 7–17) to ensure universal literacy, numeracy, and digital readiness, and expanding pathways in vocational, technical, higher, and professional education to meet sector-specific demands (Lendai et al., 2024; Rakan Sarawak, 2024).

Sarawak also established a range of active international enhanced learning opportunities across the pipeline, from foundational education to professional upskilling, anchored in internationally recognised standards for its priority sectors. The UK remains a longstanding collaborator, supporting British curricula and the International General Certificate of Secondary Education (IGCSE) syllabus in public international schools, providing teacher training, and delivering civil servant upskilling programmes at the UK Civil Service College (The Borneo Post, 2024; Umpang, 2025a; Khushiri, 2024b). Swinburne University of Technology Sarawak and Curtin University Malaysia provide access to globally recognised qualifications and research capacity (Toyat & Chua, 2024; Swinburne University Sarawak, 2023; 2025). Other collaborations that Sarawak partake in also include China and Brunei, which have supported training in hydrogen fuel cell technology, artificial intelligence, and data analytics (Sarawak Energy, 2025; SMD Semiconductor, 2024; Sarawak Skills, 2024; Sarawak Digital Economy Corporation Berhad, 2024b).

This study identifies three priorities in Sarawak's education sector: strengthening foundational education to reduce dropout rates, expanding Technical and Vocational Education and Training (TVET) to build a skilled workforce, and advancing research and development (R&D) to support innovation in sectors such as renewable energy and advanced manufacturing. While all areas are central to Sarawak's long-term vision, the recommendations focus on partnership opportunities where the UK can play a catalytic role in scaling TVET and R&D.

RECOMMENDATION 1: ENHANCING RESEARCH PARTNERSHIPS IN RENEWABLE ENERGY, ADVANCED MANUFACTURING, AND DIGITAL TECHNOLOGIES

Sarawak's ongoing investment in R&D provides a strategic opportunity to deepen collaboration with the UK in renewable energy, advanced manufacturing, and digital technologies. Despite significant local funding, limited access to sustained international expertise constrains the scale and impact of research. A co-funded, co-designed UK–Sarawak research partnership would strengthen scientific collaboration while enabling both economies to capture industrial value chains in priority sectors critical to their long-term growth.

The UK is recognised as a global scientific leader, backed by institutions like Innovate UK and the Catapult Network, which link cutting-edge research to commercial applications (UK Government, 2025). Its world-class centres, including the Advanced Manufacturing Research Centre (Sheffield), Durham Energy Institute, and the Alan Turing Institute, demonstrate how targeted research can accelerate industrial growth and societal impact.

The UK and Sarawak share aligned priorities in renewable energy, advanced manufacturing, and digital technologies. By adopting a co-funded, co-designed applied research model, the partnership would allow both parties to align objectives, mitigate asymmetries in capacity, and ensure collective ownership of knowledge outputs.

Collaboration would include:

- **Co-design and planning of research initiatives,** including jointly defining priority sectors, research questions, project scopes, expected outcomes, and governance mechanisms.

- **Collaborative experimentation and field trials,** leveraging Sarawak's local testbeds and UK technical expertise for methodology design, lab-based research, and prototype validation.

- **Industry integration and applied use-case project development,** engaging UK and Sarawak industry partners to translate research into commercially viable applications, pilot new technologies, and develop shared intellectual property, licensing, or technology adoption opportunities.

Key partners are organised based on thematic areas of collaboration in the higher education sector:

Thematic Areas	Sarawak Institutions	UK Institutions
Engineering & Advanced Manufacturing	iCATS University College Curtin University Malaysia Swinburne University Sarawak UNIMAS	University of Sheffield – Advanced Manufacturing Research Centre Cardiff University – Manufacturing Engineering Centre University of Strathclyde – Advanced Forming Research Centre Cranfield University – School of Aerospace, Transport and Manufacturing
Renewable Energy & Green Technologies	CENTEXS Green Energy Academy Curtin University Malaysia Swinburne University Sarawak Sarawak Biodiversity Centre	Durham University – Durham Energy Institute Loughborough University – Centre for Renewable Energy Systems Technology University of Derby – Zero Carbon Centre Imperial College London – Energy Futures Lab
Computer Science & Digital Innovation	Swinburne University of Technology Sarawak Curtin University Malaysia	Cardiff University – Digital Transformation Innovation Institute Alan Turing Institute University of Edinburgh – Bayes Centre

Table 1: Key Institutions between Sarawak and the UK for University-Based Partnerships

For Sarawak, this partnership would strengthen domestic research & development capacity, align research with industrial priorities, and provide access to UK research excellence and technical expertise. It enables Sarawak to adopt internationally recognised standards and methodologies while cultivating a skilled local research workforce. High-profile collaborations with the UK in priority sectors can further enhance Sarawak's credibility, attracting international partners, investment, and additional collaborative opportunities.

For the UK, the partnership provides access to Sarawak-funded research design, technical consultancy, and innovation contracts delivered by UK universities, research consortia, and firms. It also facilitates early market entry into Sarawak's renewable energy, advanced manufacturing, and digital technology sectors, positioning UK expertise at the forefront of emerging opportunities. This approach directly supports the UK's Modern Industrial Strategy by expanding global technology exports and reinforcing its presence in fast-growing Southeast Asian markets.

RECOMMENDATION 2: EXPANDING UK HIGHER EDUCATION EXPORTS AND MARKET PRESENCE IN SARAWAK

Despite strong interest in international education among Sarawakian students, the UK's presence remains limited, particularly compared to Australia and, increasingly, China. Australian universities have long-established campuses in Sarawak, while Chinese institutions are ramping up partnerships, scholarships, and outreach (British Council, 2025). In contrast, UK initiatives such as Study UK, the UK-Malaysia University Consortium, and Going Global Partnerships remain concentrated in Peninsular Malaysia, leaving East Malaysia underserved despite its large, young, English-speaking population that shows strong interest in science, technology, and international mobility.

The UK can address this missed opportunity by extending its education promotion and recruitment activities directly into Sarawak. A more targeted approach would not only raise awareness of UK pathways and scholarships but also position the UK as a leading partner in a strategically important region.

Practical avenues for collaboration could include:

- **Targeted outreach events** in Sarawak, such as education fairs, school visits, and information sessions hosted in partnership with local schools and universities.
- **Digital marketing and scholarship promotion** tailored to Sarawakian students**,** highlighting the comparative advantages of UK qualifications and campus life.
- **Partnership facilitation** for dual degree and credit transfer programmes, providing affordable entry points for Sarawakian students and giving UK institutions long-term engagement opportunities; and
- **Stronger coordination with government-level actors,** including the Ministry of Education, Innovation and Talent Development (MEITD) and local agents, to strengthen the UK's presence and visibility.

For Sarawak, this partnership expands the range of education options, increases the global recognition of qualifications, and provides students with access to international networks and career pathways. It allows students to experience high-quality education abroad without the typically high financial burden, supporting the development of a globally competitive workforce.

For the UK, the partnership offers a cost-effective, high-impact approach to strengthen its higher education brand in a strategically important and fast-growing market increasingly dominated by Australia and China. By engaging directly with schools, universities, and prospective students, UK institutions can diversify their international student pipeline beyond traditional markets and establish early, long-term relationships with a young, English-proficient population seeking global qualifications. Over time, this generates sustained commercial benefits through increased student enrolment, tuition revenue, and expanded alumni networks – directly contributing to the

UK's target of GBP 35 billion in annual education exports by 2030 and reinforcing its position as a global leader in quality higher education.

RECOMMENDATION 3: SUPPORTING INTEGRATED TVET-HIGHER EDUCATION PATHWAY

As Sarawak redesigns its talent pipeline to support high-growth sectors, Sarawak and the UK can collaborate to develop a coherent progression system that connects technical, vocational, and higher education pathways. The vision is to establish flexible, "education-to-employment" pathways that combine industry-relevant skills, practical training, and globally recognised qualifications.

The UK offers relevant experience through models such as Scotland's Foundation Apprenticeships, which elevate TVET to equal status with academic education and enable seamless mobility between vocational and academic streams (Scottish Qualifications Authority, 2019). Sarawak stakeholders have shown strong interest in adapting such frameworks.

This collaboration would include:

- **Technical advisory and system design** support for integrated TVET-higher education pathways. Sarawak could contract UK experts to help design and implement a more connected system, including the creation of shared credit frameworks and the development of dual-certification pathways.

- **Capacity-building** workshops for TVET educators and administrators, focusing on strengthening the interface between technical and higher education systems. Key areas could include curriculum co-design, employer engagement, and qualification mapping.

- **Co-development of industry-linked apprenticeship schemes and work placements** tailored to Sarawak's priority growth sectors. The UK would export its expertise in apprenticeship model design by adapting Scotland's Foundation Apprenticeships framework.

For Sarawak, this collaboration represents a concrete step toward implementing integrated, industry-aligned education models by leveraging global expertise to strengthen TVET quality. It would create a more agile education system capable of producing technically skilled, industry-ready graduates trained and accredited to UK standards, thereby enhancing local employability and international mobility.

For the UK, supporting Sarawak's integration of TVET and higher education offers commercial and strategic opportunities. In the short term, UK skills agencies and training providers can secure government-funded contracts for consultancy, capacity-building, and licensing UK-accredited frameworks, establishing a sustained presence in Sarawak's growing education ecosystem. In the longer term, aligning Sarawak's

qualifications with UK benchmarks would create a pool of industry-ready and UK-qualified talent, benefiting UK firms already operating or seeking entry into Sarawak. Collectively, these initiatives reinforce the UK's global reputation in skills development while delivering tangible commercial returns.

Conclusion

The UK–Sarawak partnership presents a strategic opportunity to drive inclusive, sustainable development while unlocking mutual economic and innovation opportunities. Collaborations across the four priority sectors – advanced manufacturing, renewable energy, digital transformation, and education – respond directly to Sarawak's Post-COVID Development Strategy 2030 and the UK's international development goals on climate resilience, human capital, and digital inclusion.

For the UK, these create commercial and innovation opportunities, enabling UK firms, universities, and research centres to engage in applied R&D, technology deployment, and skills-building initiatives. It allows the UK to export its expertise in green technologies, public sector modernisation, and education. Sectoral collaborations would help address structural challenges, including institutional fragmentation, talent and skills gaps, digital and education access, and limited financing and implementation capacity. They also reinforce the UK's global reputation in sustainable development, digital government, and education excellence.

With Sarawak's strong political commitment, evolving industrial base, and strong historical ties to the UK, the UK can build a forward-looking and mutually beneficial relationship that demonstrates the UK's solutions at scale and positions it as a trusted partner.

1 INTRODUCTION

1.1 Background

Sarawak is one of two Malaysian states on Borneo Island, spanning a landmass of 124,450 km². It is located near Singapore and neighbouring Indonesia and Brunei. Sarawak has a population of 2.5 million and holds a distinctive position in the Malaysian federation due to its expansive territorial size (Department of Statistics Malaysia, 2024b).

Figure 1: Map of Sarawak, Malaysia | Source: Encyclopaedia Britannica, 2025

Sarawak is strategically located in the South China Sea region, placing it in a favourable position to serve as a regional energy hub. Its abundant natural resources, such as the huge mass of water bodies, mineral reserves, and vast green landscapes, offer Sarawak a clear advantage in advancing a green economy and clean energy transition. With three operational hydropower dams in Bakun, Batang Ai, and Murum, generating a combined capacity of more than 2,000 megawatts, Sarawak aspires to position itself as the 'Battery of ASEAN' by 2035 (The Malaysian Reserve, 2024).

In 2023, Sarawak was officially accorded 'region' status – an acknowledgement of its unique position under the Malaysia Agreement 1963 (MA63). The MA63 outlines the constitutional safeguards that ensure the autonomy and development of Sabah and Sarawak within Malaysia. This recognition comes with a set of autonomies, granting the Sarawak government greater authority and sovereignty in areas such as education, healthcare, immigration, finance, judiciary, and legislation (Puyok, 2024).

These new mandates have enabled Sarawak to pursue specific policy initiatives and development strategies. Notable examples include the establishment of Sarawak's own tertiary-level educational institutions to address the growing demand for skilled talent;

the formulation of a Sarawak-specific Carbon Capture, Utilisation and Storage (CCUS) Bill to regulate and advance low-carbon technologies; and the strategic pursuit of foreign investment in the green economy and clean energy sectors to support sustainable development (Aubrey, 2024c). This autonomy enables Sarawak to maintain a neutral stance in strategic areas whilst cultivating strong diplomatic and development ties with countries such as Japan, China, and the Republic of Korea through ongoing bilateral development projects under the Post COVID-19 Development Strategy (PCDS) 2030 (Department of Statistics Malaysia, 2025b).

Sarawak recorded its highest-ever financial performance, with MYR 14.18 billion (GBP 2.5 billion) in revenue for 2024 (Meraw, 2025). In 2024, Sarawak's development spending amounted to MYR 8.66 billion (GBP 1.5 billion) – 64 per cent share of the total budget. For 2025, Sarawak allocated MYR 10 billion (GBP 1.8 billion) for development, an increase of approximately 15.5 per cent (MYR 1.34 billion; GBP 238 million), with MYR 5.9 billion (GBP 1 billion) sourced from the federal government (Umpang, 2025b). The Sarawak government continues diversifying its revenue streams by developing other economic sectors, such as green energy industries, and sourcing foreign investments independently to maintain Sarawak's high-income status in the region.

Figure 2: PCDS Economic Anchors and Enablers | Source: EPU Sarawak, 2023a

The Sarawak government launched the Post COVID-19 Development Strategy 2030 (PCDS 2030) in 2021 as a strategic framework to align economic prosperity, social inclusivity, and environmental sustainability with its goal of becoming a high-income, innovation-driven economy. The strategy integrates economic growth with social inclusion and environmental stewardship, detailing a series of catalytic initiatives across six priority economic sectors – manufacturing, agriculture, tourism, forestry, mining, and social services – and seven enablers: digital transformation, innovation, education and human capital, basic infrastructure, utilities, transport, and renewable energy.

PCDS 2030 aims to boost productivity, attract investment, accelerate digital adoption, and promote environmental and social inclusion. This integrated approach strengthens Sarawak's capacity to attract quality investments from abroad, such as Japan, China, and the Republic of Korea, to build a more resilient, sustainable economy (UKAS, 2025c). This study outlines Sarawak-UK aligned economic sectors and further explores potential bilateral collaborations in four key areas: advanced manufacturing, renewable energy, digital transformation and education and human capital development.

1.2 Approach and Methodology

This study employed a mixed-methods approach to assess opportunities for collaboration between the United Kingdom and Sarawak to support Sarawak's long-term development goals and broader strategic economic relations. The research combined desk-based research, key informant interviews, and focus group discussions. A validation workshop was conducted with industry key players from Sarawak and the UK to verify and challenge study findings and discuss preliminary recommendations. Ethical standards were applied throughout the process, including source validation, transparent data use, and proper attribution to enhance the study's credibility and minimise biases.

The study's main scoping question and research questions were:

- **How can the UK and Sarawak governments develop and foster partnerships that support Sarawak's socioeconomic development over the next twenty years?**
- What are the Sarawak government's long-term development policy goals in these sectors?
- What are the existing gaps in expertise and resources?
- What other government partnerships have been established in these sectors, and to what extent have these partnerships been successful?
- What kinds of long-term and sustainable partnerships are Sarawak looking to establish through collaboration with the UK in the focus areas of this study?
- How can Sarawak and the UK stakeholders advance Sustainable Development Goals (SDGs) and mutually benefit from collaborations in these sectors, and what are the potential indicators of success?

Drawing from the economic sectors and enablers detailed in PCDS 2030 and based on initial consultations with the FCDO and Economic Planning Unit (EPU) Sarawak, the study will focus on four priority sectors:

- **Advanced Manufacturing** – covering industrial parks, aerospace, and semiconductors.
- **Renewable Energy** – covering hydrogen, carbon capture, utilisation, and storage (CCUS), alternative sources like solar and biomass, and grid infrastructure.
- **Digital Transformation** – covering infrastructure modernisation, digital governance frameworks, and upskilling civil servants in digital skills and services delivery.
- **Education and Human Capital Development** – covering initiatives such as the Dual Language (Malay-English) Programme, teacher professional development, and the enhancement of tertiary education systems with integrated technical and vocational education and training (TVET) programmes.

1.3 Limitations of Study

Certain constraints affected the depth and scope of sectoral insights in this study, such as scope and subsector coverage, insights extension of economic sectors and access to current policy documents and roadmaps. Each economic sector selected in this study offers a broad range of subsectors, many of which warrant dedicated and in-depth analysis beyond the scope of this research. These constraints underscore the evolving nature of sectoral strategies in Sarawak and the need for continued policy monitoring and stakeholder engagement. Broader access to strategic documents, industry feedback, and programme performance data would enable the strengthening of future partnership assessments and policy alignment.

2 FINDINGS

2.1 Overview

Sarawak is actively strengthening its economic positioning by forging partnerships with governments, institutions, and private sector entities. Leveraging its geostrategic location in the South China Sea, abundant natural resources, and conducive policy environment for investment, Sarawak aims to establish itself as a key sustainable and innovation-led player in the region (Lim, 2025a).

Guided by the economic sectors and enablers outlined in PCDS 2030, and informed by preliminary consultations with the Foreign, Commonwealth and Development Office (FCDO) and the Economic Planning Unit (EPU) Sarawak, this study examines four sectors: advanced manufacturing, renewable energy, digital transformation, and education and human capital development. Across these sectors, **four cross-cutting challenges consistently emerge: weak coordination across institutions and stakeholders, persistent talent and skills mismatch, unequal access and inclusion gaps, and financing and institutional capacity constraints.** These structural

challenges reflect deep-rooted system-level issues that are hindering Sarawak's progression.

International partnerships are pivotal in this strategy, especially in emerging sectors, such as advanced manufacturing and renewable energy. Sarawak maintains multiple international partnerships, including the United Kingdom on semiconductor chip design, Japan and China on hydrogen technology, Australia on higher education and public sector digitalisation, and Singapore specifically on public sector digitalisation.

While Sarawak's economic transformation agenda is progressing, systemic gaps continue to stall the effectiveness and scalability of sectoral initiatives. These gaps are outlined below:

- **Fragmented Coordination Across Institutions and Stakeholders**

There is a clear need for stronger coordination across institutions and stakeholders as responsibilities are dispersed across multiple agencies and organisations that often operate in silos. In the renewable energy sector, overlapping mandates between ministries, e.g. the Ministry of Energy and Environmental Sustainability Sarawak (MEESty), the Economic Planning Unit (EPU) Sarawak and the Ministry of Utility and Telecommunication (MUT), hinder integrated oversight. Similarly, weak institutional alignment affects industrial park planning and management, where linkages between training providers, regulators, and investors remain ad hoc. In the digital transformation sector, the integration of over 200 legacy systems, many developed in isolation, continues to impede public sector digitalisation. The education and human capital development face parallel issues, where a lack of articulation between academic and technical pathways undermines the formation of a cohesive talent pipeline.

- **Talent Gaps and Skills Mismatch**

Despite growing demand in high-growth areas, such as semiconductors, hydrogen technology, and artificial intelligence (AI), the supply of skilled labour remains limited. Sarawak lacks local expertise in hydrogen, environmental engineering, and microelectronics, increasing reliance on foreign technical support. Industry players in advanced manufacturing report that graduates are not adequately equipped with the technical competencies required for high-value roles. Similarly, the digital economy is constrained by shortages in AI, cybersecurity, and data analytics. While initiatives from government institutions like the Centre for Technology Excellence Sarawak (CENTEXS) and Sarawak Digital Economy Corporation Berhad (SDEC) aim to bridge these gaps, the training ecosystem remains unevenly matched to the pace of technological change.

- **Unequal Access and Inclusion Gaps**

Training programmes and academic pathways are not always aligned with sector-specific needs, causing gaps in graduate employability and slow technology adoption. High student dropout rates during the primary-to-secondary transition, especially in rural areas, highlight systemic barriers such as poverty, child marriage, and infrastructure deficits. Despite improved connectivity through the National Digital Network (JENDELA) and Sarawak Linking Urban, Rural and Nation (SALURAN) programmes, rural and senior populations face persistent adoption challenges due to language barriers and low digital confidence. Unequal access also limits participation in high-growth sectors, with women, youth, and rural communities underrepresented in fields such as clean energy and semiconductors.

- **Financing and Institutional Capacity Constraints**

Access to financing, particularly for early-stage innovation and capital-intensive projects like green hydrogen infrastructure and biomass generation facilities, remains constrained due to limited financing instruments. While Sarawak agencies such as the Sarawak Ministry of International Trade and Industry (MINTRED), Invest Sarawak, Sarawak Digital Economy Corporation (SDEC), and the Sarawak Research and Development Council offer funding and investment-related support, current mechanisms remain modest in both scope and scale, relative to sector needs. The public sector is experiencing gaps in areas such as digital governance and artificial intelligence. In education, reform initiatives, such as standardised assessments and dual-language programmes, require sustained investment and technical expertise. Across sectors, stakeholders emphasise the need for stronger institutional capacity to support policy execution, workforce development, and long-term ecosystem building.

2.2 Advanced Manufacturing

2.2.1 Overview

Advanced manufacturing is a crucial pillar of Sarawak's strategic shift from traditional reliance on oil and gas and primary industry towards a diversified, innovation-driven economy. It refers to the use of innovative technologies and modern production processes to enhance the design, manufacturing and delivery of goods. This approach emphasises greater efficiency, precision, and environmental sustainability, enabling industries to produce higher-value products while reducing costs and resource consumption. Key technologies employed to drive this approach include automation and robotics, artificial intelligence and machine learning, advanced materials, and the Internet of Things (IoT).

Sarawak's ambitions in this sector are guided by the broader federal-level New Industrial Masterplan (NIMP) 2030[1], particularly Mission 1: "Advance Economic Complexity", developed by the Ministry of Investment, Trade and Industry (MITI),

which seeks to foster growth in advanced manufacturing sectors, such as semiconductors and aerospace. These sectors are regarded as areas where Sarawak is beginning to assert a distinct comparative advantage, driven by strong political commitment and abundant resources to spur industrial development. (Bernama, 2024a).

Sarawak's manufacturing sector is steadily growing but currently remains behind Malaysia's leading manufacturing hubs, such as Selangor, Johor, and Penang (Department of Statistics Malaysia, 2024a). The growth is predominated by key sectors, such as electrical and electronics, chemical products, and machinery and equipment, which primarily produce components and semi-finished products that are exported to other countries for further assembly or manufacturing. With the sector accounting for up to 28 per cent of Sarawak's gross domestic product, it is poised to exceed its 30 per cent manufacturing contribution to gross domestic product target by 2030 (Sander, 2025).

Sarawak's ambition in advanced manufacturing is defined in the Post-COVID Development Strategy 2030 (PCDS 2030). Aligned closely with the federal objectives of nurturing high-value and innovation-driven manufacturing, the PCDS 2030 envisions Sarawak as a preferred destination for high-value downstream manufacturing, targeting both domestic and foreign investors. Within this vision, key performance indicators include:

- Increasing the manufacturing sector's share of the gross domestic product to 30 per cent by 2030;
- Mobilising MYR 10 billion (GBP 1.8 billion) in private investment annually;
- Raising SME participation by 40 per cent; and
- Promoting digital adoption among 70 per cent of small and medium-sized enterprises (Economic Planning Unit Sarawak, 2021).

These ambitions reflect Sarawak's commitment to leveraging industrial development not only to drive economic growth but also to promote social mobility, technological progress, and enhanced export competitiveness.

To achieve its manufacturing aspirations, Sarawak is pursuing a comprehensive strategy that focuses on building new transport and industrial infrastructures, improving industrial park management, and supporting local businesses in transitioning to higher value activities[2], enhancing the skilled workers pipeline, and reviewing regulations to attract foreign direct investment. These efforts are especially timely, as international companies continue to reassess their manufacturing footprints in response to ongoing trade tensions, particularly between the United States and China, rapid technological change, and growing pressure to build more sustainable,

low-carbon supply chains. This confluence of factors presents a unique opportunity for Sarawak to position itself as a competitive and reliable option to both domestic and global investors.

The Sarawak government demonstrates its commitment to the sector through targeted fiscal measures and investment priorities. Between 2021 and 2023, the Sarawak government secured MYR 21.5 billion (GBP 3.8 billion) in approved investments for the manufacturing sector, underscoring growing investor interest and policy traction (Economic Planning Unit Sarawak, 2023a). In 2025, the government reaffirmed its "Intensifying Industrialisation" agenda in the State Budget with MYR 40 million (GBP 7.1 million) for 14 new industrial parks and MYR 5 million (GBP 880,000) for a high-tech industrial park in Kuching focusing on semiconductors, advanced manufacturing, and research and development (Abang Zohari Abang Openg, 2024). Aside from that, the government also earmarked MYR 3.1 million (GBP 550,000) for small and medium enterprises (SMEs) capacity-building programs in entrepreneurship, technical expertise, digital marketing, and product promotion (Minggu, 2024). These budgetary allocations signal a strong political will for industrial upgrading and aim to create conditions for greater local business participation in higher-value economic activities.

Aligning with the federal government's broader industrial strategy, the Sarawak government emphasises retaining a greater share of the economic value generated through its production activities. Instead of exporting raw materials or basic components, Sarawak aims to expand local processing and manufacturing of finished or specialised goods. This approach is expected to create stronger economic linkages within the local economy, generate higher-income jobs, and support wider benefits for local communities.

A core part of this strategy is to increase the role of small and medium-sized enterprises in more advanced stages of manufacturing, such as precision machining, advanced packaging, and smart manufacturing, which are considered high-value segments in both the semiconductor and aerospace industries. By leveraging Sarawak's existing assets like skilled labour, raw materials, and infrastructure, local businesses can shift toward producing higher-value goods with greater market potential. To support this, the government is investing in better-organised, sector-focused industrial parks designed to attract high-technology firms and enable collaboration across the supply chain. Following the success of established facilities, such as the Sama Jaya Free Industrial Zone and the Samalaju Industrial Park, the government is also considering developing a dedicated Aerospace Industrial Park to support entry into emerging and innovation-led sectors.

Talent development, particularly in technology-driven industries, is also a key policy direction for the Sarawak government in facilitating its transition towards advanced manufacturing. Industries, such as semiconductor design, precision electronics, and clean energy, require workers with strong technical expertise and the ability to adapt to rapidly evolving tools, processes, and technologies. To support this,

the 2025 State Budget earmarked MYR 6 million (GBP 1.1 million) for talent development in semiconductor design, expanding professional training programmes by SMD Semiconductor, the Sarawak government-incorporated fabless chip design house (Abang Zohari Abang Openg, 2024). This funding supports initiatives, such as the SMD Semiconductor's Integrated Circuit Design Competition and the Semiconductor Mastery Programme, which provides specialised industry training courses in semiconductor testing and development (The Sun, 2025; BERNAMA, 2025b). These efforts form part of a broader workforce strategy supported by the Ministry of Education, Innovation, and Talent Development (MEITD), which seeks to cultivate a pool of 500,000 skilled workers by 2030 through industry-aligned training.

Beyond these efforts, Sarawak is also reviewing its investment policies to provide clearer guidance and reduce bureaucratic barriers for investors. A new investment policy, the Sarawak Investment Policy, is currently in development to provide greater regulatory clarity and streamline investor onboarding processes (Wong, 2024a). MINTRED is also leading the formulation of a master plan for SME development, while efforts are underway to improve the management and governance of industrial parks through digital tools and performance benchmarks (Wong, 2024a). These initiatives, once launched, are expected to attract greater foreign investment by providing greater policy certainty and improving governance across Sarawak's industrial parks.

While the government is keen to promote growth, several issues could slow down progress. Small and medium-sized enterprises, particularly those engaged in low-value[3] export activities, face difficulties in integrating into domestic supply chains. Many operate with limited access to technology, financing, and market information, restraining their ability to improve productivity or transition into higher-value activities.

Stronger coordination between academic institutions and industry players is essential to ensure a steady pipeline of skilled workers in key sectors. Industry feedback indicates that university training programmes often lag the rapidly evolving technical demands of advanced manufacturing, leaving graduates ill-equipped to meet current market demands. While curriculum development remains under the purview of national educational authorities, there is a clear need for more flexibility and responsiveness in academic programmes to keep pace with emerging technologies and shifting labour market trends.

These limitations are particularly evident in the planning and management of industrial parks, where weak linkages with training institutions have contributed to mismatches between workforce supply and industry demand. Although the semiconductor sector has made some progress in bridging this gap through targeted industry training and robust collaboration with tertiary institutions, other priority areas, such as aerospace and clean technology, require more deliberate planning to develop the technical and professional skills needed for long-term growth.

2.2.2 Key Priority Areas

2.2.2.1 Industrial Parks Development

Industrial parks are a key component in Sarawak's strategy to foster spatially distributed and sector-specific industrial growth across the region. Sarawak implements a whole-of-region approach by strategically placing 22 industrial parks across urban centres (outlined in Figure 3 and detailed overview in Table 2), including Kuching, Bintulu, and Miri. Among the flagship projects, the Sama Jaya Free Industrial Zone stands out for its focus on export-oriented electronics, electrical components, and advanced materials. Meanwhile, the Samalaju Industrial Park (SIP), located within the Sarawak Corridor of Renewable Energy (SCORE), caters to energy-intensive and heavy industries, including aluminium smelting, iron and steel, silica-based industries, amongst others.

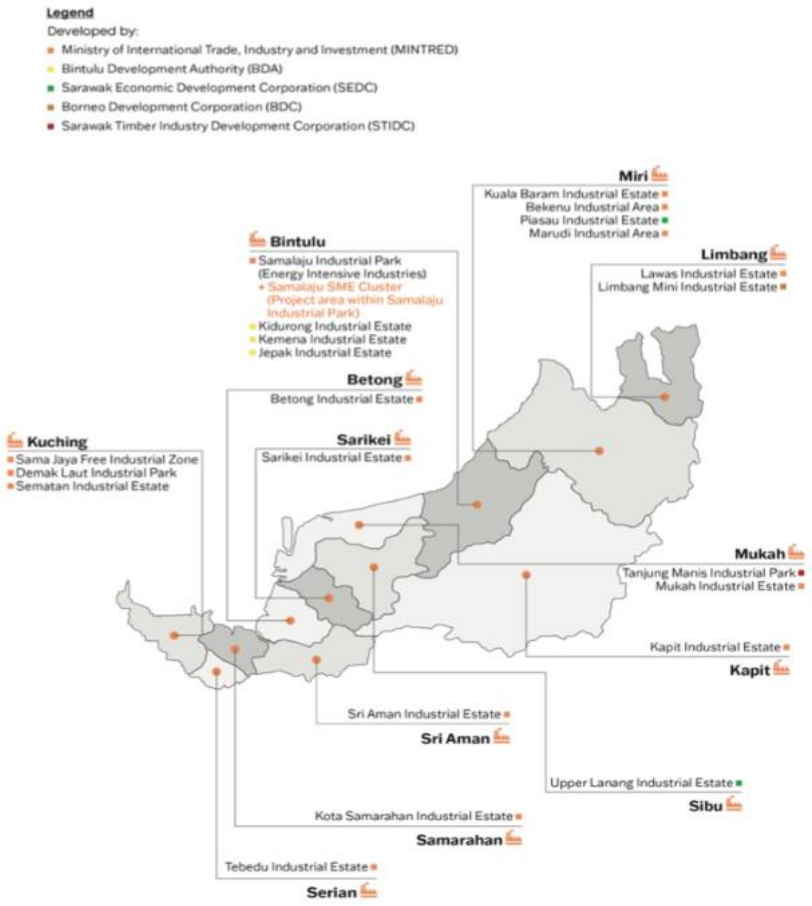

Figure 3: Industrial Parks Developed in Sarawak | Source: EPU Sarawak, 2023a.

The park has attracted major foreign investors, including Sakura Ferroalloys (a joint venture between companies from South Africa, Japan, and Taiwan), OCI TerraSus (Republic of Korea), and LONGi Green Energy (China), helping to connect Sarawak to wider regional and global industrial supply chains (Francis, 2024). More recently, the Sarawak government has outlined plans to develop an Aerospace Industrial Park,

following the establishment of the Aerospace Academy at the Centre for Technology Excellence Sarawak (CENTEXS) at Lundu, Kuching (Bong, 2025).

Division	Industrial Parks	Focus Segment
Betong	Betong Industrial Estate	Mixed Light & Medium Industries
Bintulu	Samalaju Industrial Park	Energy Intensive and Heavy Industries
	Kidurong Industrial Estate	Light Industries
	Kemena Industrial Estate	Timber-based Industries
	Jepak Industrial Estate	Wood-based Industry & Shipyard
Kapit	Kapit Industrial Estate	Mixed Light Industries[4]
Kuching	Sama Jaya Free Industrial Zone	High-tech and Electronic Industries
	Demak Laut Industrial Park	Mixed Light & Medium Industries
	Sematan Industrial Estate	Mixed Light & Medium Industries
Limbang	Lawas Industrial Estate	Mixed Light Industries
	Limbang Miri Industrial Estate	Small-scale and Light Industries
Miri	Kuala Baram Industrial Estate	Timber, Shipbuilding, Mixed Light & Medium Industries
	Bekenau Industrial Area	Food Processing
	Piasau Industrial Estate	Mixed Light Industries
	Marudi Industrial Area	Mixed Light & Medium Industries
Mukah	Tanjung Manis Industrial Park	Food Processing
	Mukah Industrial Estate	Mixed Light & Medium Industries
Samarahan	Kota Samarahan Industrial Estate	Mixed Light Industries
Sarikei	Sarikei Industrial Estate	Mixed Light Industries
Serian	Tebedu Industrial Estate	General Industries
Sibu	Upper Lanang Industrial Estate	Mixed Light Industries
Sri Aman	Sri Aman Industrial Estate	Mixed Light & Medium Industries

Table 2: Industrial Parks in Sarawak by Location and Sectoral Specialisation | Source: MINTRED, n.d.; Sarawak State Secretary's Office, n.d.

Despite progress in developing industrial parks, there remains a significant misalignment between the management of these parks and the capabilities of local training and academic institutions, limiting the overall efficiency and effectiveness of industrial park operations. Currently, various stakeholders, such as park management authorities, investment agencies and training institutions, tend to operate in silos. Each entity pursues its own sectoral or local development priorities, resulting in fragmented efforts and preventing the establishment of a cohesive, synchronised ecosystem. This independent approach undermines the potential to integrate workforce development with industry needs. Nevertheless, in 2024, the government took a significant first step by piloting the Industrial Park Management Committee (IPMC) in Samajaya Free Industrial Zone and Demak Laut Industrial Park (Robin, 2024). This initiative aims to improve public-private coordination in park management, with plans to expand this committee structure to other government-owned industrial parks in Sarawak.

A particularly prevalent issue is the weak relationship between industrial park operators and nearby academic or training institutions. Partnerships where they exist often take the form of isolated, one-off initiatives rather than comprehensive, strategic collaborations. A notable example is the Semiconductor Mastery Programme, developed by SMD Semiconductor in partnership with Melexis (a Belgian company) and the Centre for Technology Excellence Sarawak (CENTEXS). While the programme to develop talents in integrated circuit design, layout, and testing remains ongoing and offers a strong model for industry-academic collaboration, it is only available to a limited number of participants. Expanding the programme could significantly strengthen the local talent pipeline and better meet the growing demands of Sarawak's high-tech manufacturing sectors (Edward, 2025).

Stakeholders from MINTRED, the agency responsible for industrial park planning, have expressed interest in mapping existing universities and assessing industry demand to better synchronise academic offerings with industrial requirements. The goal is to develop a more conducive ecosystem where education and training programs are directly tailored to meet the specific skill needs of industries located within the parks. Such an integrated model would foster continuous collaboration between industrial parks and training institutions, enhancing workforce readiness and supporting sustainable industrial growth.

2.2.2.2 Semiconductor Sector

Sarawak's growing focus on the semiconductor sector is a result of a deliberate effort to enhance its existing industrial infrastructure and manufacturing base. Over the past two decades, Sarawak has attracted investments in the electrical and electronics (E&E) sector, most of which are located in the Sama Jaya Free Industrial Zone in Kuching. Companies like X-FAB Sarawak (Germany), Taiyo Yuden (Japan), and Western Digital (United States) have helped build a local manufacturing ecosystem that supports the production and assembly of electronic components. Sarawak aims to deepen these capabilities and progress into higher-value activities, such as integrated

circuit design, advanced packaging, and compound semiconductors, segments that support new applications in smart devices, electric vehicles and green energy (Tawie, 2024a; Dayak Daily, 2024a).

Compared to the more established semiconductor cluster in the northern region of Peninsular Malaysia, which hosts over 200 firms, Sarawak's industry remains relatively small, represented by nine companies, with a focus on solar photovoltaic (PV) and semiconductor manufacturing (MITI, 2023a). Nevertheless, Sarawak is charting a larger role in the sector through targeted investments and public-private initiatives. While Sarawak is not formally included in the National Semiconductor Strategy, the Sarawak government has made clear its intentions to grow the sector and pursue an export-oriented industrial development (MITI, 2024).

A central mover of these efforts is the establishment of SMD Semiconductor in November 2022, which serves as the primary catalyst for Sarawak's ambition to become a semiconductor hub. The company is tasked with building local capabilities in integrated circuit design, developing partnerships with global semiconductor players, and supporting local talent development. While the sector's current economic contribution remains small, the establishment of a state-owned company dedicated to semiconductors signals the government's long-term industrial commitment.

Aside from that, Sarawak also hosts existing semiconductor activities in component manufacturing and assembly – sometimes referred to as midstream and downstream activities of the production chain. Midstream refers to the stage of semiconductor manufacturing that involves producing wafers and chips based on pre-existing designs. This includes X-FAB Sarawak, a subsidiary of a German multinational, which produces analogue and mixed-signal chips for use in automotive, medical, and industrial applications; and Taiyo Yuden, a Japanese multinational, which manufactures ceramic capacitors – essential components in nearly all electronic devices. Western Digital, an American data storage company, assembles hard disk drives and other storage solutions (Goh, 2024). These firms provide Sarawak with a foundation of technical skills, physical infrastructure, and industry relationships that support its transition into more complex and knowledge-intensive areas of production.

Given the relatively small scale of Sarawak's semiconductor industry, well-designed partnerships can play a significant role in shaping its development. Sarawak's increasing relevance in clean energy, digital technologies, and export manufacturing makes it a strategic location for early engagement. At this formative stage, the semiconductor sector presents a timely opportunity for international collaboration. For the United Kingdom, this represents a strategic entry point into a high-priority sector that is taking shape. The UK's strengths in compound semiconductors, chip design, and workforce development closely align with Sarawak's industrial priorities, with partnerships already underway. Notable institutions such as the UK's Compound Semiconductor Applications (CSA) Catapult and UK Research and Innovation offer relevant expertise and experience in research-industry collaboration.

A prominent example is the partnership between SMD Semiconductor and CSA Catapult, which reflects Sarawak's strategic shift from basic manufacturing to higher-value activities that integrate engineering, design, and applied research. This collaboration focuses on developing compound semiconductors tailored for energy transition applications and led to the launch of KETEQ AI in June 2025 – an AI-powered power conversion device designed for smart grids, electric vehicles, and autonomous systems (CSA Catapult, 2024; Dayak Daily, 2025a).

The UK's involvement also extends into sustainability and industrial energy resilience. Through a memorandum of understanding with the Big Innovation Centre in London, SMD Semiconductor is working to develop a sustainable approach and circular economy strategy for semiconductor manufacturing (Ling, 2024a). The UK's industrial engagement further includes contributions from Rolls-Royce, which has supplied four kinetic energy-based power units to X-FAB's facility in Kuching to enhance energy resilience and support decarbonisation – an important consideration for manufacturers operating in energy-intensive industries (Rolls-Royce, 2024; Hammerschmidt, 2006).

Human capital remains a critical factor in the success of Sarawak's semiconductor ambitions. SMD Semiconductor has partnered with local universities like Curtin University Malaysia and Swinburne University of Technology Sarawak to deliver advanced training programmes in chip design, semiconductor engineering, and artificial intelligence. It also offers shorter technical training courses in collaboration with global firms such as Melexis NV – a Belgium-based semiconductor solutions provider – and with support from local government and education bodies, including MEITD and CENTEXS (Bernama, 2025; Dayak Daily, 2024c). These initiatives are helping to build a talent pipeline for more advanced industrial roles. They also offer opportunities for future UK-Sarawak cooperation in areas such as curriculum development, faculty training, and institutional capacity building.

Despite these positive developments, a lack of talent, especially in integrated circuit design and advanced packaging, remains a significant bottleneck. Feedback from government and industry stakeholders highlights that training programmes are often fragmented and not fully aligned with industry needs. Moreover, Sarawak's semiconductor ecosystem is still relatively narrow, with limited participation in upstream segments such as logic design and application-specific integrated circuits (ASICs). Weak connections between universities and commercial firms slow the pace of technology adoption and reduce the commercial potential of academic research. Infrastructure also needs attention. For example, a 3.5 MW grid upgrade scheduled for completion in 2027 is essential to meet projected electricity demand from the semiconductor industry (Goh, 2024).

2.2.2.3 Aerospace Sector

Sarawak's aerospace sector is in its early stages of development, underpinned by an ambition to build a domestic manufacturing ecosystem encompassing aircraft

maintenance, high-value components manufacturing, and sustainable aviation fuels. While the sector remains nascent, Sarawak's strategic intent aligns with national priorities under the New Industrial Master Plan (NIMP) 2030, which identifies aerospace as a high-potential industry within Malaysia's future economic structure.

As of 2023, Malaysia's aerospace industry comprises around 240 companies, with 54 per cent involved in engineering and design services and 20 per cent in manufacturing (MITI, 2023b). The majority are concentrated in Selangor, particularly around the Subang Airport, which serves as the country's main aerospace cluster (Akmar Annuar, 2025). In contrast, Sarawak's ecosystem is still emerging, with limited private sector participation and institutional capacity. This gap presents an opportunity for targeted policy intervention and strategic partnerships to accelerate Sarawak's aerospace trajectory.

A significant turning point came during the acquisition and rebranding of MASwings as AirBorneo in early 2025, granting the Sarawak government greater control over its regional air logistics capabilities. Soon after, AirBorneo announced its plans to upgrade its current fleet to ATR 72-600 aircraft, aiming to expand passenger and cargo capacity and improve service quality (Malay Mail, 2025). This move supports Sarawak's broader policy objectives: enhancing connectivity, facilitating logistics for resource-based sectors, improving inter-city access, and laying the foundation for industrial clusters. Crucially, it underscores Sarawak's ambition to develop a comprehensive aerospace ecosystem, anchored by manufacturing, maintenance, and repair capabilities.

In parallel, Sarawak is investing in institutional capacity, skills development, and infrastructure to support its long-term aerospace development. In April 2025, the Sarawak government soft-launched its aerospace roadmap at the Sarawak Aerospace Transformation Forum, gathering feedback from industry players, academia, and civil societies to explore the way forward for aerospace research, development, and production activities (Dayak Daily, 2025b). The roadmap remains unpublished, pending further consultation and refinement. As part of this initiative, Sarawak is also collaborating with Malaysia East Asia Satellite (MEASAT) – the country's national satellite operator – on co-developing key elements of the Sarawak aerospace roadmap, particularly in satellite technology (Dayak Daily, 2025b).

To support workforce development, Sarawak established the Aerospace Academy at the Centre for Technology Excellence Sarawak (CENTEXS) in October 2024 (Jee, 2024). The academy offers specialised training in drone technology, satellite components, and maintenance, repair, and overhaul (MRO) services (Jee, 2024). Through CENTEXS, Sarawak also forged a joint initiative with AIROD - Malaysia's principal aerospace MRO service provider - and the Aviation Design Centre (ADC), a federal government-linked nonprofit entity, to establish an Aerospace Design Academy (Johanna Mumtaz Wanpa, 2024). This initiative aims to train a new generation of aerospace engineers and technical specialists (Johanna Mumtaz Wanpa, 2024).

Additionally, Sarawak's international engagements in the aerospace sector grew following its Premier's visits to the Airbus and ATR facilities in France in 2024 to examine aircraft assembly and industry operations (Aubrey, 2025b). These engagements culminated in a strategic cooperation agreement with Airbus, focusing on Sustainable Aviation Fuel (SAF) development, human capital development, digitalisation of aviation services, and planning support for Sarawak's aerospace roadmap (UKAS, 2025b). The government also signed a Letter of Intent with a French hybrid-electric aircraft manufacturer to explore the local assembly of the Cassio aircraft, indicating Sarawak's interest in future-oriented, low-carbon aviation technologies (Dayak Daily, 2025c).

Despite these promising developments, private sector participation and research-commercialisation linkages remain limited. Local small and medium-sized enterprises' activities are not yet deeply involved in designing, prototyping, and maintenance, repair, and overhaul (MRO) activities, constraining the development of a robust supply base. Stakeholders highlight persistent skills mismatches, brain drain, and the absence of early-stage investors to help de-risk capital-intensive projects. Although training and infrastructure initiatives are expanding, there remains an opportunity for Sarawak to strengthen the integration of technical education, research and development, and industrial growth through a more cohesive policy framework for the aerospace sector.

2.3 Renewable Energy

2.3.1 Overview

Sarawak's leadership in Malaysia's renewable energy transition is underpinned by its distinctive constitutional autonomy under the Malaysia Agreement 1963 (MA63), which grants Sarawak full authority over its domestic energy resources and infrastructure. This devolved authority enables Sarawak to independently shape its energy agenda, with the federal government only overseeing cross-border energy trade.

As of 2024, Sarawak's energy generation capacity surpassed its 2030 target of a 60 per cent renewable energy mix, five years ahead of schedule (Umpang, 2025c). Its current energy generation capacity stands at 5.7 gigawatts, with 62 per cent derived from hydropower, 21 per cent from gas, 16 per cent from coal, and 1 per cent from diesel (Aubrey, 2024b). Alternative sources, such as biomass, hybrid solar, and micro-hydro plants, collectively contribute less than 1 per cent (Aubrey, 2024b). Moving forward, the government seeks to expand its electricity generation capacity to 10 gigawatts by 2030 and 15 gigawatts by 2035 by leveraging renewable sources, reducing dependency on fossil fuels and large-scale hydropower due to their association with environmental impacts (Umpang, 2025c).

Sarawak is also positioning itself as the "Battery of ASEAN" by developing a mature green energy industry with advanced green technologies and regional electricity exports. This strategic vision serves two goals: driving decarbonisation and

stimulating economic growth. The government aims to embrace a low-carbon and revenue-generating economy by diversifying Sarawak's energy generation and advancing sustainability projects (Economic Planning Unit Sarawak, 2021). This ambition is reinforced by strong federal support, which endorses Sarawak's emergence as a domestic and regional energy hub (Ling, 2025b). This progressive stance is further bolstered by a stable political environment that provides the continuity and policy coherence required to prioritise long-term infrastructure development and sustainability outcomes.

Looking ahead, Sarawak is set to triple its renewable energy generation from 5.7 gigawatts to 15 gigawatts by 2035 through the diversification of its energy generation, which includes exporting surplus clean electricity to neighbouring regions (Aubrey, 2024b). Currently, Sarawak supplies energy through the Borneo Grid to West Kalimantan and Brunei, and the government is also actively advocating for deeper ASEAN Power Grid integration (Wong, 2024b; The Borneo Post, 2025). This includes the construction of a 1,400 km-long, 500 kilovolts transmission link to Singapore, alongside further connectivity to Johor, Sabah, and the Southern Philippines (Economic Planning Unit Sarawak, 2021; Ten, 2023; Ling, 2025a).

Environmental sustainability is integrated into Sarawak's broader development agenda. Having achieved its 2030 renewable energy target, Sarawak is now focused on sustaining and building upon its progress by pursuing an annual reduction of 600,000 tons of CO2 emissions and generating over 15 per cent of its foreign income from the sector (Economic Planning Unit Sarawak, 2021). To realise these goals, the Sarawak Government seeks enhanced public-private partnerships to expand its renewable energy generation capabilities and promote clean energy export while pledging a robust regulatory framework (Economic Planning Unit Sarawak, 2021).

Sarawak's decarbonisation efforts are supported by a strong legislative foundation, which includes the establishment of the Environmental Ordinance and Sustainability Blueprint 2030. In 2023, Sarawak became the first in Malaysia to legislate climate action through the Environmental (Reduction of Greenhouse Gases Emission) Ordinance, which aligns with the national greenhouse gases reduction target of 45 per cent by 2030 and carbon neutrality by 2050 (Ling, 2023b). The ordinance formalises carbon emissions thresholds and carbon reporting for businesses. This encourages the government to develop a more comprehensive carbon framework and to pursue carbon credits and pricing, Carbon Capture, Utilisation, and Storage, alongside other relevant energy transition strategies. Further strategic direction is illustrated in the Sustainability Blueprint 2030, which offers detailed strategies for Sarawak to achieve the broader goals in the PCDS 2030. These strategies include improving SAIDI performance, increasing energy export, boosting solar and electric vehicle (EV) adoption, and enhancing overall energy generation and export (MEESty, 2025b).

Moving forward, Sarawak plans to introduce additional guiding documents to strengthen its regulatory foundation and cultivate a conducive environment for the

growth of a mature renewable energy sector. Upcoming policy frameworks include the Sarawak Energy Transition Policy, the Sarawak Energy Efficiency Roadmap, and the Carbon Credit Policy (Toyat, 2025c). To support climate-related research and policy development, the government has established an advisory panel that focuses on carbon credits and pricing, emission thresholds, and energy transition strategies (Ling, 2023b). In addition, it is also looking into developing its Blue Economy Policy and Roadmap, which will focus on renewable energy activities in coastal and marine areas.

Underpinning the ambition is a series of international collaborations, with its partnership with the UK playing a central role in developing policy frameworks for environmental sustainability. Working with the United Kingdom Partnering for Accelerated Climate Transitions (UK PACT), the Sarawak government is drafting a Green Economy Policy and Carbon Offset Strategy to determine Sarawak's pathway in implementing carbon trading practices (UK PACT, n.d.-a). The UK PACT also conducted capacity-building workshops with officials from EPU Sarawak and MEESty, focusing on carbon trading governance and greenhouse gas inventory practices (UK PACT, n.d.-b). These sessions shared international best practices regulating the emerging carbon industry (UK PACT, n.d.-b). Building on this foundation, EPU Sarawak and MEESty are mulling the establishment of a Climate Change Centre to manage environmental-related policy development and technical collaboration (Tawie, 2025a).

Beyond its partnership with the UK, Sarawak continues to foster international collaborations and public-private partnerships with other countries to further drive innovation and sustainability (Sarawak Tribune, 2025a). Through Invest Sarawak, Sarawak has partnered with the Chinese company CRE International, the renewable energy arm of China National Nuclear Corporation, to identify suitable locations and financial mechanisms for renewable projects.

2.3.2 Key Priority Areas

Sarawak's green transition strategy is structured across four priority areas: hydrogen, carbon capture, utilisation, and storage (CCUS), alternative sources like solar and biomass, and the enhancement of grid infrastructure. These priorities were selected through a pragmatic assessment of resource availability, existing infrastructure, environmental considerations, and market demand. This further aligns with the government's interest in less ecologically intrusive options, shifting away from developing new large-scale hydropower projects due to environmental and communal impact (Sarawak Energy, 2024; The Borneo Post, 2025).

Sarawak's renewable energy development is still in its early stages, with the government actively pursuing international collaborations to accelerate progress and build technical capacity. While clear strategies are in place for hydrogen, carbon capture, utilisation and storage, and grid development, the government's plans for other alternative energy sources, such as biomass and mini hydro, are less detailed due to their

diverse and rapidly evolving nature. Therefore, the UK should explore possibilities to propose alternative energy solutions where it possesses specific expertise.

2.3.2.1 Hydrogen

The hydrogen sector is a key component of Sarawak's energy transition, as Sarawak aims to become a leading hydrogen producer and supplier in the Asia Pacific region. This ambition is supported by the Sarawak Hydrogen Economy Roadmap (SHER), released in 2025, which sets out Sarawak's strategy to expand cost-competitive, large-scale hydrogen production. It aims to promote domestic industrial adoption, support decarbonisation efforts, and build long-term export capacity through international offtake agreements. To achieve these goals, the roadmap proposes the establishment of a dedicated Sarawak hydrogen certification platform and the strengthening of research and development to drive innovation in industrial applications of hydrogen. Legislative support for sector growth has also been introduced through the Distribution of Gas (Amendment) Ordinance 2024, which enables the establishment of a dedicated hydrogen regulator and a legal framework and licensing framework for the hydrogen supply chain. Additionally, the government is considering establishing a Centre of Excellence for Hydrogen R&D and Innovation to spur industrial innovation and develop new applications.

At the federal level, Sarawak is prominently featured in the Hydrogen Economy and Technology Roadmap (HETR) and is regarded as the national leader in green hydrogen development. This leadership stems from its abundant renewable resources, particularly hydropower, which provides a clean and stable electricity supply for hydrogen production (Sarawak Energy, 2020). HETR outlines hydrogen's strategic role in achieving Malaysia's net-zero ambitions and economic growth. Sarawak Energy Berhad (SEB) has also emerged as a pioneering player in this development, establishing Southeast Asia's first integrated hydrogen production and refuelling facility in Kuching (Sarawak Energy, 2020).

Sarawak's hydrogen plans serve two objectives: contributing to global decarbonisation while diversifying its revenue base to support its high-income ambition (MEESty, 2025a; Len, 2024). The priority export markets identified are Japan, South Korea, and Singapore, given their limited renewable potential (MEESty, 2025a; MOSTI, 2023). Through the Sarawak Economic Development Corporation (SEDC) Energy, partnerships have been formed with companies from South Korea and Japan to develop hydrogen derivative production facilities in Bintulu. Offtake agreements have been established to export the hydrogen products to both countries. Project H2biscus is a collaboration with South Korean companies, including Samsung, Lotte, and Korea National Oil Corporation, to produce green hydrogen export in the form of ammonia. On the other hand, Project H2ornbill features collaboration with Japan's ENEOS to export green hydrogen in methylcyclohexane (MEESty, 2025a). Both projects are currently in the front-end engineering design phase.

Domestically, the Sarawak government is committed to improving hydrogen infrastructure to boost domestic usage. Sarawak collaborated with Gentari, a clean energy solution entity established by national oil company PETRONAS, to jointly develop the Sarawak H2 Hub that aims to provide common utilities and infrastructure, serving as a centralised hub to support hydrogen production, including Project H2biscus and Project H2ornbill (Gentari, 2024). In collaboration with companies from China, the government has pursued the deployment of the hydrogen-powered autonomous rapid transit (ART) systems with multifuel refuelling stations in Kuching as part of the Kuching Urban Transportation System (KUTS) (Sarawak Metro, n.d.; Sarawak Energy, 2020). Sarawak has also launched the Sarawak Electrolyser Assembly-Distribution Facility (SEA-DF) to boost green hydrogen production capacity and maximise local value creation (Bernama, 2024b).

2.3.2.2 Carbon Capture, Utilisation, and Storage (CCUS)

Sarawak is keen on deploying Carbon Capture, Utilisation, and Storage (CCUS) as a key component of its energy transition, as it holds 65 per cent of Malaysia's geological carbon storage potential (Tawie, 2025c). To enable this agenda, the Sarawak government amended the Sarawak Land Code (Carbon Storage) Rules 2022, laying the legal groundwork for onshore and offshore carbon storage activities within Sarawak's borders (Liong, 2025). This landmark legislation reinforces Sarawak's authority over energy governance and land usage, as recognised under the MA63. The Sarawak Hydrogen Economy Roadmap (SHER) identifies Carbon Capture and Storage (CCS) technology and infrastructure as essential for blue hydrogen production, which requires capturing and storing carbon dioxide emissions. As part of this strategy, Sarawak plans to establish four operational carbon storage sites by 2030, with Petroleum Sarawak Berhad (PETROS), a Sarawak energy company, tasked with overseeing site development and coordination (Liong, 2025).

Progress in CCUS development has been supported by international collaboration, particularly with the United Kingdom and Japan. In partnership with British Petroleum, Petroleum Sarawak Berhad (PETROS) conducted technical assessments that identified three viable storage zones, Western Luconia, Central Luconia, and Balingian, with a combined estimated capacity of approximately 1,000 million tonnes of CO2 (Aubrey, 2023b, Business Times, 2024). Following this, PETROS launched a bid round to attract international firms and has indicated interest in involving Shell in upcoming CCUS initiatives (UKAS, 2024c). PETRONAS also signed a storage site agreement with Japanese consortia for a depleted field offshore Sarawak (Teo, 2025). In parallel, Sarawak Energy Berhad (SEB) and Sarawak Biodiversity Centre (SBC) have collaborated with the Japanese Chitose Group to establish a microalgae-based carbon capture facility that recycles carbon waste from power generation (MIDA, 2024). This collaboration, known as Chitose Carbon Capture Central Sarawak (C4 Sarawak), features the delivery of exhausted gas containing CO2 from the Sejingkat coal-fired power

plant to cultivate microalgae biomass. It is currently the world's largest microalgae production facility (MIDA, 2024).

2.3.2.3 Alternative Energy Sources and Grid Reliability

Exploring alternative energy sources is an important agenda for the Sarawakian government as it seeks to identify other potential energy resources to meet its 15-gigawatt clean energy ambition. Leveraging its diverse resources, Sarawak is actively exploring various types of sustainable energy generation, testing out the technical and commercial feasibility of a diverse range of feedstocks. This includes biomass power generation, solar farms, mini-hydro projects, and ocean energy systems (Toyat, 2024b).

The pursuit to grow its biomass industry is driven by increasing foreign investment interest, particularly from countries like Singapore, China, and Japan (Toyat, 2024a). The Sarawak Government plans to replace coal usage with biomass at the Sejingkat and Balingian power plants, inspired by the successful transition of the UK's Drax power station (Invest Sarawak, 2024). Sarawak is currently a world-leading large-scale Napier grass biomass pellet producer and exporter, supplying these pellets to the Drax power station (Toyat, 2024b). Efforts to diversify feedstock are underway, with the Sarawak Timber Industry Development Corporation (STIDC) exploring alternatives, such as bamboo and sago trunks (Toyat, 2024a). Additionally, Sarawak aims to explore cascade hydropower sources, planning the development of eight mini hydroelectric power plants (Sarawak Energy Berhad, 2024).

Solar energy is also gaining traction in Sarawak's energy mix, with a targeted capacity of 1,500 megawatts by 2030 (Dayak Daily, 2025d). Large-scale solar projects and residential solar initiatives. support these projects. Notably, Sarawak has partnered with companies from China and the United Arab Emirates to deploy floating solar installations at its existing hydropower facilities, enabling efficient land use and hybrid generation (Dayak Daily, 2025d; Aubrey, 2024; Edward, 2024; Sarawak Energy Berhad, 2025). Concurrently, the Sarawakian government is also promoting rooftop solar adoption among households. This effort is reinforced by the 2023 amendment to the Electricity Ordinance, which institutionalised the Single Buyer concept[5] and created a clearer regulatory pathway for distributed solar systems (Sarawak Energy, 2024). The amendment allows Sarawak Energy Berhad (SEB) to be the single buyer for Sarawak's electricity distribution, enabling it to procure energy from other producers for integration into its grid, thereby facilitating broader grid integration and independent solar power producers (Dayak Daily, 2023b). Nevertheless, solar power contribution is expected to be minor relative to other sources like biomass and hydropower due to its intermittency, which demands significant investment in battery storage to ensure grid stability.

Beyond generation, Sarawak is also focused on enhancing grid reliability to support these new energy sources and enable cross-border exports (BERNAMA, 2025a). Sarawak has successfully launched Malaysia's first battery energy storage system (BESS) in Kuching, aimed at stabilising energy supply in rural areas and

integrating renewable energy sources (UKAS, 2025a). The Sarawakian government is also exploring pumped hydro energy storage (PHES), where a discussion was held with Australia regarding site identification and construction of PHES (UKAS, 2024a). These energy storage systems aim to store excess energy for high-demand periods, enhancing the stability of renewable energy while phasing out reliance on fossil fuels.

Plans are also underway to establish a centralised operations hub with advanced monitoring, diagnostics, and analytical tools to enhance grid oversight and decision-making (Dayak Daily, 2023c). Sarawak's broader smart grid initiative encompasses key components such as distribution automation, asset monitoring, geographical information, and advanced metering infrastructure, designed to achieve optimal energy performance (Wong, 2023). Among the identified regulatory frameworks, the net metering system is being developed to support decentralised generation and wider renewable adoption (Ling, 2023a).

2.3.3 Key Challenges

Despite notable progress, Sarawak's energy transition continues to encounter structural and operational challenges that risk slowing long-term progress. These issues are particularly evident in the renewable energy sector, where projects are often early-stage, capital-intensive, and technically complex. Key challenges include fragmented governance, access to diversified and sustainable financing, and a shortage of technical expertise to support emerging green industries. Without a coordinated strategy to address these cross-cutting challenges, Sarawak may face difficulties in maintaining momentum and scaling its efforts toward a low-carbon transition.

2.3.3.1 Governance

Sarawak's energy governance remains fragmented across multiple institutions, with responsibilities dispersed across various agencies and unclear lines of accountability. The governance of Sarawak's energy sector is currently shared among several stakeholders – Economic Planning Unit (EPU) Sarawak, Ministry of Energy and Environmental Sustainability (MEESty), and Ministry of Utility and Telecommunication (MUT) – each with distinct but occasionally overlapping mandates. Given the absence of an overarching mechanism, the energy governance structure lacks institutional clarity, limiting effective oversight and coordination, particularly in emerging areas like hydrogen and smart grid deployment. For instance, MEESty oversees Sarawak Energy Berhad's (SEB) renewable energy initiatives, such as floating solar projects. Meanwhile, the Ministry of Utility and Telecommunication (MUT) is responsible for regulating power distribution and grid infrastructure.

Furthermore, limited institutional capacity, coupled with the absence of an independent energy regulator, further complicates Sarawak's transition into a green economy. As Sarawak moves towards expanding its renewable energy generation with solar and biomass, it requires the decentralisation of energy generation, exemplified

by the growing participation of independent power producers (IPPs). The lack of a dedicated regulator, such as the Energy Commission in Peninsular Malaysia and Sabah, presents challenges to effectively implement its energy policy that could unlock Sarawak's full renewable energy sources. Additionally, the regulatory responsibilities for SEB remain split between MEESty and MUT, with MEESty overseeing the corporation and MUT regulating the energy distribution. This reinforces institutional fragmentation, slowing decision-making, and impeding future sectoral growth. Relatedly, while the establishment of MEESty in 2022 marks its commitment to centralise oversight of the renewable energy sector, the Ministry continues to face resource and staffing constraints that may affect its ability to respond to emerging policy and regulatory needs.

2.3.3.2 Financial Challenge

Financing also represents a significant constraint, particularly for capital-intensive renewable energy projects. Although Sarawak aims to scale up its green energy sector, these efforts require substantial upfront investment in infrastructure and technology. However, private financial institutions often perceive such projects as high-risk due to their early-stage development and limited track record of commercial viability. This perception limits access to affordable capital under existing financing mechanisms and impedes the growth of innovative ventures in emerging renewable energy areas. Local financial institutions generally have the capacity to support small-scale projects but often lack the financial resources to fund larger, capital-intensive sustainability projects, such as floating solar farms and green hydrogen facilities.

2.3.3.3 Talent Gap

Sarawak faces technical expertise challenges in emerging and specialised fields, critical to the energy transition. Key sectors, such as environmental engineering, green finance, and hydrogen technology, are encountering a lack of qualified local talent, forcing reliance on foreign expertise. Sarawak currently is encountering a shortfall of 300,000 skilled workers and aims to reach a target of 500,000 by 2030 (Lu, 2024). This talent gap is especially critical for the renewable energy industry, which demands specialised expertise in microelectronics manufacturing and hydrogen logistics – skills essential for Sarawak's plans to export hydrogen to Japan via the maritime route (Lu, 2024).

This dependency undermines Sarawak's energy resilience and slows the localisation of technologies and services. A case in point is the operational disruption of the hydrogen-powered bus service during the COVID-19 pandemic. Due to travel restrictions, technicians from China were unable to enter Sarawak to carry out essential maintenance, rendering the service inoperable for an extended period. This incident revealed the risks of overreliance on foreign technical support and highlighted the urgent need to develop local capabilities to ensure operational resilience and long-term sustainability.

2.4 Digital Transformation

2.4.1 Overview

The Sarawak government regards digital transformation as a critical enabler in its pursuit to expand its gross domestic product from MYR 148.2 billion (GBP 26.3 billion) in 2024 to MYR 282 billion (GBP 50.1 billion) by 2030 - framing it not merely as modernisation, but as a deliberate economic repositioning strategy to future-proof its development model. This shift is a reaction to the growing global significance of the digital economy, whose share of global gross domestic product is projected to rise from 15.5 per cent in 2016 to 24.3 per cent by 2025. In this context, Sarawak has set a target for the digital economy to contribute 20 per cent to gross domestic product by 2030, supported by long-term policy planning, institutional reforms, and sustained financial commitments (Economic Planning Unit Sarawak, 2023b).

The transformation is part of a broader aspiration to transition from a resource-based development model to a high-income, innovation-driven economy. The Sarawak government no longer views digitalisation as a sector-specific priority but as a cross-cutting enabler of economic diversification, public sector modernisation, and inclusive development. This ambition is anchored in the Sarawak Digital Economy Blueprint 2023-2030, which builds upon the initial Sarawak Digital Economy Strategy 2018-2022 and the Post-COVID Development Strategy (PCDS) 2030.

From a national perspective, Sarawak's digital transformation strategy is closely aligned with Malaysia's MyDIGITAL Blueprint, which seeks to modernise public service delivery, strengthen digital infrastructure, and foster an inclusive digital economy. One example of this alignment is the rollout of Sarawak ID, a unified digital identity platform that enables residents to access public services through a single sign-on. This initiative precedes the federal government's introduction of its own MyDigital ID initiative and is designed to improve accessibility, security, and efficiency in digital public services.

Both Sarawak and the federal government strongly emphasise fostering business adoption and the creation of innovative technologies, human capital development, and the growth of an integrated digital ecosystem. At the national level, the Malaysia Digital Economy Corporation (MDEC) leads a range of initiatives to promote digital talent and ecosystem development. In Sarawak, these priorities are localised through the Centre for Technical Excellence Sarawak and its Aerospace, Digital & Green Energy Academy, which delivers upskilling and reskilling programmes in high-demand fields such as artificial intelligence (AI), the Internet of Things (IoT), and cloud computing. Complementing these efforts, Sarawak has prioritised digitalisation support for micro, small, and medium-sized enterprises (MSMEs). For instance, the Go Digital Sarawak programme by MINTRED provides up to MYR 10,000 (GBP 1,776) per enterprise for digital hardware and software, helping to accelerate business adoption of digital tools (Economic Planning Unit Sarawak, 2023b).

At the infrastructure level, both the Sarawak and federal governments are committed to expanding digital connectivity across Sarawak. The federal Jalinan Digital Negara (JENDELA) initiative focuses on expanding broadband infrastructure across Malaysia. Sarawak mirrors this through three major programmes:

- The Sarawak Multimedia Authority Rural Telecommunication Towers (SMART 600) initiative involves the construction of 600 rural telecommunications towers;
- The Sarawak Rural Broadband Network (MySRBN), which provides affordable high-speed internet access to rural communities; and
- The Sarawak Linking Urban, Rural and Nation Programme (SALURAN) aims to enhance digital infrastructure and bridge the digital divide.

As of mid-2024, these combined initiatives collectively expanded the internet coverage in Sarawak to over 81.6 per cent, with a target of reaching 93.87 per cent by the end of 2025 (Economic Planning Unit Sarawak, 2023a).

Apart from aligning with federal policies, Sarawak's approach to digital transformation is evident in its policy trajectory: it has evolved from a focus on basic technology adoption to systemic digital transformation, guided by the Post-COVID Development Strategy (PCDS) 2030 and the Sarawak Digital Economy Blueprint 2023-2030. The Blueprint outlines this transformation through five strategic pillars, 31 strategic actions, and 106 initiatives, integrating policy, infrastructure, and talent development to drive innovation across both public and private sectors. This builds on the foundation of the Sarawak Digital Economy Strategy 2018-2022, which adopted a more sectoral approach by targeting eight priority sectors – including agriculture, manufacturing, tourism, and smart cities – supported by enabling factors such as digital infrastructure, talent development, cybersecurity, and research and development.

Guided by this vision, the Sarawak government established several key institutions to coordinate and streamline its digital strategy. Policy and regulatory oversight are led by the Sarawak Multimedia Authority (SMA). While implementation is supported by the Sarawak Digital Economy Corporation Berhad (SDEC), the Sarawak Information Systems (SAINS) acts as the primary technology partner responsible for developing the digital ecosystem in coordination with the public sector. Within the public sector, the Sarawak Civil Service Digital Unit (SCSDU) drives digital transformation and service digitalisation. The role of financing for critical state-led digital projects is provided by the Development Bank of Sarawak (DBOS), a Sarawak government-owned development bank, to ensure that key initiatives receive adequate funding (State Service Modernisation Unit, 2017). Together, these institutions form a governance framework that underpins Sarawak's ongoing digital transition.

With a clear blueprint and governance structure in place, Sarawak aims for digital transformation to spur both internal development and regional competitiveness by

2030. Its ambitions are reflected in the targets outlined in the Sarawak Digital Economy Blueprint 2023–2030: achieving 96 per cent internet coverage (91.93 per cent in July 2025), 100 per cent online government service delivery (54.7 per cent in 2024), 500 high-tech startups (113 achieved in 2023), and a MYR 56.4 billion (GBP 10 billion) contribution to gross domestic product from digital activities (Economic Planning Unit Sarawak, 2023b; Yunus et al., 2025; Toyat, 2025d; Economic Planning Unit Sarawak, 2023a). These targets highlight not only the scale of Sarawak's aspirations but also the degree to which its growth model hinges on digital transformation. The Blueprint advances this agenda through five strategic pillars: (1) economic growth priorities, (2) digital business development, (3) enhancement of public sector and services, (4) adoption of frontier technologies, and (5) strengthening of the foundational digital ecosystem. Guided by these pillars, the Sarawak government is aligning policy, investment, and talent development to build a digitally enabled, innovation-driven economy (Economic Planning Unit Sarawak, 2023b).

2.4.1.1 Enabling Economic Growth through Digital Transformation

Sarawak's emphasis on economic growth priorities reflects its ambition to transition from a resource-dependent model to a digitally enabled, innovation-driven economy. Realising this ambition requires embedding digital tools and platforms across priority sectors, including agriculture, manufacturing, tourism, mining, forestry, and social services, to move Sarawak up the value chain, diversify its economy, and enable higher-value activities and greater productivity.

Three key components guide this pillar:

- **Platform-based economic models –** expanding e-commerce, fintech, and other digital marketplaces to connect producers and consumers directly, reduce transaction costs, and unlock new revenue streams;
- **Accelerated sectoral digitalisation –** integrating advanced digital solutions into priority sectors to optimise production, distribution, and market access; and
- **Unlocking the value of data –** through monetisation strategies, improved sharing frameworks, and investments in infrastructure such as secure data centres and smart operation hubs.

Notable initiatives include the Sarawak Integrated E-Commerce Platform, a State Intellectual Property Framework, and a Data Monetisation Programme, designed to foster a knowledge-based economy rooted in innovation and IP-driven growth (Economic Planning Unit Sarawak, 2023b).

2.4.1.2 Developing Digital Business in Sarawak

Digital transformation outlines the strategic priorities for Sarawak's economy, while digital business development focuses on strengthening the local capabilities

needed to realise those priorities. Sarawak's approach emphasises support for local entrepreneurship, improved investment readiness, and more inclusive business models. By positioning digital enterprises, start-ups, and MSMEs as key drivers of economic growth and job creation, rather than as secondary or support actors, the government signals a shift toward embedding digital business development at the core of its long-term economic strategy (Economic Planning Unit Sarawak, 2023b).

This strategy follows a two-pronged approach: enabling new digital businesses to emerge, while simultaneously striving to modernise legacy MSMEs in a digitally enabled economy. To do this, Sarawak is investing in institutional mechanisms and financial incentives to support early-stage innovation, reduce market-entry barriers, and expand the commercialisation of high-tech products. Key initiatives include the Go Digital Consultancy Programme to digitalise 2,000 MSMEs annually, the High-Tech Entrepreneurship Development Programme for IoT and advanced manufacturing start-ups, and 22 innovation hubs serving as anchors for talent, incubation, and scaling (Economic Planning Unit Sarawak, 2023b).

Recognising that entrepreneurship alone cannot sustain an ecosystem, Sarawak also strongly prioritises attracting domestic and foreign investment. InvestSarawak, Sarawak's investment and trade agency, was developed to strengthen public-private partnerships, streamline regulatory processes, and promote Sarawak as a hub for digital services, data infrastructure, and fintech innovation (Economic Planning Unit Sarawak, 2023b).

Importantly, this goal also embeds inclusion into the digital business agenda through programmes for community entrepreneurship, the sharing economy, and gig work, ensuring digital transformation delivers broad-based and equitable benefits (Economic Planning Unit Sarawak, 2023b).

2.4.1.3 Transforming Public Institutions and Service Delivery

Now that the sources of growth and the drivers of change are defined, the next focus is on how Sarawak's public institutions will transform to deliver in a digital era. Sarawak seeks to build a citizen-centric, data-driven, and transparent public sector, embedded in digital technologies across administration and public-facing platforms to provide efficient, secure, and inclusive service. The underlying aim is not only service modernisation, but also to strengthen citizen trust in government. This agenda is anchored on five strategic actions:

- Accelerating personalised and integrated digital services;
- Unlocking public sector data for innovation;
- Improving civil service capability and workflows;
- Enhancing regulatory compliance with digital tools; and

- Strengthening institutional capacity for digital transformation.

To translate its digital vision into practice, Sarawak plans to roll out a series of initiatives that embed technology into public service delivery and governance. These include the development of a one-stop digital platform to make all public services accessible online by 2030; a centralised business management system to simplify licensing and registration and reduce red tape for entrepreneurs; the creation of smart city ecosystems with digital infrastructure that integrates sensors and data platforms to improve urban services such as traffic management; project management tools to digitise and monitor government projects in real time; and a real-time operations centre that enables government agencies to coordinate responses during emergencies (Economic Planning Unit Sarawak, 2023b).

Sarawak is also harnessing public sector data as a driver of innovation, both to strengthen governance and to create new opportunities for citizens and businesses. To achieve this, Sarawak is developing digital innovation clusters that bring together government, industry, and academia to experiment with emerging technologies; expanding open data systems to make government datasets accessible for research, start-ups, and civic use; and piloting sector-specific testbeds where new digital solutions can be trialled before full-scale deployment. These initiatives are ongoing and are enabling data-driven systems for biodiversity mapping, environmental monitoring, and urban planning. Additionally, the government is upgrading its core digital infrastructure by modernising records management, strengthening enterprise architecture, and expanding the Sarawak ID platform for secure citizen access to ensure interoperability, resilience, and long-term scalability.

Sarawak is strengthening its human and institutional foundations of digital transformation by acknowledging that technology must be supported by skilled personnel and flexible governance frameworks to drive meaningful change. Key efforts include digital talent programmes for civil servants, aimed at equipping the public workforce with the skills to design, manage, and deliver digital services. In parallel, Sarawak is reviewing its laws and regulations to identify gaps in its digital governance framework, benchmarking against international best practices, and aligning with federal regulations. Together, these initiatives are intended to ensure public institutions are not only digitally enabled, but also agile, transparent, and trusted – capable of delivering inclusive services and sustaining citizen confidence in the digital age (Economic Planning Unit Sarawak, 2023b).

2.4.1.4 Adopting Frontier Technologies for Strengthened Capabilities

Sarawak acknowledges that emerging technologies, such as artificial intelligence (AI), 5G, big data, and data analytics[6] are crucial to long-term economic resilience and innovation (Economic Planning Unit Sarawak, 2023b). Sarawak's strategy goes beyond the acquisition of new technologies; it also focuses on ways the government can

responsibly integrate them across public services and private businesses to create tangible benefits for the economy and society.

Sarawak implemented several programmes targeting both businesses and government agencies to lower the barriers of digital adoption. For example, the Business Digitalisation Programme helps micro, small, and medium enterprises (MSMEs) adopt digital tools, intending to have 80 per cent of MSMEs digitally ready by 2030. To support this, the government deploys financial incentives, such as grants and vouchers, through schemes like the Industry Linkage Fund, which encourages collaborative research and innovation between academia and industry (Economic Planning Unit Sarawak, 2023b). These measures aim to foster innovation, create high-value jobs, and accelerate the growth of new technologies in key sectors.

In the area of infrastructure and research, Sarawak is pioneering 5G deployment and experimentation to support applications in agriculture, smart cities, manufacturing, and environmental protection (Sarawak Digital Economy Corporation Berhad, n.d.). The Centre of Excellence for Digital Economy Openlab serves as a testing ground for real-world solutions, such as precision farming, smart infrastructure management, and advanced manufacturing systems (Sarawak Digital Economy Corporation Berhad, n.d.). Similarly, the Rainforest Guardian System uses Huawei's cloud and AI technologies to detect illegal logging in real time – cutting enforcement response times by up to 80 per cent. This illustrates how emerging technologies can deliver both economic and ecological benefits (Huawei Malaysia, n.d.).

To strengthen domestic capacity, Sarawak launched the Sarawak Artificial Intelligence Centre (SAIC) in early 2025. SAIC works to embed AI in strategic sectors like healthcare, agriculture, and manufacturing while developing local expertise and AI models (Jee, 2025). Complementing this, Sarawak is drafting its own Data Sharing Act, inspired by legislation from New South Wales, to allow secure sharing of data between government agencies while aligning with federal laws (Minggu, 2025).

2.4.1.5 Building a Strong Foundation for Digital Economy

Sarawak's overarching aim is to strengthen the foundations of its digital economy so every citizen, community, and business can fully participate in – and benefit from – digital transformation. Beyond infrastructure, Sarawak envisions a whole-of-society readiness built on connectivity, skills, trust, and governance (Economic Planning Unit Sarawak, 2023b).

To address the digital divide, Sarawak has invested significantly in expanding broadband access through initiatives such as the Sarawak Multimedia Authority Rural Telecommunication (SMART) programme, Sarawak Rural Broadband Network (MySRBN), and Very Small Aperture Terminal (VSAT) satellite connectivity. These programmes aim to reach underserved communities across Sarawak with a clear target: 96 per cent internet coverage and 80 per cent improvement

in ease of doing business by 2030. In tandem, Sarawak also aims to attract global investment in data centres to position itself as a secure hub for cross-border data services (Economic Planning Unit Sarawak, 2023b).

Recognising that infrastructure alone is insufficient, Sarawak is growing a digitally fluent workforce through upskilling, R&D scholarships, and early integration of digital skills. These efforts begin early: digital skills are integrated into primary and secondary education to strengthen the long-term talent pipeline. At the grassroots level, rural libraries are being repurposed into Digital Community Centres (DCCs) – accessible hubs that provide hands-on digital training and promote inclusion, especially for marginalised communities (Economic Planning Unit Sarawak, 2023b).

Trust and resilience form the final layer of this foundation. As more public and private services move online, Sarawak has prioritised the development of a Cybersecurity Framework, supported by Sarawak Multimedia Authority (SMA) and a dedicated Cyber Security Unit, alongside cybersecurity awareness campaigns to ensure safe usage of digital platforms. Complementing this are the forthcoming Data Protection Framework and Data Leak Protection Policy, designed to safeguard government data sovereignty, promote ethical data management, and strengthen public confidence in the digital ecosystem (Economic Planning Unit Sarawak, 2023b).

Altogether, the goal of building a strong foundation for the digital economy reflects Sarawak's recognition that digital transformation cannot succeed without equitable access, secure systems, and empowered communities. By embedding digital capacity and trust at every level – from homes and schools to businesses and government – Sarawak is laying the groundwork for a digital economy that is not only fast-moving but also inclusive and sustainable.

2.4.1.6 Sarawak's Digital Transformation Fiscal and Investment Landscape

Sarawak is underpinning its digital transformation ambitions with significant fiscal investments to facilitate implementation. The 2025 State Budget earmarked over MYR 470 million (GBP 83.5 million) in alternative financing for digital economy initiatives managed by the Sarawak Digital Economy Corporation (SDEC) – a government-owned agency tasked with implementing digital economy initiatives (Abang Zohari Abang Openg, 2024). There are also additional allocations, signalling a clear move from vision to implementation, underpinned by strong institutional coordination, including:

- MYR 40 million (GBP 7.1 million) for CENTEXS, a key skills training institution that delivers industry-aligned technical and digital upskilling programmes;
- MYR 20 million (GBP 3.6 million) for the CENTEXS Digital Academy, which focuses specifically on developing digital talent in emerging areas such as cloud computing, AI, and IoT;

- MYR 25 million (GBP 4.4 million) for SPayGlobal, a Sarawak-backed digital wallet platform that aims to promote cashless transactions, particularly in rural and semi-urban areas; and

- MYR 25 million (GBP 4.4 million) for the Sarawak Multimedia Authority (SMA), the statutory body responsible for policy coordination, regulation, and digital strategy implementation across Sarawak. (Abang Zohari Abang Openg, 2024).

Sarawak's digital transformation is a multi-level effort: aligning with federal priorities, building autonomous delivery institutions, investing in foundational infrastructure, and catalysing grassroots innovation. The success of this model hinges not only on effective policy execution but also on Sarawak's ability to integrate digital solutions across its development ecosystem, particularly in rural and underserved areas. As Sarawak advances towards 2030, the government views digital transformation not as a discrete programme but as a structural mechanism for enhancing productivity, public service delivery, and inclusive economic growth.

2.4.2 Key Priorities Areas

2.4.2.1 Transforming Public Institutions and Service Delivery

Among Sarawak's wide-ranging digital ambitions described above, a core enabler is the readiness of its public sector. Recognising the central role of government capability in driving transformation, the Sarawak Digital Economy Blueprint 2030 positions a fully digitised, citizen-centred government as a strategic priority – aiming for inclusive growth, improving service delivery, and modernising public administration. Targets include 100 per cent digitalisation of public services and increased public adoption, supported by improved digital literacy and accessibility.

One of the flagship initiatives is the Sarawak ID system, a single sign-on digital identity platform that currently enables access to over 200 government services (Economic Planning Unit Sarawak, 2023b). Modelled after Singapore's Singpass, it incorporates biometric authentication and facial recognition to strengthen verification and prevent identity fraud. Sarawak ID is evolving to allow secure sharing of verified personal data, such as address, income, and demographic details, across participating ministries, streamlining administrative processes, and improving service efficiency. At the same time, Sarawak is navigating the complexities of integrating its system with Malaysia's federal MyDigital ID. According to the Sarawak Civil Service Digitalisation Unit (SCSDU), which oversees the initiative, an official agreement has been reached with the federal government to pursue interoperability with the national MyDigital ID. However, discussions around data-sharing protocols and cross-jurisdictional governance are still ongoing.

The Service Sarawak platform complements this effort by providing multi-channel access to government services through digital interfaces, in-person counters, and call centres (Economic Planning Unit Sarawak, 2023b). Inspired by New South

Wales's "anytime, anywhere" model, it seeks to improve service convenience while ensuring accessibility for those less digitally connected. As of mid-2025, 54.7 per cent of targeted government services are available online – 24.3 per cent fully online and 30 per cent partially digitised – indicating steady progress. However, end-to-end digitalisation remains a work in progress.

Stakeholders noted that while user-facing platforms have become more seamless and intuitive, many backend processes remain manual or siloed. This highlights a broader institutional challenge of integrating over 200 legacy systems, most of which were developed in isolation and lack interoperability. These limitations reduce the efficiency and transformative potential of front-end platforms. To address these bottlenecks, one of the initiatives by the Sarawak Multimedia Authority (SMA) is to develop a data-sharing framework based on New South Wales' Data Sharing Act. The policy aims to create a structured and secure environment for data exchange across agencies, enabling better coordination and more personalised service delivery. The initiative supports broader ambition in artificial intelligence, analytics, and evidence-based policymaking, while also prompting wider discussions on legal-operational alignment across ministries.

Despite strong political backing and advances in digital infrastructure, digital inclusion and literacy remain key factors influencing the pace and equity of adoption in Sarawak. While coverage is improving under state-led initiatives such as Sarawak Linking Urban, Rural, and Nation (SALURAN) and the federal Jalinan Digital Negara (JENDELA) programme, digital adoption among rural communities and senior citizens remains modest. Barriers such as language mismatches, interface complexity, and low digital confidence often limit engagement with digital public services. In response, Sarawak is scaling up the National Information Dissemination Centre (NADI) Digital Community Centres, which serve as local hubs for digital access, training, and support (Economic Planning Unit Sarawak, 2023b). These centres are playing a growing role in bridging capability gaps and promoting inclusive uptake. However, stakeholders emphasised the need for stronger localisation, especially content in native languages, and proactive community outreach to increase uptake and ensure all population segments are included in the digital transition.

An equally important focus is strengthening the capability of Sarawak's civil service, which offers potential for international collaboration by benchmarking training content and delivery methods. Sarawak's digital transformation is anchored by multiple public and private entities, including the Sarawak Civil Service Digitalisation Unit (SCSDU), the Sarawak Multimedia Authority (SMA), and Sarawak Information Systems (SAINS), each with distinct roles (refer to Table A3 for roles' breakdown) (Economic Planning Unit Sarawak, 2023b). Despite a strong institutional foundation, stakeholders emphasise the need for more targeted efforts to build specialised skills in digital project management, cybersecurity, data analytics, and emerging technologies like artificial intelligence, to ensure the public sector is equipped to implement digital transformation at scale.

In parallel, enhanced coordination in the planning, procurement, and integration of digital systems across departments remains a core priority. SMA and SAINS are leading efforts to explore more structured approaches to enterprise architecture and digital procurement. This includes creating common templates and standards for individual departments to adopt for digitalisation. This will support the integration of legacy systems, ensure interoperability, minimise duplication, and accelerate technology adoption.

Sarawak's international partnerships are further enhancing these efforts. The government has collaborated with Huawei to deploy private 5G and improve cybersecurity, while partnerships with Microsoft and Amazon Web Services are advancing cloud adoption, upskilling, and digital service modernisation (The Rakyat Post, 2024; Microsoft Malaysia, 2022; Ling, 2025c). The University of Melbourne contributes research and innovation support through its collaboration with the Sarawak Digital Economy Corporation (SDEC), particularly in areas such as digital governance and artificial intelligence (Sarawak Digital Economy Corporation Berhad, 2024a). While some of these partnerships are still in the early phases, they reflect Sarawak's openness to global expertise and commitment to collaborative innovation. Workshop participants noted the importance of strengthening monitoring and evaluation mechanisms to better track outcomes and support adaptive implementation of digital initiatives.

2.4.2.2 Establishing a Robust Digital Economy Foundation

To complement efforts to build a digitally ready public sector, Sarawak's broader ambition is to develop a vibrant digital ecosystem that will position Sarawak as a technology-driven economy by 2030. As articulated in the Sarawak Digital Economy Blueprint 2030, Sarawak aims to grow the digital sector's contribution to gross domestic product to 20 per cent, supported by targets such as 96 per cent high-speed internet coverage, a 50 per cent increase in digital investment, and full public service digitalisation (Economic Planning Unit Sarawak, 2023b). Achieving these ambitions requires more than infrastructure; it demands coordinated changes across talent, policy, investment, and governance. Sarawak's progress to date reflects both momentum and areas for improvement: while infrastructure and strategic planning are advancing, continued attention to skills development, regulatory readiness, and ecosystem coordination will be essential to sustain inclusive and impactful digital growth.

Heavy investment in infrastructure through initiatives such as the Sarawak Rural Broadband Network (MySRBN), Sarawak Linking Urban, Rural, and Nation (SALURAN), and the national Jalinan Digital Negara (JENDELA) programme has improved last-mile connectivity to Sarawak's dispersed rural settlements (Economic Planning Unit Sarawak, 2023b). However, stakeholders note persistent disparities in service performance and uptake in remote areas. Local telecom providers, including Irix, Danawa Resources, Reach Ten, Celcom, and Telekom Malaysia, have shouldered most rollout costs due to the absence of significant foreign direct investment

(FDI), which could provide both capital and technical expertise. The challenges remain in scaling advanced service deployment, such as 5G and fibre, at the pace required.

Talent remains one of the most significant bottlenecks in Sarawak's digital economy transformation. Despite growing demand across sectors, from digital agriculture and manufacturing to e-commerce and public services, there is a shortage of workers with specialised skills in data analytics, cybersecurity, artificial intelligence, cloud infrastructure, and platform engineering. These gaps exist across both public and private sectors, particularly among SMEs and rural communities (Wong, 2025). To address this, agencies such as the Sarawak Digital Economy Corporation (SDEC) and the Centre for Technical Excellence Sarawak (CENTEXS) have launched targeted digital upskilling programmes to support SMEs, youth, and rural communities (CENTEXS, 2025; News Hub Asia, 2025).

Sarawak is also positioning innovation, research, and artificial intelligence (AI) as strategic enablers of long-term economic resilience and service transformation. Initial artificial intelligence-related initiatives include DeepSAR – a proprietary identity-based AI model – as well as early use cases such as the Dayang Chatbot and AI-assisted sentencing in e-court systems (Toyat, 2025a; Tawie, 2024c; Mohd Shith Putera et al., 2022). The establishment of the Sarawak Artificial Intelligence Centre (SAIC), with support from the federal National Artificial Intelligence Office (NAIO), reflects institutional efforts to underpin these developments (Jee, 2025). Nonetheless, the adoption of AI remains in a formative stage, largely focused on pilot projects, with ongoing challenges around data quality, workforce skills, and system readiness.

Furthermore, stakeholders identified the need for a clear and supportive policy environment, alongside well-defined regulatory frameworks, as crucial to foster private sector participation and attract international investments. Gaps in intellectual property protection, cybersecurity regulation, data governance, AI, and targeted fiscal incentives were identified as persistent barriers that constrain investor confidence and delay market development. While the ongoing development of a Sarawak-level Data Sharing Act is a step forward, stakeholders noted that there is a need for greater proactive, coordinated regulatory reform to create clarity and long-term confidence in the ecosystem. To this end, a dedicated unit has been established to assess legal and institutional frameworks and support more coherent policy development.

Despite growing political will and policy intent, while the current digital transformation governance structure brings diverse capabilities, stakeholders noted a lack of structured coordination and performance tracking. Sarawak's current Integrated Project Monitoring System (IPMS) is geared towards development project tracking, but it does not yet serve as a fully integrated M&E ecosystem capable of measuring digital economy outcomes. Without this, assessing progress towards key targets, such as the 20 per cent digital gross domestic product contribution, and making data-informed adjustments becomes challenging. Stakeholders recommended expanding this system by incorporating cross-agency performance scorecards, real-time

data feedback loops, and open dashboards to enhance transparency, accountability, and strategic learning.

2.5 Education and Human Capital Development

2.5.1 Overview

Sarawak is undergoing a deliberate shift in its education and human capital development strategy to align with its evolving economic priorities. While education remains a federal mandate in Malaysia, the Sarawak government has taken proactive approaches to introduce complementary initiatives to address its fast-evolving labour market needs. This reflects Sarawak's ambition to transition toward an innovation-driven economy by 2030.

It recognises the need to produce a skilled workforce of 30,000 people to support its priority sectors, including energy transition, advanced manufacturing, and digital technology. Meeting this target requires progress on two interconnected fronts: strengthening foundational education (ages 7 to 17) to ensure universal literacy, numeracy, and digital readiness from the earliest levels of schooling, and expanding skills development pathways, from vocational and technical training to higher education and professional upskilling (aged 17 and above), for sector-specific talent needs.

To achieve this, Sarawak plans to improve educational infrastructure (e.g., building more schools and improving access to underserved areas), foster innovation (e.g., research hubs), and provide universal access to quality learning opportunities (e.g., free higher education for all Sarawakians) (Economic Planning Unit Sarawak, 2023a). By 2030, the government aims to align its talent development with global standards to drive sustainable economic growth. Since late 2024, the government has been developing the Sarawak Talent Policy; however, limited public access to the draft restricts a full understanding of Sarawak's educational strengths, gaps, and opportunities at both foundational and advanced levels (Lendai et al., 2024; Rakan Sarawak, 2024).

The Sarawak government aims to widen the accessibility of quality education to all Sarawakian children. This is showcased in Sarawak's offering of free education through state-owned international schools for students from low-income households, ensuring that all students, regardless of socioeconomic status, can pursue higher studies and compete for entry into top international universities (Bong, 2019; Yayasan Sarawak International Secondary School, n.d.; Economic Planning Unit Sarawak, 2023a, p.93). Due to this initiative, Sarawak has achieved strong school retention outcomes, with primary and secondary completion rates in government schools exceeding 98 per cent in 2022 (Ministry of Education, 2024).

Moreover, schools in Sarawak have embraced digital learning tools to address the urban-rural infrastructural barriers. An example would be the use of the UK's Raspberry Pi computing kits – a portable device that enables students to gain hands-on

experience in computing and coding without requiring extensive laboratory facilities. These kits are particularly effective in rural and resource-constrained settings, where students face challenges such as limited internet connectivity, long travel distances, and inadequate facilities, which often hinder learning. To further advance this effort, Sarawak's Ministry of Education, Innovation and Talent Development (MEITD) recently conducted a state-wide tour under its STEM Raspberry Pi initiative, promoting STEM education through hands-on coding activities in rural communities (Umpang, 2025a).

Sarawak's Ministry of Education, Innovation and Talent Development (MEITD) is actively refining its education ecosystem strategies across all levels, emphasising English proficiency and Science, Technology, Engineering, and Mathematics (STEM) learning through the Dual Language Programme (DLP). It is also collaborating with Cambridge University Press & Assessment to develop local standardised examinations for Science, Mathematics and English subjects under the Dual Language Programme, and enable students access to Cambridge International General Certificate of Secondary Education (IGCSE) qualifications in Sarawak-owned international schools under Yayasan Sarawak (Khushiri, 2024b). This commitment is centred on equipping the workforce for fast-growing sectors such as renewable energy, aerospace, and artificial intelligence (Economic Planning Unit Sarawak, 2023a). However, while reforms lay the groundwork for future development, Sarawak faces immediate challenges in addressing short-term talent shortages across key industries, such as aerospace, electrical and electronics manufacturing, and the hydrogen economy (Aubrey, 2024d).

The Sarawak government views strategic international partnerships as essential to addressing both capacity building and system-wide transformation. Its long-standing engagement with the UK, evident through support for British curricula, positions the UK as a key education partner (The Borneo Post, 2024). UK institutions and agencies already play a visible role in Sarawak through initiatives such as: Raspberry Pi training for Sarawak teachers and students, upskilling programmes for Sarawak civil servants at the UK Civil Service College, and Sarawak-owned universities and UK universities' partnerships in academic mobility and joint research. These collaborations have demonstrated tangible outcomes and enjoy high levels of institutional trust. Stakeholders on both sides recognise the potential to scale these efforts, particularly in digital skills training, technical and vocational education, and policy exchange.

Building on these long-standing educational linkages with the UK, there is scope for deeper collaboration, including the establishment of UK-affiliated international schools, leveraging the UK's strong global reputation in education. Such schools would widen access to high-quality British curricula and qualifications, further expanding pathways to world-class universities and international career opportunities for Sarawakian students. They would also reinforce people-to-people ties and promote long-term institutional linkages.

Sarawak's investments in its home-grown tertiary institutions reflect a dual strategy to localise expertise while expanding international engagement. Institutions such as Swinburne University of Technology Sarawak, Curtin University Malaysia, University of Technology Sarawak (UTS), i-CATS University College, Sarawak Skills, and the Centre for Technology Excellence Sarawak (CENTEXS) are being equipped through local and international partnerships to meet the talent demands in the priority sectors mentioned above. These efforts align with the UK's Skills and Post-16 Education Act detailing localised skills improvement plans, investment in AI-powered educational tools, such as Aila, and commitment to leveraging technology in education (Department for Education & Burghart, 2022; Department for Science, Innovation and Technology, 2025a).

Parallel investments in higher education and vocational training further demonstrate Sarawak's long-term vision of building a highly skilled workforce by 2030 and beyond. The UK's approach to upskilling and reskilling through apprenticeship and workforce development programmes also mirrors Sarawak's needs, ensuring workforce adaptability in the face of technological advancements. These initiatives present potential partnership opportunities, particularly in workforce development and digital education solutions tailored to Sarawak's evolving economy.

Despite the breadth of Sarawak's education partnerships with many countries, the UK remains Sarawak's preferred long-term partner for talent development, quality assurance, and institutional capacity-building. This preference stems from Sarawak's ties as a former Commonwealth territory and is reinforced by the educational background of many political leaders and senior figures in Sarawak's government-linked entities, many of whom are alumni of UK institutions. This institutional familiarity positions UK institutions as a comparative advantage in supporting steering Sarawak's higher education, STEM, and skills training reform.

Given this strong foundation, UK-Sarawak collaboration could be deepened across the education lifecycle, linking local needs with British expertise. Opportunities span from foundational and secondary education (aged 7 to 17) levels, student and academic mobility (university and postgraduate level), and joint research (early-career to senior researchers), public service and policy training (civil servants). UK-Sarawak collaboration in these areas would help align local education and training systems with industry needs, increase uptake of UK scholarships and grants from East Malaysia, and enable contextualised adoption of UK education policies and best practices within Sarawak's education ecosystem. These partnerships can enhance the visibility of UK programmes within local institutions, facilitate student and academic mobility between the UK and Sarawak, increase uptake of UK scholarships and grants from East Malaysia, and enable contextualised adoption of UK education policies and best practices within Sarawak's education ecosystem.

2.5.2 Key Priorities Areas

This study identifies foundational education (aged 7 to 17), TVET enhancement (post-secondary youth and adult learners) and research and development (university students, early-career, and senior researchers) to be the main priority areas in the education sector for the Sarawak government.

2.5.2.1 Foundational Education

Sarawak can strengthen its foundational education for future talent development by bolstering early literacy, assessment standards and equitable access. Recent data reveal a disproportionately high student dropout rate among Sarawakian students between Primary 6 (aged 12) and Form 1 (aged 13), compared to the national trend, which sees higher attrition beginning at Form 4 (aged 16) (Siaw, 2025). This early disengagement highlights the need for targeted intervention during the primary-to-secondary transition. Strengthening early-stage education is important to ensure inclusive human capital development and to sustain Sarawak's shift toward a knowledge-based economy.

Addressing these gaps requires a multi-dimensional approach. Early literacy education, early standardised assessment, and access to education, especially among underserved communities, are particularly weak. Sarawak's MEITD has introduced the Sarawak Education Enhancement Programme (SEEP), a MYR 20 million (GBP 3.6 million) initiative to provide free tuition for low-performing students aged 15 to 17, with an emphasis on STEM subjects (Bruno, 2025). However, programme effectiveness may be constrained if systemic barriers, such as poverty, child marriage, teenage pregnancy, and disparities in basic infrastructure between urban and rural areas, are not addressed in parallel (Rickie & Alias, 2024).

Sarawak's average educational attainment lags national benchmarks, affecting long-term human capital productivity. Sarawakians aged 25 and above average of just 8 years of schooling, compared to 11 years nationally and 13 years in more developed territories such as Kuala Lumpur and Selangor. This gap raises concerns about the quality of Sarawak's talent pool and its capacity to drive growth in emerging industries (Siaw, 2025)**.** This concern is shared amongst stakeholders, who noted the relatively weak academic performance of Sarawak students in the Malaysia Certificate of Education (SPM), limiting students' ability to find decent entry-level jobs or perform well in their university courses. Sarawak's MEITD's ambition in increasing STEM subject uptake by Sarawakian students through free tuition and other education initiatives, such as the Sarawak Education Enhancement Programme might improve students' motivation and resilience to finish their primary and secondary education.

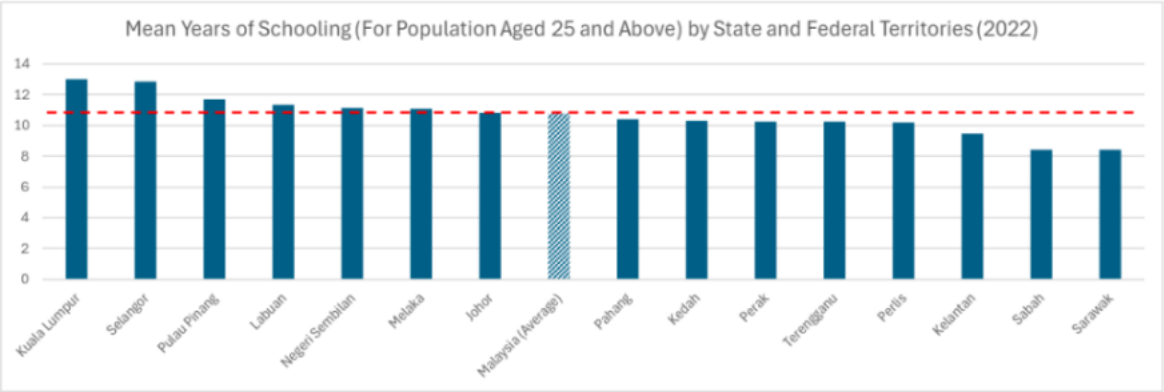

Figure 4: Average Years of Schooling amongst the Malaysian Population Aged 25 and Above | Source: Siaw, 2025

The Sarawak government complements the federal government's education policies by expanding the Dual Language Programme (DLP) beyond primary schools. Sarawak's MEITD will expand the Dual Language (Malay-English) Programme (DLP) implementation in the national secondary schools in Sarawak into a full programme roll-out by 2026 (Boon, 2024). This decision was made based on the successful implementation of DLP in national primary schools, which mandates teaching of Science and Mathematics in English, starting in Year 1. This programme expansion shows the Sarawak Government's commitment to encouraging more young students to be interested in STEM subjects. The government targets a 60 per cent STEM enrolment increase in upper secondary education in upper-secondary education as part of this broader strategy, equipping the next generation with vital skills for a rapidly evolving job market (Economic Planning Unit Sarawak, 2023, p.92). This initiative goes beyond developing English language proficiency amongst young Sarawakians in line with the Sarawak government's objective of using the English language as a medium of instruction, but also to develop students' critical and creative thinking in preparation for Industrial Revolution 4.0.

Recognising that the quality of its talent pool is closely tied to the rigour of its education system, the Sarawak government is pursuing alternative approaches to assess students' academic outcomes. With the federal government abolishing the Primary School Assessment Test (UPSR) and the Lower Secondary Assessment (PMR), Sarawak plans to invest its resources to reintroduce standardised assessments for Year Six and Form Three students (Khushiri, 2024b). However, creating a suitable evaluation system that aligns with Sarawak's education goals will demand substantial expertise and resources. Sarawak's MEITD announced the Dual Language Programme Sarawak Assessment Test (UP-DLP) for Primary Six and Form Three students. This initiative serves as a benchmarking exercise to ensure that Sarawak's education standards meet global standards. This Sarawak-wide assessment covers three subjects (English, Mathematics and Science) and is locally developed in Sarawak and vetted by Cambridge University Press and Assessment (Ten, 2025). Thus, the introduction of an independent primary and secondary school assessment system under DLP reflects Sarawak's intent

to tailor its education framework to better suit global workforce demands (Khushiri, 2024b).

The Sarawak government equips all primary schools with digital learning tools powered by foreign digital technologies to bridge the urban-rural digital divide and improve learning outcomes. Since 2021, the Sarawak government has independently invested in the deployment of the UK's Raspberry Pi technology in all primary schools (Umpang, 2025a). Raspberry Pi, a portable computing device, provides students with hands-on experience in coding and computational thinking without the need for extensive laboratory facilities. This initiative reflects Sarawak's sustained commitment to digital literacy by ensuring that every child, regardless of location or accessibility, gains early exposure to foundational digital skills. Even after four years, the government remains a strong advocate of Raspberry Pi, with continued support from key stakeholders such as Sarawak Skills, the British High Commission, the United Nations Children's Fund, and the Rolf Schnyder Foundation. Beyond student engagement, the initiative extends to teacher upskilling, with local universities – including Swinburne Sarawak, University of Technology Sarawak, and Curtin Malaysia – actively training educators from 1,265 schools in coding education. By integrating digital tools into early education, this initiative strengthens Sarawak's digital learning ecosystem, fostering a future-ready workforce equipped with critical technological competencies.

2.5.2.2 TVET Pathways

Technical and Vocational Education and Training (TVET) play a pivotal role in building a semi-skilled and highly skilled workforce to meet future labour market demands. The Sarawak Government has set three catalytic targets: increasing STEM enrolment at the upper secondary level to 60 per cent (50.8 per cent in 2025), providing annual training opportunities for 30,000 skilled workers, and ensuring that at least 30 per cent of the workforce is skilled by 2030 (Economic Planning Unit Sarawak, 2023a; Petingi, 2025). These goals align with Sarawak's broader economic strategy and reflect an urgent need to strengthen the education-skills-employment pipeline.

While the federal government outlined its strategic direction through the National TVET Policy 2030, including the aspiration to integrate TVET with Higher Education, Sarawak now faces the challenge of localising and operationalising this policy to reflect its economy and development goals. Sarawak is in a relatively strong position to do so, as it has ownership over five TVET and higher education institutions. Namely, Curtin University, Swinburne University, Sarawak University of Technology (UTS), i-CATS University College, and the Sarawak Centre of Technological Excellence (CENTEXS) (UKAS, 2024b). Even though this creates an opportunity to lead the development of a coordinated, agile, and industry-aligned education system, it remains untapped. Existing pathways between TVET and HE remain fragmented, and articulation between technical and academic qualifications is limited in practice. As a result, school leavers and working adults face barriers to progression and struggle to access advanced training or transition into high-growth sectors, such as semiconductors, hydrogen

technology, and advanced materials (Aubrey, 2023a). This lack of mobility between the education and training landscape weakens career progression and undermines the development of a resilient, skilled workforce.

The composition of the current workforce, which is heavily weighted toward low-skilled and semi-skilled occupations in services, agriculture, manufacturing, construction, and mining and quarrying – due to Sarawak's historical reliance on resource-based and low-value industries – further underscores the urgency of reform (Department of Labour Sarawak, 2023). This skills mismatch is compounded by a foundational education system that often does not adequately equip students with digital literacy, STEM proficiency, or technical exposure required to succeed in modern industrial settings. Institutions, such as CENTEXS and Sarawak Skills, provide valuable entry-level courses for school leavers, but these programmes generally lack the depth required for cultivating the advanced, specialised competencies required by high-impact sectors (Centre for Technology Excellence Sarawak, n.d.; Sarawak Skills, n.d.).

The talent deficit is most acute in technical, engineering, and renewable energy fields, where demand continues to outpace supply (Laeng, 2024). As of 2023, only 21 per cent of workers possessed the skillsets required of high-value sectors (Aubry, 2023a). The Sarawak government targets 500,000 workers by 2030, with the Sarawak Workforce Information System (SWIS)[7] facilitating industry-labour matching (Aubrey, 2023a). To accelerate progress, the Ministry of Education, Innovation and Talent Development (MEITD) has partnered with MINTRED, the Malaysia Productivity Corporation, and RECODA roll out the Industry Continuous Professional Development (iCPD) Programme, designed to upgrade semi-skilled workers to higher occupational standards (MEITD, 2024). Complementing this, Sarawak-owned universities have introduced tuition-free science-based upskilling programmes to create hybrid academic–vocational pathways for adult learners (The Star, 2025c).

Despite these positive developments, limited data on enrolment, completion rates, and employment outcomes continue to hinder the effective evaluation of current TVET efforts. Moreover, the absence of a coordinated, government-led approach has resulted in programmes being fragmented and reactive programme development, undermining strategic alignment and long-term impact (Centre for Technology Excellence Sarawak, n.d.; Sarawak Skills, n.d.). These challenges are further compounded by a lack of systematic engagement between academia and industry to guide curriculum development, employer participation, and student transitions.

Strengthening collaboration between industry leaders and education providers is important to ensure training programmes remain responsive to labour market needs. Addressing structural challenges, particularly the gaps in foundational technical skills and clear progression pathways for school leavers, will be key to establishing a cohesive talent pipeline that supports Sarawak's long-term economic and development objectives.

2.5.2.3 Research and Development

To realise the goals under PCDS 2030, Sarawak is actively establishing its research and development (R&D) domains in alignment with fast-growth, high-technology industries such as new energy production and advanced manufacturing. The Sarawak government has partnered with local and international research institutions to conduct various feasibility and impact assessments. The research partnerships also include industrial partners such as the UNIMAS-Sarawak Energy partnership on biodiversity assessment in Baleh, Kapit (Sarawak Energy, 2025) and Curtin University-SMD Semiconductor partnership on semiconductor research and workforce development (SMD Semiconductor, 2024). Sarawak's MEITD has also established its research centres and councils to support economic and social development in Sarawak and is expanding its research network globally.

The Sarawak Research and Development Council, under Sarawak's MEITD, allocated MYR 16.6 million (GBP 2.9 million) in funding for 76 innovative research projects related to PCDS 2030 economic sectors and enablers. One of its subsidiaries, Sarawak Infectious Disease Centre (SIDC), established a partnership with the University of Sheffield, UK and Hilleman Laboratories Singapore[8] (Tawie, 2024b, 2024). This signifies the Sarawak government's commitment to using data and innovation to drive its economic growth and social development while committing to the United Nations Sustainable Development Goals.

International academic partners are expanding as they support Sarawak's research capacity and talent pool, allowing it to be globally competitive in the knowledge economy. Sarawak is expanding its international partnerships to plug talent gaps, boost competitiveness, and modernise delivery systems across higher education, civil-service training, and priority industries. Moreover, a cornerstone of Sarawak's external education partnership is its long-standing collaboration with Australian universities, notably Swinburne University of Technology and Curtin University. These institutions have provided Sarawak access to internationally recognised qualifications and enhanced research capacity, particularly in STEM fields (Toyat & Chua, 2024). Other than that, Sarawak collaborates with a few Malaysian public universities, such as Universiti Malaysia Sarawak (UNIMAS), Universiti Teknologi MARA (UiTM) Sarawak campus and Universiti Putra Malaysia (UPM) Sarawak, based on their respective research niche. This shows the Sarawak government's greater commitment to engaging and involving local universities and overseas branch campuses in Sarawak to support the PCDS 2030 aspirations through research and development.

A key challenge for Sarawak is to address its sector-specific talent gaps in renewable energy, advanced manufacturing, and digital transformation. To meet Sarawak's target of closing an estimated shortfall of 30,000 skilled workers by 2030, the government actively seeks international partners to co-fund mobility schemes and structured professional development partnerships with overseas institutions. Priority formats include industry-embedded apprenticeships, stackable certification pathways,

and short executive courses customised to local market demands. For example, the Australian local campuses, such as Swinburne Sarawak, maintain their own research ecosystems and engage in academic collaborations with foreign universities, including China's Zhejiang Yuexiu University and East China Normal University, to support research, virtual labs, and commercialisation initiatives (Swinburne University Sarawak, 2023; Swinburne University Sarawak, 2025). Sarawak's abundant natural resources and politically neutral position make it an attractive place for international researchers to conduct cutting-edge research or energy-related feasibility and impact assessments.

These collaborations are expected to play a crucial role in cultivating specialised talent by facilitating knowledge transfer, workforce upskilling, and industry-driven training programs. Nevertheless, these initiatives align with Sarawak's broader industrial strategy to build a competitive semiconductor ecosystem, leveraging global expertise to drive innovation and long-term economic growth. While the government has introduced various initiatives, including TVET programmes and university-industry collaborations, these efforts remain fragmented, lacking strategic coordination and robust government oversight. Without a comprehensive framework, many initiatives fail to scale or deliver sustained outcomes. Sarawak has established strong sector-related international partnerships with the institutions listed below:

- **In the semiconductor sector, Sarawak is actively forging strategic collaborations with global industry leaders to enhance its technological capabilities and talent development.** Notable partnerships have been established with Belgium's Melexis, Germany's X-Fab, and Silicon Valley-based firms Synopsys and Cadence, underscoring Sarawak's commitment to strengthening its talent pipeline and positioning itself within the global semiconductor supply chain (Aubrey, 2023a).

- **In the hydrogen sector, Sarawak Skills and i-CATS University College entered into an agreement with China's Foshan Polytechnic to jointly develop and offer specialised programmes in Hydrogen Fuel Cell Technology.** As part of this collaboration, 10 teaching personnel from both institutions underwent Hydrogen Technology Training at Foshan Polytechnic, which led to the development and implementation of two customised training programmes (Sarawak Skills, 2024).

To cultivate a future-ready workforce capable of driving innovation and industry growth, Sarawak is pursuing strategic initiatives to enhance the development of digital skills. A key collaboration in this effort is its partnership with Brunei's Dynamik Technologies, which focuses on advancing AI-driven data analytics training and cross-border digital innovation (Sarawak Digital Economy Corporation Berhad, 2024b). This initiative leverages Dynamik's KARYADI platform for digital talent training and TENUN as a regional AI and data analytics hub while fostering business, startup, and SME engagement through knowledge-sharing and technology transfer. Moreover, the Sarawak government recently announced specialised AI training for teachers across Sarawak, as AI will be the key enabler across various sectors in Sarawak (Toyat, 2025b). The Premier

of Sarawak has expressed the importance of ethical values in the use of AI, which shows the importance of training teachers in using AI in teaching and learning.

Brain drain and a rapidly ageing population threaten Sarawak's long-term economic growth, as many graduates seek jobs abroad (Varkisa, 2025). The government faces the challenges of attracting returnees by enhancing local opportunities or accelerating automation to sustain its workforce and economy.

3 RECOMMENDATIONS

The following recommendations identify strategic, high-impact opportunities for UK–Sarawak collaboration that align with Sarawakian stakeholder priorities, support Sarawak's development agenda, and leverage the UK's comparative strength. While not exhaustive, these entry points represent the most feasible and mutually beneficial pathways for partnership.

Each recommendation is intended to support Sarawak's ambition to become a high-income, innovation-led economy by 2030, while enabling the UK to expand its international development engagement in a region with strong political will, resource potential, and a shared commitment to sustainable, inclusive growth.

3.1 Advanced Manufacturing

As Sarawak advances its industrial transformation under PCDS 2030, there is a growing avenue for UK–Sarawak collaboration in ecosystem development, workforce enhancement, and SMEs capacity building. Targeted efforts in the semiconductor and aerospace sectors, for instance, will help build Sarawak's industrial foundation. The UK's expertise in regional industrial clusters and industry-academia collaboration offers readily adaptable models. This strategic alignment advances the objectives of the UK's Modern Industrial Strategy and Indo-Pacific Tilt, while supporting Sarawak's goals for inclusive, innovation-driven growth and deeper integration into global value chains.

RECOMMENDATION 1: CAPACITY BUILDING ON INDUSTRIAL POLICY AND ECOSYSTEM PLANNING

The UK and Sarawak could collaborate on industrial policy development and ecosystem planning via an integrated approach that links industrial parks, research institutions, and skills providers. While physical infrastructure is expanding, limited coordination between R&D and technical education institutions continues to hinder technology transfer and workforce development. This gap reduces the effectiveness of current investment strategies by constraining innovation and industrial growth.

The UK offers deep expertise in building integrated industrial clusters that combine research, enterprise, and skills. Proven models such as the Advanced Manufacturing Park (AMP) and Cambridge Science Park demonstrate how co-located infrastructure and

public-private collaboration can drive innovation uptake, supply chain resilience, and inclusive economic growth. Complementing this, the Catapult network supports applied research and commercialisation through dedicated national centres that bridge gaps between academia and industry. These initiatives offer adaptable frameworks for Sarawak's next phase of industrial development.

Sarawak's establishment of the Industrial Park Management Committee (IPMC) signals its intent to strengthen governance structures and operational efficiency across its industrial zones – presenting an opportune moment for UK engagement. While the setup of the committee is a critical first step, its success will depend on the integration of strategic frameworks, performance management systems, and stakeholder coordination mechanisms – areas where the UK possesses relevant expertise. Furthermore, Sarawak expressed interest in emulating the UK models, such as the National Manufacturing Institute Scotland and Catapult Centres, which reflect a policy direction for the UK to apply its proven industrial governance models.

Key initiatives the UK and Sarawak could jointly pursue include:

- **High-level advanced manufacturing dialogues to cultivate a high-quality ecosystem for frontier industries** by identifying operational bottlenecks, designing strategic measures to foster innovation and commercialisation, and developing a business-friendly industry plan. These dialogues would enable the UK to identify gaps in Sarawak's industrial policy, co-develop strategies to enhance Sarawak's innovation ecosystems, while creating commercial and partnership opportunities for UK firms and research institutions across advanced manufacturing, semiconductor design, and low-carbon technologies

- **Joint technical workshops and capacity-building programmes** between the UK and Sarawak industrial park authorities to exchange best practices in industrial park governance, including designing incentives to drive digital transformation and measures to enhance supply chain integration, such as coordinated marketing support and initiatives to connect businesses with investors.

These initiatives could be facilitated through UK institutions such as the Industrial Strategy Advisory Council (ISAC) and the Department for Business and Trade (DBT), in collaboration with Sarawak counterparts like the Economic Planning Unit (EPU) of Sarawak, the Ministry of International Trade, Industry and Investment (MINTRED), InvestSarawak, the Sarawak Economic Development Corporation (SEDC), the Industrial Park Management Committee (IPMC), and the Regional Corridor Development Authority (RECODA).

This partnership would help Sarawak to establish a more mature and coordinated industrial ecosystem by strengthening linkages between its manufacturing base, research institutions, and skills providers. Through exposure to UK models of integrated industrial development, Sarawak can accelerate the adoption of advanced

manufacturing practices aligned with global standards. Embedding UK expertise into the design of industrial policies, incentive structures, and governance mechanisms would improve Sarawak's policymaking and planning capabilities, thus supporting Sarawak's ambition to move up the manufacturing value chain.

Critically, such engagement provides the UK with direct insight into Sarawak's evolving industrial framework, allowing UK institutions to help shape new policies, incentives, and regulations that align with the operating models of UK businesses. This proactive alignment reduces operational risk and gives UK firms a competitive advantage over foreign competitors in accessing this high-growth market. Furthermore, this partnership enables UK firms to strategically access Sarawak's emerging high-value supply chains by deploying and commercialising the UK's core strengths within them, specifically in compound semiconductor design, R&D, and intellectual property (IP), and aerospace Maintenance, Repair, and Overhaul (MRO) expertise.

By drawing on Sarawak's clean hydropower for energy-intensive manufacturing, UK firms can operate in energy-intensive manufacturing within a low-carbon ecosystem, gaining access to sustainable supply chains while pursuing the UK's industrial decarbonisation goals. Deeper investment could also provide UK firms with a greater role in shaping Sarawak's renewable energy strategy. For instance, through collaboration with Sarawak Energy and local research centres to design the policy and infrastructure frameworks for Sarawak's emerging renewable hydrogen industry; it could also commercialise on its technical and regulatory expertise on hydrogen certification, storage, and export systems to help Sarawak establish internationally recognised standards that enable cross-border trade in low-carbon fuel (Department for Energy Security and Net Zero & Department for Business, Energy & Industrial Strategy, 2021). This would position UK firms as trusted partners in Sarawak's clean energy transition and create new export channels for UK hydrogen technologies and professional services in Malaysia.

RECOMMENDATION 2: BUILDING INTEGRATED TALENT PIPELINES AND EMPOWERING WORKFORCE THROUGH TECHNICAL TRAINING AND RESEARCH-INDUSTRY LINKAGES

Workforce empowerment is a potential avenue for collaboration between the UK and Sarawak in the advanced manufacturing sector. Sarawak's manufacturing expansion is constrained by a persistent shortage of high-level technical expertise, particularly in frontier industries such as semiconductors and aerospace, limiting Sarawak's ability to absorb advanced technologies, increase productivity, and move up the value chain. The UK can address these gaps through its network of globally recognised universities, research institutions, and advanced manufacturing firms, providing targeted technical training, applied research partnerships, and skills certification.

The UK's expertise in key sectors like chip design, compound semiconductors, aerospace engineering, and sustainable manufacturing aligns with Sarawak's industrial priorities. The UK's Advanced Manufacturing Sectoral Plan underscores similar focus areas, i.e. aerospace and advanced materials, as key priorities of the UK to lead global innovation. This strategic alignment, combined with the UK's strong record in integrating technical education with industrial innovation, presents a significant opportunity for long-term, mutually beneficial partnerships to support Sarawak's workforce strategy while advancing UK engagement in high-growth sectors.

Strengthening partnerships in this area could involve:

- **Industry-aligned curricula, micro-credentialing programmes, and upskilling initiatives for the co-development of core technical skill sets** that meet international standards in the semiconductor and aerospace sectors – such as aerospace quality management, aircraft maintenance, repair, and overhaul, and semiconductor manufacturing standards like electronic assembly quality, microelectronics reliability, and cleanroom.

- **Integration of international industry manufacturing standards into Sarawak's technical and vocational education system**, guided by advisory input from UK institutions.

Key stakeholders to co-develop upskilling programmes and industry-aligned curricula could include UK institutions like the Advanced Manufacturing Research Centre (AMRC), Compound Semiconductors Applications Catapult, the University of Nottingham Institute for Aerospace Technology, Rolls-Royce, and Institute of Technology (IoTs), collaborating with their Sarawak counterparts, such as UNIMAS, CENTEXS, SMD Semiconductor, and AirBorneo. Furthermore, UK standards and accreditation bodies, including the British Standards Institution (BSI) and Engineering Council UK, can collaborate with Sarawak's education and industry regulators – namely, the Ministry of Education, Innovation and Talent Development (MEITD), the Sarawak Skills Development Centre (PPKS) on harmonising local education and technical standards with international industry requirements.

For Sarawak, this partnership accelerates the development of a high-skilled, industry-ready workforce capable of supporting advanced manufacturing sectors such as semiconductors and aerospace. Building on the UK's expertise in preparing specialists for frontier industries, Sarawak can significantly elevate teaching and learning outcomes, equipping local talents with globally recognised qualifications and industry-relevant technical skills. Furthermore, collaboration with UK innovation hubs and Catapult Centres can also foster technology transfer and applied research exchange. Collectively, these efforts would bridge Sarawak's skills gap to meet the requirements of global value chains. A robust, industry-ready workforce will play a crucial role in driving Sarawak's economic growth, supporting local SMEs and foreign investors, and advancing Sarawak's transformation into a developed economy.

For the UK, this partnership offers an opportunity to strategically shape workforce development in Sarawak that aligns with the UK and global industry standards, establishing a trusted partner in Southeast Asia that supports the UK industrial strategy and trade objectives. By embedding UK expertise and practices into Sarawak's frontier industries, UK firms can reduce operational and compliance risk while facilitating smoother entry for UK suppliers and investors into Sarawak's high-value supply chains. Beyond immediate commercial benefits, this collaboration also reinforces the UK's global reputation for excellence in industrial standards and technical education, enhancing its position as an international leader in science, technology, and frontier manufacturing.

RECOMMENDATION 3: SME CAPACITY BUILDING AND READINESS PROGRAMMES

While the Sarawak government is actively driving infrastructure development and policy reform to cultivate high-value industries, many local small and medium enterprises (SMEs) struggle to meet global standards, integrate into advanced supply chains, and access export markets. The Sarawak government recognises the need to enhance SME participation in component manufacturing and specialised services, particularly in high-value sectors like aerospace and semiconductors. Collaboration with the UK offers a pathway to address these capability gaps by embedding international standards, strengthening SME competitiveness, and linking Sarawak's enterprises with global value chains. This presents a significant entry point for the UK to contribute its industrial governance expertise and standards leadership in support of Sarawak's industrial transformation, while expanding the UK's commercial presence and institutional partnerships in a key Southeast Asian growth region.

Leveraging its globally competitive manufacturing ecosystem and strengths in research design and intellectual property, the UK is well-positioned to support Sarawak SMEs' growth in frontier industries. The UK's Advanced Manufacturing Sector Plan prioritises frontier sectors such as advanced materials and aerospace, which align closely with Sarawak's industrial ambitions. At the same time, the UK's semiconductor sector illustrates the value of complementary partnerships: while the UK possesses research and design capabilities, it has limited large-scale manufacturing capacity and remains reliant on imports of key components, materials, and services from major hubs in Asia such as Taiwan and South Korea (Imagination Technologies, 2022; Department for Science, Innovation, Technology, 2024). This dependency exposes the UK to supply chain vulnerabilities and geopolitical risk, underscoring the importance of diversifying partnerships with trusted regions that share its values and offer complementary industrial capacities. Collaboration with Sarawak presents clear commercial and diplomatic opportunities for the UK to strengthen its industrial network in Southeast Asia.

Key initiatives could include:

- **High-level business matching discussions** between the UK and Sarawak trade and investment agencies to establish strategic fit and scoping by mapping SME capabilities and assessing technical readiness.

- **Targeted business-to-business (B2B) engagements** between leading UK companies and Sarawak SMEs in the semiconductor and aerospace sectors to explore opportunities in key supply chain activities, including component manufacturing, maintenance, repair, and overhaul services (MRO).

- **Technical showcase and industry sharing sessions through business associations** from both the UK and Sarawak to promote knowledge exchange on technology adoption, quality assurance, and supply development best practices.

UK and Sarawak government agencies, trade entities, and industry groups could facilitate the implementation of activities. Potential UK partners include the Department for Business and Trade (DBT) and sectoral bodies such as ADS Group (aerospace), Rolls-Royce (aerospace), TechWorks UK (semiconductors), and the Compound Semiconductor Applications Catapult (semiconductors). On the Sarawak side, potential collaborating partners would be the Ministry of International Trade, Industry and Investment (MINTRED), Invest Sarawak, the Sarawak Economic Development Corporation (SEDC), the Sarawak Business Federation (SBF), the SME Association of Sarawak, and the Sarawak Digital Economy Corporation (SDEC).

For Sarawak, this partnership accelerates the modernisation and internationalisation of its SME ecosystem by facilitating technology transfer, improving production standards, and fostering SME's entry into international supply chains. Exposure to UK best practices will enhance SME competitiveness and equip Sarawak's SMEs to participate in high-value sectors in the aerospace and semiconductor sectors. Over time, this will strengthen Sarawak's position as a regional industrial hub and promote broader socio-economic development.

On the other hand, engaging in talent development and industrial partnerships in Sarawak enables the UK to actively shape a locally embedded ecosystem aligned with its industry standards, producing professionals skilled to operate according to internationally recognised technical and operational practices. This alignment reduces operational and compliance risks for UK firms, facilitates faster integration into high-value supply chains in sectors such as aerospace and semiconductors, and provides direct access to skilled, industry-ready personnel, lowering training costs and accelerating project execution. By partnering with Sarawak's SMEs in component manufacturing and specialised services, UK firms can reduce dependence on high-risk regions while accelerating the commercialisation of UK-designed intellectual property. Embedding UK standards and practices through technical exchanges will not only extend the reach of UK quality frameworks but also create a trusted extension of the UK's manufacturing

ecosystem in Southeast Asia. Aside from the commercial dimension, this partnership reinforces the UK's commitment to the Southeast Asia region, positioning itself as a reliable industrial partner amid global competition.

3.2 Renewable Energy

Sarawak's ambitious targets in renewable energy development present significant opportunities for collaboration with the United Kingdom, aligning closely with the UK's policy priorities. Capitalising on the latter's expertise in energy transition, the UK and Sarawak can collaborate in two key areas: governance and regulatory development, and innovative financing. This partnership will be delivered through initiatives such as technical assistance, capacity building, and investment facilitation. Such collaboration will allow Sarawak to achieve its decarbonisation goals while reinforcing the UK's position as a global climate leader and trusted long-term partner in Southeast Asia's clean energy transformation.

The following outlines key recommended areas for strategic collaboration between Sarawak and the UK to accelerate the growth of Sarawak's renewable energy sector.

RECOMMENDATION 1: STRENGTHENING ENERGY GOVERNANCE AND REGULATORY PLANNING TO SUPPORT RENEWABLE ENERGY DEVELOPMENT AND EMERGING MARKETS

The UK and Sarawak can collaborate to strengthen energy governance and regulatory planning, leveraging the UK's leadership in global climate action and renewable energy transition. As Sarawak's energy system matures, new subsectors rapidly emerge, requiring a streamlined governance model. While strategic development plans are in place, Sarawak's core challenge lies in modernising and integrating Sarawak's energy governance framework to ensure the effective development of these emerging sectors.

The UK's expertise in energy governance and experience with devolved administrative structures offer valuable insights that could inform Sarawak's energy transition. As a pioneer in climate action, the UK has a comprehensive clean energy strategy covering green finance, low-carbon innovation, system resilience, and market reform, guided by frameworks such as the Clean Power 2030 Action Plan and the Clean Energy Industries Sector Plan. With major UK companies like BP and Shell exploring Carbon Capture, Utilisation, and Storage (CCUS) projects in Sarawak, the UK can apply its expertise from the North Sea Transition Authority (NSTA) to guide governance reforms and transfer legal frameworks, regulatory approaches, and best practices to support the design and implementation of Sarawak's emerging CCUS regime (UKAS, 2024c; North Sea Transition Authority, n.d.). Moreover, Scotland's devolved governance model, which aligns subnational and national climate objectives, provides a

particularly relevant example for Sarawak as it designs its own energy market institutions and regulatory mechanisms.

Significantly, the Sarawak government's expressed interest in exploring the UK-Scotland carbon revenue model further highlights an opportunity to co-develop a locally tailored carbon market framework. Such a model could mobilise domestic investments, incentivise emission reductions, and enhance the economic viability of low-carbon initiatives. Together, these factors position UK-Sarawak collaboration as both a practical blueprint and a strategic mechanism for advancing energy transition objectives while aligning policy frameworks with local priorities.

Potential initiatives could include:

- **High-level strategic discussions on energy governance structure** to exchange best practices, including legal and fiscal modelling on carbon revenue sharing, assessment of Sarawak's regulatory architecture, and identification of institutional and policy gaps.

- **Joint technical studies and policy dialogues between energy regulators** on practical regulatory issues such as tariff-setting, IPP licensing, emissions governance, revenue-sharing model, and energy market reform.

- **Institutional secondments and twinning arrangements,** funded by Sarawak, to facilitate two-way regulatory learning and capacity transfer, enabling mutual sharing of expertise. Sarawak's untapped potential in biomass and Carbon Capture, Utilisation, and Storage (CCUS) aligns with the UK's priority sectors.

Relevant stakeholders could include energy governance bodies from both the UK and Sarawak, such as the Department for Energy Security and Net Zero (DESNZ), the Office of Gas and Electricity Markets (Ofgem), the UK Partnering for Accelerated Climate Transitions (UK PACT), the National Energy System Operator (NESO), and the Scottish Government, alongside Economic Planning Unit (EPU) Sarawak, the Ministry of Utility and Telecommunication (MUT), the Ministry of Energy and Environmental Sustainability (MEESty), and the Sarawak Energy Berhad (SEB).

This collaboration will strengthen Sarawak's regulatory and institutional capacity to manage a diversified and emerging energy system. By accessing UK expertise in energy governance, market reform, and devolved administrative models, Sarawak can streamline decision-making processes, align subnational and national energy objectives, and design regulatory frameworks capable of accommodating emerging subsectors such as CCUS, carbon markets, and IPPs. Enhanced governance will create a more predictable and transparent investment environment, unlocking domestic and international capital for low-carbon sectors. Furthermore, institutional learning through joint studies, policy dialogues, and twinning arrangements will build long-term capacity within Sarawak's energy regulators, enabling Sarawak to anticipate and respond to

evolving market challenges and technological opportunities, thereby increasing the resilience and efficiency of its energy system.

For the UK, this partnership provides an opportunity to help shape Sarawak's emerging energy regulatory frameworks in line with UK standards, creating favourable conditions for UK firms in advisory, consultancy, and research roles. Engagement in joint technical studies and institutional exchanges will give UK institutions early insights into Sarawak's energy market, facilitating long-term operational entry and strategic positioning in high-growth low-carbon sectors such as CCUS, biomass, and renewable energy. Beyond commercial benefits, the partnership reinforces the UK's global profile as a leading partner in sustainable energy transitions, demonstrating the transferability of UK governance models to emerging markets and showcasing the UK's expertise in climate-resilient energy policy.

RECOMMENDATION 2: MOBILISING FINANCE TO SUPPORT RENEWABLE ENERGY ECOSYSTEM DEVELOPMENT

The UK and Sarawak can collaborate to develop strategic financing mechanisms that mobilise blended capital and de-risk private investment in Sarawak's renewable energy sector. Many frontier projects involve substantial capital requirements and unproven technologies, making them high-risk for private investors. Enhancing public–private partnerships with experienced international firms and developing a financing framework will be critical to scaling up investment while ensuring long-term financial sustainability.

The Sarawak government indicated interest in developing a blended financing model that combines public funds, concessional finance, and private capital to enable commercially viable clean energy projects. Recognising the growing importance of clean growth and the need to mitigate financial risks, the UK has a robust and mature financing framework to support sustainable development. For example, the National Wealth Fund, established by the UK Treasury, offers a valuable model for Sarawak, demonstrating how institutional capital allocation can drive renewable energy deployment. In addition, the UK Export Finance (UKEF) provides guarantees and concessional loans to mitigate investment risk in emerging sectors and connects UK firms with international partners through a suite of financing instruments and risk mitigation tools. These efforts are guided by UKEF's Sustainability Strategy 2024–2029, which aims to deliver GBP 10 billion in clean growth finance by 2029 and identifies Malaysia as a priority market, aligning directly with Sarawak's renewable energy ambitions (UK Export Finance, n.d.).

To advance this agenda, the UK and Sarawak can consider the following initiatives:

- **Blended finance mechanism assessment** to map funding sources, policy constraints, and sectoral priorities, optimising capital allocation and supporting Sarawak's decarbonisation goals.

- **Technical assistance** to design and structure innovative financing instruments such as green bonds and climate-impact loans. This could include capacity-building workshops for Sarawak regulators to assess project viability, measure risk-adjusted returns, and calibrate policy levers, mobilising private capital through the UK's expertise in green finance frameworks.

- **Financing instruments**, such as guarantees, concessional loans, and insurance instruments, to de-risk private investments in Sarawak, particularly in renewable energy, emerging technologies, and infrastructure.

- **Business matching sessions** to bridge UK investors, technology providers, and manufacturers with high-potential clean energy projects in Sarawak, particularly across the biomass, solar, and hydrogen supply chains.

Key relevant stakeholders could include the UK's energy governance bodies and institutional investors, such as the Department for Business and Trade (DBT), the Department for Energy Security and Net Zero (DESNZ), the National Wealth Fund, UK Export Finance (UKEF), UK Partnering for Accelerated Climate Transitions (UK PACT), and Green Finance Institute. Sarawak counterparts include the Ministry of Energy and Environmental Sustainability (MEESty), InvestSarawak, the Economic Planning Unit (EPU) of Sarawak, Sarawak Energy Berhad (SEB), Petroleum Sarawak Berhad (PETROS), and the Sarawak Economic Development Corporation (SEDC) Energy. Meanwhile, business matching sessions could involve key UK players in emerging renewable energy sectors, including BP, Shell, Hydrogen UK, Drax Group, and Renewable Energy Associations, aligned with Sarawak's renewable energy focus. For direct financing, UK commercial and investment banks specialising in international project finance, particularly for renewable energy, emerging technologies, and infrastructure, can explore the funding of these projects in Sarawak.

This collaboration would enable Sarawak to accelerate its clean energy transition by enhancing institutional capacity to manage complex financing structures and develop bankable renewable energy projects. A dedicated green financing mechanism would strengthen agencies' ability to structure and evaluate blended finance projects while creating a predictable and attractive investment climate for international investors. Mobilising additional capital could unlock large-scale renewable infrastructure, stimulate local economic activity, and drive green growth.

In turn, this collaboration provides the UK exporters and investors with early access to Sarawak's emerging clean energy market, generating new revenue streams and strengthening the UK's commercial and strategic presence in Southeast Asia's growing green economy. By embedding UK expertise in financing, risk management, and sustainable investment practices into Sarawak's energy transition, the UK can shape project pipelines compatible with UK firms' operational models and sustainability objectives. Strategically, this collaboration positions the UK as a trusted partner in the region's energy transition and establishes a replicable model for sustainable financing in emerging markets. It further reinforces the UK's reputation as a global leader in green finance and clean growth diplomacy.

3.3 Digital Transformation

Sarawak's digital transformation agenda presents opportunities for UK engagement to support capacity building for the civil service with digital governance and system improvement, both underpinned by commercially viable collaboration. Strategic partnerships in civil service digital capability development and institutional digital governance can strengthen Sarawak's institutional resilience while opening new markets for UK firms in digital reform, GovTech, and cloud infrastructure. By aligning the UK's strengths in digital public services with Sarawak's digital government priorities, the following recommendations deliver economic value for the UK while advancing citizen-centric transformation for Sarawak.

RECOMMENDATION 1: SUPPORTING DIGITAL SKILLS DEVELOPMENT FOR SARAWAK CIVIL SERVICE

Sarawak's civil service digitalisation push creates opportunities for the UK to export its expertise in public sector digital skills training, particularly in GovTech, AI, and digital service delivery. With both governments committed to raising the digital competency baseline across the public sector to enhance service delivery, the partnership builds on a strong foundation of shared priorities (Economic Planning Unit Sarawak, 2023b; Government Digital Service, 2025a). Sarawak stakeholders have consistently highlighted the need to strengthen digital understanding across the civil service, particularly among senior leaders whose decisions shape digital transformation trajectories, signalling the importance of upskilling for digital initiatives to succeed. UK vendors with experience in developing tailored training content for various levels are well-positioned to provide customised training, certification, and advisory solutions for Sarawak's civil service.

The UK's expansion of its Government Digital and Data profession – now representing 6 per cent of total civil service headcount – illustrates deliberate efforts to institutionalise digital expertise within the public sector, ensuring the continuity and scalability of government digital transformation initiatives (Government Digital Service, 2025a). As the UK enters the next phase of its digital government strategy, these milestones create opportunities to commercialise its public

sector learning frameworks, strengthen its international brand in digital reform, and secure early market access in Sarawak. A proven model for export is the UK's integrated digital upskilling ecosystem for civil servants, delivered through a unified, one-stop learning platform that consolidates courses in digital, data, and innovation under a nationally endorsed curriculum. This platform combines general and specialised courses, from free AI modules and data innovation masterclasses to the Digital Excellence Programme for senior leaders, providing an export-ready model that can be adapted to Sarawak's civil service context (Government Skills, 2025).

While activities under this partnership can remain flexible and be adapted to evolving priorities, potential areas of collaboration that align with Sarawak's current situation could include:

- **Technical workshops on assessing digital capabilities**, including frameworks and tools to measure digital maturity, identify skills gaps, and design targeted interventions for the civil service.

- **Development of an online and blended learning platform for civil servants**, modelled after the UK's example, including centralised access to certified courses and learning modules tailored to different levels of technical proficiency.

- **Enhancement of digital upskilling content and leadership modules**, including the development of modular learning tracks for senior leaders and technical specialists in areas such as digital transformation leadership, data governance, AI for public policy, and ethical technology adoption.

Key UK partners could include the Government Digital Service (GDS), Government Skills, the UK Civil Service College, and UK training providers or consultancies with experience in delivering civil service training in digital skills. On the Sarawak side, the Sarawak Civil Service Digitalisation Unit (SCSDU) and the Leadership Institute of Sarawak Civil Service could lead the coordination and implementation.

For Sarawak, strengthening digital capacity across the civil service will accelerate policy delivery, improve service accessibility for citizens, and enable the secure and effective integration of emerging technologies, such as AI and data analytics, across sectors. Partnering with the UK, which has established a mature digital upskilling framework for its civil service, would help Sarawak develop a digitally capable government through a structured, top-down capacity-building approach.

For the UK, such collaboration allows UK institutions and vendors to export proven digital government learning frameworks, certification services, and advisory expertise to a growing market, creating immediate and future commercial opportunities. Co-developing integrated learning platforms and tailored leadership modules would allow UK firms to establish early partnerships with Sarawak's civil service, shaping digital transformation in line with UK standards. The initiative also enhances the

UK's reputation as a global leader in GovTech and public sector digital reform, while providing insights from a new market context that can inform future international engagements and strengthen the UK's competitive position in public sector digital services.

RECOMMENDATION 2: STRENGTHENING INSTITUTIONAL CAPACITY FOR DIGITAL GOVERNMENT ADOPTION

Sarawak and the UK can collaborate to improve Sarawak's institutional capacity for digital government adoption, particularly in digital governance, GovTech platforms, and enterprise architecture. According to Sarawak stakeholders involved in the government's digital transformation planning, steady progress is being made to lay the groundwork for digital government. However, system-level coordination could be further reinforced through structured frameworks and implementation tools to ensure that ministries and agencies follow a coherent, unified approach in their digitalisation journey – an area where enterprise architecture plays a critical role in aligning strategy, technology, and service delivery across government.

While Sarawak's Digital Economy Blueprint 2030 sets a clear goal of achieving fully integrated digital public services by the end of the decade, Sarawak faces barriers such as a lack of common standards and coordination mechanisms across ministries. In contrast, the UK has successfully implemented a whole-of-government digital transition, driven by strong leadership and coordinated delivery through the Government Digital Service (GDS). This creates a natural opportunity for the UK to provide practical, commercially scalable solutions, such as enforceable design standards, interoperability frameworks, and cloud-based service delivery models utilised by GDS, to help address Sarawak's challenges effectively.

Key UK initiatives such as GOV.UK, a single publishing platform that replaced over 1,800 separate websites, and One Login, which simplifies access to government services, provide exportable reference models (Government Digital Service, 2025a). Supported by GDS's globally recognised Design System, the Service Standard, and open-source frameworks, these models demonstrate how consistent governance and user-centred service design can enhance trust, interoperability, and efficiency (McEvoy, 2020; Government Digital Service, 2025a). The UK's expertise in digital architecture, cloud governance, and procurement frameworks offers significant potential for commercial application in Sarawak's evolving digital ecosystem.

A strategic UK–Sarawak partnership in this area could focus on strengthening institutional capacity and governance for digital service adoption. Potential areas of collaboration could include:

- **Technical workshops and advisory missions** on digital governance, enterprise architecture, and interoperability frameworks, including development of interoperable digital architectures, shared data and service standards, and governance mechanisms.

- **Co-development of a localised "Sarawak Digital Service Standard" and implementation playbook**, adapted from the UK Government Digital Service (GDS) principles. This could consist of guidance on planning, designing, and delivering digital services, key milestones, performance goals, and integration of data localisation principles.

- **Advisory support** for designing a centralised digital procurement marketplace, enabling government entities to source approved digital services, infrastructure, and tools through a single platform.

Potential partners could include GDS, digital transformation consultancies specialising in public sector reform, such as Public Digital Ltd and Thoughtworks UK, which have supported the UK government in implementing scalable digital transformation models (Public Digital Ltd, n.d.; Thoughtworks, Inc., n.d.). On Sarawak's side, the Sarawak Multimedia Authority (SMA) and the Sarawak Civil Service Digitalisation Unit (SCSDU) could lead coordination and execution.

For Sarawak, this partnership would enable a decisive shift from fragmented, siloed digital initiatives toward a unified, standards-based model of digital governance. It would improve service delivery, ensure interoperability across ministries, and achieve significant cost efficiencies and scalability through standardised governance, coordinated digital procurement, and shared platforms – reducing duplication and enabling faster, more consistent digital rollouts.

For the UK, the partnership offers direct commercial access to Sarawak's growing GovTech market, creating immediate opportunities and sustained demand for UK digital solutions and advisory services. Aligning Sarawak's digital governance standards with the UK's proven GDS model would support the internationalisation of UK GovTech providers and consultancies, offering new market access and practical use case studies to demonstrate the adaptability of their frameworks in emerging markets. This would not only reinforce the global credibility of the UK's digital government model but also position UK firms as credible partners for other developing markets seeking scalable, standards-based digital transformation.

3.4 Education and Human Capital Development

While early primary school leavers remain a concern, the following recommendations focus on students who complete secondary education. While this would impact a smaller group, these students strategically represent Sarawak's best opportunity to rapidly build a skilled, innovation-ready workforce aligned with its economic transformation goals.

With the UK's strong reputation for world-class education and research quality, the UK and Sarawak could pursue collaborations across three fronts: co-designed research partnerships in priority sectors, the promotion of UK education exports to strengthen Sarawak's tertiary ecosystem, and the adaptation of proven UK Technical and Vocational Education and Training (TVET) models to enhance Sarawak's technical-to-higher education pipeline. These collaborations not only advance Sarawak's human capital goals but also open pathways for UK universities and research institutions to expand their commercial footprint in Sarawak.

RECOMMENDATION 1: ENHANCING RESEARCH PARTNERSHIPS IN RENEWABLE ENERGY, ADVANCED MANUFACTURING, AND DIGITAL TECHNOLOGIES

Sarawak's continued investment in R&D presents a strategic window to deepen collaboration with the UK in research initiatives across renewable energy, advanced manufacturing, and digital technologies. While Sarawak allocated substantial funding for research through local universities and agencies, limited access to sustained external financing and international expertise constrains its ability to scale impact. This gap creates space for co-founded and co-designed UK-Sarawak research partnerships that strengthen scientific collaboration and allow both economies to capture industrial value chains in priority sectors critical to their long-term development.

The UK is an ideal partner given its position as a scientific and innovation leader, with a proven track record in research and pioneering cutting-edge technologies (UK Government, 2025). This capability is structurally supported by Innovate UK and the Catapult Network, which facilitates innovation and commercialisation by providing essential technical and business support. The alignment between Sarawak's and the UK's technological priorities, i.e., renewable energy, advanced manufacturing, and digital technologies, creates a mutually reinforcing collaboration.

By adopting a co-funded, co-designed applied research model, the partnership allows both parties to align objectives, mitigate asymmetries in capacity, and ensure collective ownership of knowledge outputs. Sarawak would provide local facilities, policy support, and access to testbeds such as renewable energy sites, advanced manufacturing parks, and critical physical testbeds (e.g., renewable energy sites, CCUS pilot areas) to de-risk and validate new technologies. The UK would contribute technical leadership, research design expertise, and mentorship for Sarawakian researchers, while facilitating the commercialisation pathways through its

established innovation networks – linking joint research outcomes to industry partners, investors, and technology accelerators. Both sides would jointly determine research priorities, coordinate talent exchange, and oversee project outcomes to ensure that initiatives remain practical in application and industry aligned.

As an illustrative example of how this partnership could operate in practice, a joint research programme could be established in low-carbon energy technologies, focusing on hydropower, solar, or carbon capture, utilisation, and storage (CCUS). Under such an initiative, Sarawak could provide physical test sites, such as hydropower dams, solar farms, or onshore CO_2 storage facilities, to pilot and validate UK-developed technologies. Sarawak's existing energy infrastructure and natural resources would form the basis for joint experimentation, while the UK would contribute technical supervision, research methodology design, and specialist expertise.

This collaboration would help translate academic research into deployable, market-ready solutions, bridging the gap between innovation and implementation. Industry involvement from both countries could further strengthen the research-to-market pipeline. UK technology developers would gain early deployment opportunities, access local data for validation, and generate demonstration results to support commercial scaling. Meanwhile, Sarawak-based companies, utilities, and government-linked agencies, particularly those in power generation, oil and gas, or green manufacturing, could observe technology performance firsthand, adopt proven innovations, and co-invest in localised production and deployment.

Under this partnership, potential activities could include:

- **Co-design and plan research initiatives,** including jointly defining priority sectors, research questions, project scopes, expected outcomes, and governance mechanisms.

- **Collaborative experimentation and field trials,** leveraging Sarawak's local testbeds (e.g., hydropower dams, solar farms, CCUS pilot sites, or advanced manufacturing facilities) and UK technical expertise for methodology design, lab-based research, and prototype validation.

- **Industry integration and applied use-case development,** engaging UK and Sarawak industry partners to translate research into commercially viable applications, pilot new technologies, and develop shared intellectual property, licensing, or technology adoption opportunities.

For Sarawak, this partnership builds domestic R&D capacity in line with industrial priorities by accessing UK research excellence and technical expertise. It enables Sarawak to leverage UK quality standards and methodologies while developing a skilled local research workforce. Furthermore, Sarawak's visible partnership with the UK on R&D

in priority sectors could also strengthen its ability and credibility to attract international partners and investors.

For the UK, the partnership creates access to Sarawak-funded contracts for research design, technical consultancy, and innovation services delivered by UK universities, research consortia, and firms. It also opens early market entry pathways into Sarawak's renewable energy, advanced manufacturing, and digital technology sectors, positioning UK expertise at the forefront of emerging opportunities. This approach directly supports the UK's Modern Industrial Strategy by expanding global technology exports and strengthening the country's presence in fast-growing markets across Southeast Asia.

Thematic Areas	Sarawak Institutions	UK Institutions
Engineering & Advanced Manufacturing	iCATS University College Curtin University Malaysia Swinburne University Sarawak UNIMAS	University of Sheffield – Advanced Manufacturing Research Centre Cardiff University – Manufacturing Engineering Centre University of Strathclyde – Advanced Forming Research Centre Cranfield University – School of Aerospace, Transport and Manufacturing
Renewable Energy & Green Technologies	CENTEXS Green Energy Academy Curtin University Malaysia Swinburne University Sarawak Sarawak Biodiversity Centre	Durham University – Durham Energy Institute Loughborough University – Centre for Renewable Energy Systems Technology University of Derby – Zero Carbon Centre Imperial College London – Energy Futures Lab
Computer Science & Digital Innovation	Swinburne University of Technology Sarawak Curtin University Malaysia	Cardiff University – Digital Transformation Innovation Institute Alan Turing Institute University of Edinburgh – Bayes Centre

Table 3: Key Institutions between Sarawak and the UK for University-Based Partnerships

RECOMMENDATION 2: EXPANDING UK HIGHER EDUCATION EXPORTS AND MARKET PRESENCE IN SARAWAK

With Sarawak seeking to internationalise its education system and broaden pathways for talent development, the UK can pursue expanding student recruitment and higher education promotion in Sarawak. This recommendation is aligned with both Sarawak's aspirations for globally connected human capital and the UK's International Education Strategy, which targets its education exports to achieve GBP 35 billion annually by 2030 (EPU Sarawak, 2021; Department for Business & Trade & Department for Education, 2023).

Despite strong interest in international education among Sarawakian students, the UK's institutional visibility and recruitment presence remain limited compared to Australia and, increasingly, China. Australian universities benefit from long-standing branch campuses in Sarawak and have already established joint programmes and exchange opportunities. Meanwhile, Chinese universities are intensifying academic outreach through school-to-university pathways, direct partnerships, and scholarships – especially in urban centres like Sibu (British Council, 2025).

While UK campaigns such as Study UK, the UK–Malaysia University Consortium and Going Global Partnerships currently concentrate their outreach efforts in Peninsular Malaysia, they have yet to effectively reach audiences in East Malaysia. This geographic gap represents a missed opportunity given that Sarawak presents a commercially attractive environment for UK higher education institutions, driven by English proficiency, stable governance, and active state investment in education and innovation.

The UK can address this by extending its education promotion campaigns and recruitment activities directly into Sarawak, in partnership with state agencies and universities. This would not only raise awareness of UK education pathways and scholarships but also position the UK as a leading education partner in a strategically important and fast-growing region.

This initiative could include:

- **Targeted outreach events in Sarawak**, such as education fairs, school visits, and information sessions hosted in partnership with local schools and universities.
- **Digital marketing and scholarship promotion** tailored to Sarawakian students, highlighting the comparative advantages of UK qualifications and campus life.
- **Partnership facilitation** for dual degree and credit transfer programmes, providing affordable entry points for Sarawakian students and giving UK institutions long-term engagement opportunities; and

- **Stronger coordination** with state-level actors, including the Ministry of Education, Innovation and Talent Development (MEITD) and local agents, to strengthen UK presence and visibility.

Relevant UK partners may include the British Council, UK universities, the Department for Business and Trade, and marketing consortia already active in Southeast Asia. On the Sarawak side, key actors include UNIMAS, UiTM Sarawak, Swinburne Sarawak, Curtin Malaysia, the Ministry of International Trade, Industry and Investment, and MEITD.

For Sarawak, this partnership offers greater diversity of education options, wider global recognition of qualifications, and new opportunities for students to access international networks and career pathways. It allows students to benefit from a different educational experience without necessarily incurring the high costs typically associated with studying abroad.

For the UK, this presents a high-impact, cost-effective strategy to further its brand presence in a strategically important and fast-growing market dominated by Australia and increasingly China. By engaging directly with schools, universities, and prospective students, UK institutions can diversify their international student pipeline beyond traditional markets and establish early, long-term connections with a young, English-proficient population increasingly seeking global qualifications. In the longer term, this creates sustained commercial opportunities for UK institutions through measurable gains like increased student enrolment, tuition revenue, and alumni networks – supporting the UK's education export goals and reinforcing its reputation as a global leader in quality higher education.

RECOMMENDATION 3: SUPPORTING INTEGRATED TVET-HIGHER EDUCATION PATHWAYS

As Sarawak redesigns its talent pipeline to support high-growth sectors, there is a strategic opportunity for the UK to help Sarawak's development of a coherent progression system that connects technical, vocational, and higher education pathways. This partnership would enable Sarawak to build a future-ready workforce while positioning the UK as a trusted partner in system design, skills accreditation, and technical advisory services.

The Sarawak government has expressed interest in Scotland's Foundation Apprenticeships model, which positions vocational education as an equal and complementary track to academic education. Unlike many systems where vocational tracks are often seen as a fallback option, the Scottish approach offers flexibility and mobility between academic and vocational streams, enabling students to make informed choices based on interest and aptitude (Scottish Qualifications Authority, 2019). This model mirrors Sarawak's ambition to elevate Technical and Vocational Education and

Training's (TVET) status and facilitate seamless progression between vocational and higher education based on students' aptitude and career goals.

This collaboration could entail:

- **Technical advisory and system design support** for integrated TVET-higher education pathways, Sarawak could contract UK experts to help design and implement a connected system. This involves shared credit frameworks and dual-certification pathways to boost employability and learner mobility.

- **Capacity-building workshops** for TVET educators and administrators, focusing on strengthening the interface between technical and higher education systems. Key areas could include curriculum co-design, employer engagement, and qualification mapping.

- **Co-development of industry-linked apprenticeship schemes and work placements** tailored to Sarawak's priority growth sectors. The UK can export its expertise in apprenticeship model design by adapting Scotland's Foundation Apprenticeships framework.

Sarawak partners could include Sarawak Skills, CENTEXS, i-CATS College University, and the Ministry of Education, Innovation and Talent Development (MEITD). On the UK side, relevant actors may include Skills Development Scotland, Skills England, the Skills Federation, Qualifications Scotland, SCQF Partnership, and UK universities with strong TVET offerings. This list of stakeholders can also extend to industry partners in Malaysia, such as the British Malaysian Chamber of Commerce and UK-based MNCs.

For Sarawak, this collaboration represents a concrete step toward implementing integrated, industry-aligned education models, leveraging global expertise to strengthen TVET quality. It would help build a more agile education system capable of producing a technically skilled, industry-ready workforce trained and accredited to UK standards, enhancing local employability and international mobility for Sarawak's graduates.

For the UK, supporting Sarawak in integrating its TVET and higher education systems presents both commercial and strategic opportunities. In the short term, UK skills agencies, qualification bodies, and training providers can secure government-funded contracts for consultancy, capacity-building, and licensing of UK-accredited frameworks. This establishes the UK as a key delivery partner and secures a sustained foothold in Sarawak's rapidly expanding education and training ecosystem.

In the longer term, aligning Sarawak's qualification standards and student competencies with UK benchmarks would create a pool of world-class, industry-ready talent. This would enable UK industries to diversify their sources of skilled labour through international partnerships, while allowing firms already operating in Sarawak, or

considering entry, to access cost-effective, locally trained talent developed to UK standards. Simultaneously, these initiatives enhance the UK's reputation as a global leader in skills development and education, while generating tangible commercial returns for UK institutions.

4 CONCLUSION

This report highlights strategic opportunities for the UK and Sarawak to deepen their relationship that align with the UK's economic, technological and global priorities. The sectors explored, advanced manufacturing, renewable energy, digital transformation, and education and human capital development, reflect shared priorities and areas where collaboration can deliver practical outcomes for both sides.

- In **advanced manufacturing**, Sarawak's focus on high-value sectors such as semiconductors, aerospace, and precision engineering offers UK firms early access to emerging supply chains, opportunities to export technology, and the ability to shape industry standards.

- In **renewable energy**, collaboration on low-carbon power, hydrogen, and cross-border energy trade supports the UK's NetZero ambitions while positioning UK companies as regional leaders in sustainable energy solutions.

- Sarawak's **digital transformation** agenda, including fully integrated public services by 2030, aligns with the UK's strengths in GovTech, cybersecurity, and digital leadership. Engagement on this allows the UK to export proven governance models, digital upskilling frameworks, and technology solutions, strengthening its influence over regional digital standards.

- In **education and human capital development**, Sarawak's expansion of TVRT, higher education, and R&D created demand for UK expertise in curriculum design, applied research, and skills development, offering UK universities and training providers access to new markets while reinforcing the UK's reputation in education.

To maximise impact, UK engagement should prioritise targeted technical advisory, institutional capacity building, joint research and innovation, business ecosystem development, and support integrated education-to-employment pathways – all anchored in Sarawak's governance and strategic frameworks. Such a partnership model is adaptable, evidence-based, and designed to leverage the UK's expertise while meeting Sarawak's long-term development goals.

By converting goodwill into targeted, sustained collaboration, the UK and Sarawak can co-create a durable, inclusive, and innovation-driven partnership. This will advance shared priorities in sustainable growth, digital governance, and global science diplomacy – positioning Sarawak as a strategic gateway for the UK's engagement in Southeast Asia's emerging economies, while generating long-term commercial, strategic, and scientific benefits for both partners.

5 References

Abang Zohari Abang Openg. (2024, November 11). *Budget Speech 2025: Together Building A Prosperous Future* [Text]. Office of the Premier of Sarawak. https://premier.sarawak.gov.my/web/attachment/show/?docid=US9FYjBrbjhCYTRQYUREd0NLTG5CUT09Ojp3VWiDhGH8kNcrpl0xbcqm

Akmar Annuar. (2025, June 6). *Selangor Aero Park lifts off as new hub for aerospace and air cargo*. The Malaysian Reserve. https://themalaysianreserve.com/2025/06/06/selangor-aero-park-lifts-off-as-new-hub-for-aerospace-and-air-cargo/

Aubrey, S. (2023a, June 14). *Abg Jo: MoU for talent development in semiconductors, chip design new milestone for Sarawak.* The Borneo Post. https://www.theborneopost.com/2023/06/14/abg-jo-mou/

Aubrey, S. (2023b, December 9). *Abg Jo: British Petroleum keen on partnering with Petros to develop CCUS in S'wak.* Borneo Post Online. https://www.theborneopost.com/2023/12/09/abg-jo-british-petroleum-keen-on-partnering-with-petros-to-develop-ccus-in-swak/

Aubrey, S. (2024a, November 7). *Curtin Malaysia, SMD forge alliance to boost Sarawak's semiconductor industry*. The Borneo Post. https://www.theborneopost.com/2024/11/07/curtin-malaysia-smd-forge-alliance-to-boost-sarawaks-semiconductor-industry/

Aubrey, S. (2024b, November 10). *S'wak targets 15 GW renewable energy generation capacity by 2035.* Borneo Post Online. https://www.theborneopost.com/2024/11/10/swak-targets-15-gw-renewable-energy-generation-capacity-by-2035/

Aubrey, S. (2024c, November 12). *Mintred working to make Sarawak preferred investment destination*. The Borneo Post. https://www.theborneopost.com/2024/11/12/mintred-working-to-make-sarawak-preferred-investment-destination/

Aubrey, S. (2024d, September 23). *Sarawak needs 30,000 skilled workers annually to meet 2030 target, says ministry*. The Borneo Post. https://www.theborneopost.com/2024/09/23/sarawak-needs-30000-skilled-workers-annually-to-meet-2030-target-says-ministry/

Aubrey, S. (2025a, April 22). *Sarawak forms special unit to advance gender equality, says Fatimah*. The Borneo Post. https://www.theborneopost.com/2025/04/22/sarawak-forms-special-unit-to-advance-gender-equality-says-fatimah/

Aubrey, S. (2025b, May 5). *Premier witnesses Airod-Satys agreement signing in France, collaboration to boost M'sia's aerospace ecosystem*. The Borneo Post. https://www.theborneopost.com/2025/05/05/premier-witnesses-airod-satys-agreement-signing-in-france-collaboration-to-boost-msias-aerospace-ecosystem/

Bernama (2024a, July 17). *Sarawak attracts RM4.2 Bln Investments in 1Q 2024, poised to receive more green investments*. https://www.bernama.com/en/news.php?id=2318692

Bernama. (2024b, June 6). *Sarawak's electrolyser facility can boost green hydrogen initiatives – Abang Johari*. https://www.bernama.com/en/news.php?id=2305242

Bernama. (2025a, February 10). *Sarawak aims to be 'Battery of Asean' by 2035*. New Straits Times. https://www.nst.com.my/business/economy/2025/02/1173035/sarawak-aims-be-battery-asean-2035

Bernama. (2025b, June 15). *SMD Semiconductor Calls on Young Talents to Explore Careers in Chip Design at TRACE 2025*. https://www.bernama.com/en/news.php?id=2434473

Bong, K. (2019, March 8). Sarawak to build 4 international schools to prepare bright students for elite universities. DayakDaily. https://dayakdaily.com/sarawak-to-build-4-international-schools-to-prepare-bright-students-for-elite-universities/

Bong, K. (2025, February 28). *Sarawak eyes Aerospace Industrial Park as key driver of aviation innovation in ASEAN*. Dayak Daily. https://dayakdaily.com/sarawak-eyes-aerospace-industrial-park-as-key-driver-of-aviation-innovation-in-asean/

Boon, P. (2024). *Secondary schools in Sarawak to implement dual-language programme immediately*. The Borneo Post. https://www.theborneopost.com/2024/05/10/secondary-schools-in-sarawak-to-implement-dual-language-programme-immediately/

Bruno, J. (2025). Sarawak allocates RM20mil to provide free tuition to weak SPM students. New Straits Times. https://www.nst.com.my/news/nation/2025/05/1221652/sarawak-allocates-rm20mil-provide-free-tuition-weak-spm-students

Business Times (2024, July 24). Petros calls for bids for three carbon storage sites to kick off CCUS industry in Sarawak. New Straits Times. https://www.nst.com.my/business/corporate/2024/07/1080896/petros-calls-bids-three-carbon-storage-sites-kick-ccus-industry

Cambridge Science Park. (n.d.). *Cambridge Science Park: A World of Impact*. https://www.cambridgesciencepark.co.uk/about/

Catapult High Value Manufacturing. (n.d.). *National Manufacturing Institute Scotland (NMIS)*. https://hvm.catapult.org.uk/centre/national-manufacturing-institute-scotland-nmis/

CENTEXS. (2025, May 25). *Aerospace, Digital & Green Energy Academy*. https://www.centex-sarawak.my/digital-academy/

Centre for Technology Excellence Sarawak. (n.d.). *Industry Academy - List of Training Programmes.* https://www.centex-sarawak.my/industry-academy-list-of-training-programme/

Compound Semiconductor Applications (CSA) Catapult. (2024, June 3). *CSA Catapult and SMD Semiconductor sign memorandum of understanding - Compound Semiconductor Applications*. https://csa.catapult.org.uk/news-insights/csa-catapult-and-smd-semiconductor-sign-memorandum-of-understanding/

Curtis, J. (2025). *The UK's tilt to the Indo-Pacific and what's next for its policy to the region*. House of Commons United Kingdom. https://researchbriefings.files.parliament.uk/documents/CBP-10052/CBP-10052.pdf

Dayak Daily. (2023a, December 9). British Petroleum shows interest in collaborating with Petros for carbon development in Sarawak. https://dayakdaily.com/british-petroleum-shows-interest-in-collaborating-with-petros-for-carbon-development-in-sarawak/

Dayak Daily. (2023b, November 21). *Electricity (Amendment) Bill 2023 to enable power production through solar panels, cascading dams*. Ministry of Utility and Telecommunication. https://mut.sarawak.gov.my/web/subpage/news_view/637

Dayak Daily. (2023c, October 5). *Sarawak to establish high-tech hub, linking all power stations into digital power plant.* https://dayakdaily.com/sarawak-to-establish-high-tech-hub-linking-all-power-stations-into-digital-power-plant/

Dayak Daily. (2024a, April 24). *Sarawak poised to be cutting-edge semiconductor research, commercialisation hub*. https://dayakdaily.com/sarawak-poised-to-be-cutting-edge-semiconductor-research-commercialisation-hub/

Dayak Daily. (2024b, May 23). Proposed federal bill cannot interfere with Sarawak's authority over land use, carbon matters, says Deputy Minister. https://dayakdaily.com/proposed-federal-bill-cannot-interfere-with-sarawaks-authority-over-land-use-carbon-matters-says-deputy-minister/

Dayak Daily. (2024c, September 2). *S'wak's first cohort of semiconductor programme completes training, sets stage for industry growth*. https://dayakdaily.com/swaks-first-cohort-of-semiconductor-programme-completes-training-sets-stage-for-industry-growth/

Dayak Daily. (2025a, April 30). *Sarawak launches KETEQ AI, world's first AI based power conversion device*. https://dayakdaily.com/sarawak-launches-keteq-ai-worlds-first-ai-based-power-conversion-device/

Dayak Daily. (2025b, May 22). *MEASAT charts Sarawak's aerospace path*. https://dayakdaily.com/measat-charts-sarawaks-aerospace-path/

Dayak Daily. (2025c, July 2). *SEDC Energy, VoltAero, ACI Groupe ink strategic pact for aircraft assembly facility in Sarawak*. https://dayakdaily.com/sedc-energy-voltaero-aci-groupe-ink-strategic-pact-for-aircraft-assembly-facility-in-sarawak/

Dayak Daily. (2025d, June 10). *Sarawak targets 1,500MW solar energy by 2030 to accelerate renewable transition*. https://dayakdaily.com/sarawak-targets-1500mw-solar-energy-by-2030-to-accelerate-renewable-transition/#:~:text=Create%20an%20account-,Sarawak%20targets%201%2C500MW%20solar%20energy%20by%202030%20to%20accelerate,of%20our%20people%20and%20businesses.

Department for Business & Trade & Department for Education. (2023). *International Education Strategy: 2023 progress update*. GOV. UK. https://www.gov.uk/government/publications/international-education-strategy-2023-update/international-education-strategy-2023-progress-update

Department for Education & Burghart, A. (2022, April 28). *Skills Bill becomes law*. GOV.UK. https://www.gov.uk/government/news/skills-bill-becomes-law

Department for Education. (2023, December 5). *England among highest performing western countries in education* [Press release]. GOV.UK. https://www.gov.uk/government/news/england-among-highest-performing-western-countries-in-education

Department for Energy Security and Net Zero. (2021). *UK Hydrogen Strategy*. GOV.UK. https://www.gov.uk/government/publications/uk-hydrogen-strategy

Department for Energy Security and Net Zero & Department for Business, Energy & Industrial Strategy. (2021). *Net Zero Strategy: Build Back Greener.* GOV.UK. https://assets.publishing.service.gov.uk/media/6194dfa4d3bf7f0555071b1b/net-zero-strategy-beis.pdf

Department for Energy Security & Net Zero, Department for Business, Energy & Industrial Strategy. (2022). *Supporting the transition across the economy*.

https://www.gov.uk/government/publications/net-zero-strategy/4-supporting-the-transition-across-the-economy?utm_source

Department for Science, Innovation and Technology. (2022, December 18). *National AI Strategy*. GOV.UK. https://www.gov.uk/government/publications/national-ai-strategy

Department for Science, Innovation and Technology. (2024). *Semiconductor sector study*. https://www.gov.uk/government/publications/semiconductor-sector-study/semiconductor-sector-study

Department for Science, Innovation and Technology. (2025a). *Cyber Security and Resilience Policy Statement.* In GOV.UK. https://www.gov.uk/government/publications/cyber-security-and-resilience-bill-policy-statement/

Department for Science, Innovation and Technology. (2025b, January 7). Hundreds of thousands of Brits in rural villages and towns to benefit from UK government broadband boost [Press release]. GOV.UK. https://www.gov.uk/government/news/hundreds-of-thousands-of-brits-in-rural-villages-and-towns-to-benefit-from-uk-government-broadband-boost

Department for Science, Innovation and Technology. (2025c, January 31). World-leading AI cyber security standard to protect digital economy and deliver Plan for Change [Press release]. GOV.UK. https://www.gov.uk/government/news/world-leading-ai-cyber-security-standard-to-protect-digital-economy-and-deliver-plan-for-change

Department of Labour Sarawak, (2023). *Infografik Perburuhan Sarawak Tahun 2023*.

Department of Statistics Malaysia. (2024a). *Economic Census 2023: Manufacturing*. http://www.statistics.gov.my/portal-main/release-content/economic-census-2023-manufacturing

Department of Statistics Malaysia. (2024b). *Population Table: States*. OpenDOSM. https://open.dosm.gov.my/data-catalogue/population_state?state=sarawak&visual=table

Department of Statistics Malaysia. (2025a). *Gross Domestic Product by State, 2024*. http://www.statistics.gov.my/portal-main/release-content/gross-domestic-product-gdp-by-state-2024

Department of Statistics Malaysia. (2025b). *Sarawak External Trade Statistics 2025 – July 2025*. http://www.statistics.gov.my/uploads/release-content/file_20250704151349.pdf

Economic Planning Unit Sarawak. (2021). *Post Covid-19 Development Strategy 2030*. https://premierdept.sarawak.gov.my/web/attachment/show/?docid=NmJwbDRkK3R2L0tSa1U1ekxXTkQxZz09OjqEv_r7kO_Z9E5Jp3YHC9Hn

Economic Planning Unit Sarawak. (2023a). *PCDS 2030 Highlights 2023*. https://drive.google.com/file/d/11peVvCaGLPdu83XDoLBf8TXLrzIfo8bZ/view?pli=1

Economic Planning Unit Sarawak. (2023b). *Sarawak Digital Economy Blueprint 2030*. https://www.sma.gov.my/web/attachment/show/?docid=amI0Y1FsaWo5MFp6ZWdwMG5rL242UT09OjrW9vijjeXQPzhr0B0hGIo7

Edward, C. (2024, June 20). *SEB exploring second phase of Batang Ai floating solar project, may deploy technology to Bakun and Murum*. The Borneo Post. https://www.theborneopost.com/2024/06/20/seb-exploring-second-phase-of-batang-ai-floating-solar-project-may-deploy-technology-to-bakun-and-murum/

Edward, C. (2025, March 19). *SMD Semiconductor announces training completion of IC programme's second cohort*. Borneo Post Online. https://www.theborneopost.com/2025/03/19/smd-semiconductor-announces-training-completion-of-ic-programmes-second-cohort/

Encyclopaedia Britannica. (2025). *Sarawak*. https://www.britannica.com/place/Borneo-island-Pacific-Ocean/History

Francis, I. (2024, March 12). *SEDC to use high-value industries to power Sarawak's new economy*. The Edge Malaysia. https://theedgemalaysia.com/node/703311

Gentari. (2024, June 10). *Premier Launches Sarawak H2 Hub: Pioneering Hydrogen Initiative to Propel State's Clean Energy Ambitions*. https://www.gentari.com/insight/premier-launches-sarawak-h2-hub-pioneering-hydrogen-initiative-propel-states-clean-energy-ambitions

Goh, N. (2024, April 15). *Malaysia's Sarawak seeks to turn itself into a chip design hub*. Nikkei Asia. https://asia.nikkei.com/Business/Tech/Semiconductors/Malaysia-s-Sarawak-seeks-to-turn-itself-into-a-chip-design-hub

Government Digital Service. (2025a). A Blueprint for Modern Digital Government. In *GOV.UK*. https://www.gov.uk/government/publications/a-blueprint-for-modern-digital-government/a-blueprint-for-modern-digital-government-html

Government Digital Service. (2025b). State of Digital Government Review. In *GOV.UK*. https://www.gov.uk/government/publications/state-of-digital-government-review/state-of-digital-government-review

Government Skills. (2025, April 7). Civil servants get one-stop access to digital skills learning. *GOV.UK*. https://www.gov.uk/government/news/civil-servants-get-one-stop-access-to-digital-skills-learning

Hammerschmidt, C. (2006, September 6). *X-FAB completes merger with 1st Silicon*. EE Times. https://www.eetimes.com/x-fab-completes-merger-with-1st-silicon/

Harworth. (n.d.). *Advanced Manufacturing Park*. https://harworthgroup.com/projects/advanced-manufacturing-park/

Huawei Malaysia. (n.d.). Malaysia: The Nature Guardians that Never Stop Listening. Huawei. https://www.huawei.com/en/tech4all/stories/nature-guardian-malaysia

Imagination Technologies. (2022). *The Future of the UK's semiconductor strategy*. https://www.global-counsel.com/sites/default/files/2024-05/The%20future%20of%20the%20UK%27s%20semiconductor%20strategy.pdf?utm_source=chatgpt.com

Invest Rotherham. (n.d.). Development: Advanced Manufacturing Park. https://www.investrotherham.com/developments/advanced-manufacturing-park-amp/

Invest Sarawak. (2024, April 28). *Premier: Sarawak to replace coal with biomass at Sejingkat, Balingian power plants*. https://investsarawak.gov.my/premier-sarawak-to-replace-coal-with-biomass-at-sejingkat-balingian-power-plants/

Jee, N. (2024, October 8). *Premier launches aerospace academy at Centexs*. Sarawak Tribune. https://www.sarawaktribune.com/premier-launches-aerospace-academy-at-centexs/

Jee, N. (2025, May 26). *Sarawak AI Centre to Spearhead State's AI roadmap, Boost Tech Sovereignty.* Sarawak Tribune. https://www.sarawaktribune.com/sarawak-ai-centre-to-spearhead-states-ai-roadmap-boost-tech-sovereignty/

Johanna Mumtaz Wanpa. (2024, October 9). *CENTEXS, AIROD-ADC tubuh akademi latihan penerbangan bebas di Sarawak*. Utusan Malaysia. https://www.utusan.com.my/pilihan-utusan/2024/10/centexs-airod-adc-tubuh-akademi-latihan-penerbangan-bebas-di-sarawak-2/

Khushiri, F. (2024a, November 22). Sarawak prepares for population ageing by 2028. *New Sarawak Tribune*. https://www.sarawaktribune.com/sarawak-prepares-for-population-ageing-by-2028/

Khushiri, F. (2024b, November 27). *Sarawak to introduce new student assessment system in 2025.* Sarawak Tribune. https://www.sarawaktribune.com/sarawak-to-introduce-new-student-assessment-system-in-2025/

Laeng, J. (2024, October 14). *Ministry proposes State Talent Policy to increase Sarawak's workforce efficiency, reduce unemployment*. The Borneo Post. https://www.theborneopost.com/2024/10/14/ministry-proposes-state-talent-policy-to-increase-sarawaks-workforce-efficiency-reduce-unemployment/

Len, C. (2024). *Sarawak's Green Hydrogen Ambitions: What It Means for Southeast Asia*. Fulcrum. https://fulcrum.sg/sarawaks-green-hydrogen-ambitions-what-it-means-for-southeast-asia/

Lendai, F., Mulok, M., Salleh, S. F., Mohamad, F. S., & Hj Othman, A. K. (2024). *Sarawak Talent Policy* [Review of Sarawak Talent Policy]. UNIMAS Institutional Repository. http://ir.unimas.my/id/eprint/46656

Lim, H. P. (2025a, May 3). *Premier: Sarawak 'open for business' with long-term growth vision*. The Borneo Post. https://www.theborneopost.com/2025/05/03/premier-sarawak-open-for-business-with-long-term-growth-vision/

Ling, S. (2023a, November 8). *S'wak to encourage more solar power usage in commitment to renewable energy*. The Star. https://www.thestar.com.my/news/nation/2023/11/08/s039wak-to-encourage-more-solar-power-usage-in-commitment-to-renewable-energy

Ling, S. (2023b, November 20). *Sarawak first in the country to enact anti-climate change law*. The Star. https://www.thestar.com.my/news/nation/2023/11/20/sarawak-first-in-the-country-to-enact-anti-climate-change-law

Ling, S. (2024a, February 1). *S'wak takes a leap of faith as semiconductor hub through partnership with British companies*. The Star. https://www.thestar.com.my/news/nation/2024/02/01/swak-takes-a-leap-of-faith-as-semiconductor-hub-through-partnership-with-british-companies

Ling, S. (2025a, February 25). *Sarawak aims to be a major energy exporter in Southeast Asia, says Premier*. The Star. https://www.thestar.com.my/news/nation/2025/02/25/sarawak-aims-to-be-a-major-energy-exporter-in-southeast-asia-says-premier

Ling, S. (2025b, June 22). *Sarawak holds potential as Malaysia, Asean energy hub, says PM Anwar*. The Star. https://www.thestar.com.my/news/nation/2025/06/22/sarawak-holds-potential-as-malaysia-asean-energy-hub-says-pm-anwar#:~:text=KUCHING%3A%20Sarawak%20has%20the%20potential%20to%20become%20the,rich%20energy%20resources%2C%20including%20hydropower%2C%20gas%20and%20hydrogen

Ling, S. (2025c, May 5). *Sarawak welcomes AWS investment to drive digital transformation by 2030.* The Star.

https://www.thestar.com.my/news/nation/2025/05/05/sarawak-welcomes-aws-investment-to-drive-digital-transformation-by-2030

Liong, A. (2025, April 20). Understanding Carbon Capture, Utilisation and Storage. Sarawak Tribune. https://www.sarawaktribune.com/understanding-carbon-capture-utilisation-and-storage/

Lu, W. H. (2024, October 22). *Malaysia's Sarawak state aims to be regional green energy powerhouse, boost talent pool*. The Straits Times. https://www.straitstimes.com/asia/se-asia/malaysia-s-sarawak-state-aims-to-be-regional-green-energy-powerhouse-boost-talent-pool

Malay Mail. (2025, March 12). Sarawak to add new ATR 72-600s for AirBorneo's rural routes, says state minister. https://www.malaymail.com/news/malaysia/2025/03/12/sarawak-to-add-new-atr-72-600s-for-airborneos-rural-routes-says-state-minister/169361

Malaysian Investment Development Authority (MIDA). (2024, February 19). *C4 Sarawak poised for major expansion*. https://www.mida.gov.my/mida-news/c4-sarawak-poised-for-major-expansion/

McEvoy, J. (2020, October 16). UK claims number 2 spot in OECD digital government rankings. https://gds.blog.gov.uk/2020/10/16/uk-claims-number-2-spot-in-oecd-digital-government-rankings/#:~:text=The%20UK%20got%20high%20marks%20for%20its,has%20been%20championing%20since%20it%20was%20created.

MEITD, (2024). *Sarawak addressing skills gap among workers, says minister*. https://meitd.sarawak.gov.my/web/subpage/news_view/1901

Meraw, M. (2025, May 28). *Sarawak generates RM 4.3 bln in revenue as of April 2025, says Deputy Premier*. Dayak Daily. https://dayakdaily.com/sarawak-generates-rm4-3-bln-in-revenue-as-of-april-2025-says-deputy-premier/#:~:text=He%20shared%20that%20back%20in,State's%20revenue%20re%2Dengineering%20strategy

Microsoft Malaysia. (2022, June 21). *Government of Sarawak and Microsoft partner to digitalize public sector, future-proof industry, and build resilience with digital skills*. Microsoft Malaysia News Center. https://news.microsoft.com/en-my/2022/06/21/government-of-sarawak-and-microsoft-partner-to-digitalize-public-sector-future-proof-industry-and-build-resilience-with-digital-skills/

Minggu, K. (2024, November 11). *Sarawak's strategic Budget 2025 unveils major boost for SMEs, green economy, industrial expansion*. The Borneo Post. https://www.theborneopost.com/2024/11/11/sarawaks-strategic-budget-2025-unveils-major-boost-for-smes-green-economy-industrial-expansion/

Minggu, K. (2025, May 16). *Federal govt seeks Sarawak's support for state-level data sharing law*. Borneo Post Online. https://www.theborneopost.com/2025/05/16/federal-govt-seeks-sarawaks-support-for-state-level-data-sharing-law/

Ministry of Education. (2024). School Completion Rates by State [Dataset]. Department of Statistics Malaysia. https://open.dosm.gov.my/data-catalogue/completion_school_state?state=sarawak&stage=secondary-upper&sex=both&visual=table

Ministry of Energy and Environmental Sustainability Sarawak (MEESty). (2025a). *Sarawak Hydrogen Economy Roadmap (SHER)*.

Ministry of Energy and Environmental Sustainability Sarawak (MEESty). (2025b). *Formulation of Green Economy Policy and Action Plan: Sarawak Sustainability Blueprint 2030*. https://meesty.sarawak.gov.my/web/attachment/show/?docid=WDhveDhiVEs4OExJRXFSandMYTdGQT09OjqqwHvYuNFPxhQSaM4gKs1I

Ministry of International Trade, Industry and Investment Sarawak (MINTRED). (n.d.). *Excellent Industrial Facilities*. https://mid.sarawak.gov.my/modules/web/pages.php?mod=webpage&sub=page&id=60

Ministry of Investment, Trade and Industry (MITI). (2023a). New Industrial Master Plan 2030. https://www.mdbc.com.my/wp-content/uploads/2023/09/NIMP_2030.pdf

Ministry of Investment, Trade and Industry (MITI). (2023b). *New Industrial Master Plan 2030: Aerospace Industry*. https://www.nimp2030.gov.my/nimp2030/modules_resources/bookshelf/e-01-Sectoral_NIMP-Aerospace_Industry/e-01-Sectoral_NIMP-Aerospace_Industry.pdf

Ministry of Investment, Trade and Industry (MITI). (2024). National Semiconductor Strategy. https://www.miti.gov.my/miti/resources/NSS_141024.pdf

Ministry of Science, Technology and Innovation (MOSTI). (2023). *Hydrogen Economy & Technology Roadmap*. https://mastic.mosti.gov.my/publication/hydrogen-economy-technology-roadmap/

Mohd Shith Putera, N. S. F., Saripan, H., Bajury, M. S. A., & Ya'cob, S. N. (2022). Artificial Intelligence-Powered Criminal Sentencing in Malaysia: A conflict with the rule of law. *Environment-Behaviour Proceedings Journal*, *7*(SI7), 441–448. https://doi.org/10.21834/ebpj.v7isi7.3813

News Hub Asia. (2025, May 6). *Sarawak expands AI talent drive with AWS to become Malaysia's premier AI state by 2027*. https://www.newshubasia.com/business-finance/sarawak-expands-ai-talent-drive-with-aws-to-become-malaysias-premier-ai-state-by-2027/

Petingi, G. (2025, April 15). Form 4, 5 STEM enrolment in Sarawak hits 50.8 pct this year, says minister. Borneo Post Online. https://www.theborneopost.com/2025/04/16/form-4-5-stem-enrolment-in-sarawak-hits-50-8-pct-this-year-says-minister/

Prime Minister's Office. (2025, June 7). PM launches national skills drive to unlock opportunities for young people in tech [Press release]. GOV.UK. https://www.gov.uk/government/news/pm-launches-national-skills-drive-to-unlock-opportunities-for-young-people-in-tech

Public Digital Ltd. (n.d.). Becoming the world's leading digital government — Public Digital. https://public.digital/pd-insights/client-stories/gds

Puyok, A. (2024). Autonomy in Sabah and Sarawak: Different paths and diverging outcomes. *Trends in Southeast Asia, Issue 28.* ISEAS Publishing. https://www.iseas.edu.sg/wp-content/uploads/2024/11/TRS28_24.pdf

Rakan Sarawak. (2024, December 19). *Sarawak's strategic response to the skilled workforce shortage*. https://www.rakansarawak.com/v3/2024/12/19/sarawaks-strategic-response-to-the-skilled-workforce-shortage/

Rickie, G., & Alias, B. S. B. (2024). Students Dropout in Rural Schools in Sarawak: Causes and Proposed Solutions. *International Journal of Academic Research in Progressive Education and Development, 13*(4), 3696–3712.

Robin, P. (2024, November 20). *IPMC ditubuh bagi pengurusan taman perindustrian lebih berkesan*. Suara Sarawak. https://suarasarawak.my/ipmc-ditubuh-bagi-pengurusan-taman-perindustrian-lebih-berkesan/

Rolls Royce. (2024, March 5). *Rolls-Royce supplies mtu Kinetic PowerPacks for semiconductor manufacturer X-FAB Sarawak*. https://www.rolls-royce.com/media/press-releases/2024/05-03-2024-rr-supplies-mtu-kinetic-powerpacks-for-semiconductor-manufacturer-x-fab-sarawak.aspx

Sanders, N. T. (2025, February 26). *State manufacturing sector on track for 2030 target*. Sarawak Tribune. https://www.sarawaktribune.com/state-manufacturing-sector-on-track-for-2030-target/

Sarawak Digital Economy Corporation Berhad. (2024a, August 7). *Strategic collaboration to drive digital transformation in Sarawak.* https://sdec.com.my/web/2024/11/05/strategic-collaboration-to-drive-digital-transformation-in-sarawak/

Sarawak Digital Economy Corporation Berhad. (2024b, October 17). Dynamik Technologies and SDEC partner up to propel Borneo's digital transformation. https://sdec.com.my/web/2024/11/08/dynamik-technologies-and-sdec-partner-up-to-propel-borneos-digital-transformation/

Sarawak Digital Economy Corporation. (2025, April 16). *Final Call for Applications: DiVA Cohort 4 Closes 30 April 2025*. https://sdec.com.my/web/2025/05/02/final-call-for-applications-diva-cohort-4-closes-30-april-2025/

Sarawak Digital Economy Corporation Berhad. (n.d.). 5G Technology Testbed. https://sdec.com.my/web/digital-economy-testbed-5g-technology/

Sarawak Digital Economy Corporation. (n.d.-a). *Go Digital Sarawak. Go Digital Sarawak - Digitalisation Grant for MSMEs*. https://go.sarawak.digital/en

Sarawak Digital Economy Corporation. (n.d.-b). *Sarawak Digital and Innovation Ecosystem*. https://sdec.com.my/web/sarawak-digital-and-innovation-ecosystem/

Sarawak Digital Economy Corporation. (n.d.-c). *Sarawak Digital Mall*. https://sdec.com.my/web/sarawak-digital-mall/

Sarawak Energy Berhad (SEB). (2024, March 7). *Working Visit By The Premier Of Sarawak To Kota 2 Mini Hydroelectric Plant In Lawas*. https://www.sarawakenergy.com/media-info/media-releases/2024/working-visit-by-the-premier-of-sarawak-to-kota-2-mini-hydroelectric-plant-in-lawas

Sarawak Energy Berhad (SEB). (2025, June 10). *Sarawak Partners China's Leading Energy Developers to Undertake Floating Solar Project at Bakun Hydroelectric Plant*. https://www.sarawakenergy.com/media-info/media-releases/2025/sarawak-partners-chinas-leading-energy-developers-to-undertake-floating-solar-project-at-bakun-hydroelectric-plant

Sarawak Energy. (2020, October 27). Progressing Towards a Green Hydrogen Economy: Sharing Sarawak Energy's Hydrogen Development at IGEM 2020. https://www.sarawakenergy.com/media-info/media-releases/2020/progressing-towards-a-green-hydrogen-economy-sharing-sarawak-energys-hydrogen-development-at-igem-2020

Sarawak Energy. (2024, January 30). *Electricity (Amendment) Act 2023: Strengthening Sarawak's Commitment To Renewable Energy*.

https://www.sarawakenergy.com/electricity-amendment-act-2023-strengthening-sarawaks-commitment-to-renewable-energy

Sarawak Energy. (2025). Baleh's Biodiversity Chronicled in New Sarawak Energy-UNIMAS Book. https://www.sarawakenergy.com/media-info/media-releases/2025/balehs-biodiversity-chronicled-in-new-sarawak-energy-unimas-book

Sarawak Metro. (n.d.) *KUTS*. https://www.mysarawakmetro.com/what-we-do/kuching-urban-transportation-system

Sarawak Skills. (2024, November 19). *Sarawak Skills and i-CATS UC team up to customize programmes in hydrogen fuel cell technology.* Sarawak Skills Media. https://sarawakskills.edu.my/media/sarawak-skills-and-i-cats-uc-team-up-to-customize-programmesin-hydrogen-fuel-cell-technology/

Sarawak Skills. (n.d.). *Short Courses Schedule.* https://sarawakskills.edu.my/public-2/

Sarawak Tribune. (2025a, June 5). *Sarawak unveils ambitious renewable energy vision in Scotland*. https://www.sarawaktribune.com/sarawak-unveils-ambitious-renewable-energy-vision-in-scotland/

Sarawak Tribune. (2025b, May 5). *Abang Jo witnesses signing of aircraft maintenance pact between Malaysia, France*. https://www.sarawaktribune.com/abang-jo-witnesses-signing-of-aircraft-maintenance-pact-between-malaysia-france/

Scottish Qualifications Authority. (2019). *Guide to Scottish Qualifications*. https://www.sqa.org.uk/files_ccc/Guide_to_Scottish_Qualifications.pdf

Secretary of State for Science, Innovation and Technology. (2025, January 13). AI Opportunities Action Plan. GOV.UK. https://www.gov.uk/government/publications/ai-opportunities-action-plan/ai-opportunities-action-plan

Siaw, N. (2025). *Understanding Education Inequality in Sarawak Using Data*. Nicole's Blog. https://nickelsiaw2.wordpress.com/2025/06/22/understanding-education-inequality-in-sarawak-using-data/

Sim, A. (2025, March 12). Free tertiary education in Sarawak: Full course details expected this November, says minister. DayakDaily. https://dayakdaily.com/free-tertiary-education-in-sarawak-full-course-details-expected-this-november-says-minister/

SMD Semiconductor. (2024). *Curtin Malaysia, SMD forge alliance to boost Sarawak's semiconductor industry*. https://smdsemiconductor.com/curtin-malaysia-smd-forge-alliance-to-boost-sarawaks-semiconductor-industry

State Service Modernisation Unit. (2017). *Sarawak Digital Economy Strategy 2018-2022*. https://www.scope.net.my/wp-content/uploads/2019/10/digitaleconomybooklet-min.pdf

Swinburne University Sarawak. (2023, September 13). *Swinburne Sarawak and East China Normal University sign MoU on academic and research collaborations.* Swinburne University, Sarawak. https://www.swinburne.edu.my/news/swinburne-sarawak-and-east-china-normal-university-sign-mou-on-academic-and-research-collaborations/

Swinburne University Sarawak. (2025, February 28). *Swinburne Sarawak and Zhejiang Yuexiu University Forge Cross-Border MOU.* Swinburne University, Sarawak. https://www.swinburne.edu.my/news/swinburne-sarawak-and-zhejiang-yuexiu-university-forge-cross-border-mou/

Tawie, S. (2024a, June 26). *Sarawak aims to be semiconductor high-value hub in SE Asia, says premier*. Malay Mail. https://www.malaymail.com/news/malaysia/2024/06/26/sarawak-aims-to-be-semiconductor-high-value-hub-in-se-asia-says-premier/141657

Tawie, S. (2024b, November 6). *Sarawak Research and Development Council funded 79 innovative projects worth RM16.6 million*. New Straits Times. https://www.nst.com.my/news/nation/2024/11/1130547/sarawak-research-and-development-council-funded-79-innovative-projects

Tawie, S. (2024c, October 16). *Sarawak AI Centre to boost digital innovation.* NST Online. https://www.nst.com.my/news/nation/2024/10/1120561/sarawak-ai-centre-boost-digital-innovation

Tawie, S. (2025a, February 10). *Sarawak to establish climate change centre for research and policy development*. New Straits Times. https://www.nst.com.my/news/nation/2025/02/1173055/sarawak-establish-climate-change-centre-research-and-policy-development

Tawie, S. (2025b, July 5). *Abang Johari: Talent development key to Sarawak's economic transformation*. New Straits Times. https://www.nst.com.my/news/nation/2025/07/1240449/abang-johari-talent-development-key-sarawaks-economic-transformation

Tawie, S. (2025c, May 28). *Petros to award offshore CCUS contracts by Q2*. New Straits Times. https://www.nst.com.my/business/2025/05/1222669/petros-award-offshore-ccus-contracts-q2

Ten, M. (2023). *'Win-win' scenario if S'wak exports energy to Singapore, says premier*. The Borneo Post. https://www.theborneopost.com/2023/09/04/win-win-scenario-if-swak-exports-energy-to-singapore-says-premier/

Ten, M. (2025). *Sagah: Inaugural Dual Language Programme Sarawak Assessment Test for Primary 6 students set for Oct 15-16*. The Borneo Post. https://www.theborneopost.com/2025/05/26/sagah-inaugural-dual-language-programme-sarawak-assessment-test-for-primary-6-students-set-for-oct-15-16/

Teo, R. (2025, June 17). *PETRONAS eyes first CO2 injection date by end-2029, early 2030 in Kasawari*. The Borneo Post. https://www.theborneopost.com/2025/06/17/petronas-eyes-first-co2-injection-date-by-end-2029-early-2030-in-kasawari/

The Borneo Post. (2025, May 31). *Sarawak steps up integration into Asean Power Grid, targets 15GW by 2035*. https://www.theborneopost.com/2025/05/31/sarawak-steps-up-integration-into-asean-power-grid-targets-15gw-by-2035/

The Malaysian Reserve (2024, February 27). *Hydropower dam develo*pment plans in Sarawak. https://themalaysianreserve.com/2024/02/27/hydropower-dam-development-plans-in-sarawak/

The Rakyat Post. (2024, July 1). *Sarawak And Huawei Malaysia Work Together To Advance State's Cybersecurity, Private 5G Networks*. The Rakyat Post. https://www.therakyatpost.com/news/2024/07/01/sarawak-and-huawei-malaysia-work-together-to-advance-states-cybersecurity-private-5g-networks/

The Star. (2025a, May 5). *Sarawak studies Scotland-UK carbon revenue model*. The Star. https://www.thestar.com.my/business/business-news/2025/05/05/sarawak-studies-scotland-uk-carbon-revenue-model

The Star. (2025b, May 18). *Free tertiary education for Sarawak-born adults resuming full time studies*. https://www.thestar.com.my/news/nation/2025/05/18/free-tertiary-education-for-sarawak-born-adults-resuming-full-time-studies

The Star. (2025c, May 19). *Free full- time higher education for Sarawakians*. https://www.thestar.com.my/news/nation/2025/05/19/free-full--time-higher-education-for-sarawakians

The Sun. (2025, May 24). *SMD launches contest to tap Sarawakian talent in IC design*. https://thesun.my/malaysia-news/smd-launches-contest-to-tap-sarawakian-talent-in-ic-design-BG14126403

Thoughtworks, Inc. (n.d.). *Government Digital Service (GDS) client story*. Thoughtworks. https://www.thoughtworks.com/en-gb/clients/government-digital-service

Toyat, J & Chua, S. (2024a, May 30). *Private unis gear up to meet demands of Sarawak's green economy.* The Borneo Post. https://www.theborneopost.com/2024/05/30/private-unis-gear-up-to-meet-demands-of-sarawaks-green-economy/

Toyat, J. (2024a, May 8). *Sarawak's biomass industry attracts interest of Singapore, China, Japan investors, says deputy minister*. The Borneo Post. https://www.theborneopost.com/2024/05/08/sarawaks-biomass-industry-attracts-interest-of-singapore-china-japan-investors-says-deputy-minister/

Toyat, J. (2024b, November 20). *Sarawak leads in renewable energy with groundbreaking biomass, solar projects*. The Borneo Post. https://www.theborneopost.com/2024/11/20/sarawak-leads-in-renewable-energy-with-groundbreaking-biomass-solar-projects/

Toyat, J. (2025a, February 7). *Sarawak Premier envisions locally developed AI model 'DeepSAR'.* Borneo Post Online. https://www.theborneopost.com/2025/02/07/sarawak-premier-envisions-locally-developed-ai-model-deepsar/

Toyat, J. (2025b, July 2). *Sarawak to provide specialised AI training for teachers, says Premier*. The Borneo Post. https://www.theborneopost.com/2025/07/02/sarawak-to-provide-specialised-ai-training-for-teachers-says-premier/

Toyat, J. (2025c, May 28). *Premier: Sarawak's energy policies to unlock up to RM430 bln investments, create 44,000 jobs*. The Borneo Post. https://www.theborneopost.com/2025/05/28/premier-sarawaks-energy-policies-to-unlock-up-to-rm430-bln-investments-create-44000-jobs/

Toyat, J. (2025d, May 28). Sarawak to digitalise all 1,106 state govt services by 2030, says Premier. *Borneo Post Online*. https://www.theborneopost.com/2025/05/28/sarawak-to-digitalise-all-1106-state-govt-services-by-2030-says-premier/

UKAS. (2024a, August 26). Two PHES Locations Identified In Sarawak. Sarawak's Premier Department. https://premierdept.sarawak.gov.my/web/subpage/news_view/5772/UKAS

UKAS. (2024b, June 20). *State-run Higher Education Institution Proposed For Development*. Premier Department of Sarawak. https://premierdept.sarawak.gov.my/web/subpage/news_view/2912/UKAS

UKAS. (2024c, October 10). *Sarawak Enacts Law To Promote, Develop CCUS Project.* Premier Department of Sarawak. https://premierdept.sarawak.gov.my/web/subpage/news_view/7731/UKAS

UKAS. (2025a, February 15). *Sarawak Launches Malaysia's First Battery Energy Storage System*. Sarawak's Premier Department. https://premierdept.sarawak.gov.my/web/subpage/news_view/13133/UKAS

UKAS. (2025b, May 6). *Sarawak & Airbus Forge Strategic Cooperation, Six Key Areas Agreed On*. Sarawak's Premier Department. https://premierdept.sarawak.gov.my/web/subpage/news_view/17429/UKAS

UKAS. (2025c, July 7). *Sarawak Catat Dagangan RM198.7 Bilion, Lebihan RM71.1 Bilion Sepanjang 2024*. Sarawak's Premier Department. https://premierdept.sarawak.gov.my/web/subpage/news_view/20929/UKAS

UK Export Finance. (n.d.). *Financing sustainable growth*. https://www.ukexportfinance.gov.uk/sustainability/

UK Government. (n.d.). UK Government Delivering for Scotland: Scotland in the UK: Devolution. https://www.deliveringforscotland.gov.uk/scotland-in-the-uk/devolution/#:~:text=The%20Scottish%20Executive%20was%20later%20renamed%20the,cannot%20make%20laws%20outside%20its%20devolved%20responsibilities

UK Government. (2025). *Clean Energy Industries Sector Plan*. GOV.UK. https://www.gov.uk/government/publications/clean-energy-industries-sector-plan

UK PACT. (n.d.-a). *Green economy policy for Sarawak*. https://www.ukpact.co.uk/pwc-malaysia-project-page#:~:text=This%20project%20has%20been%20working%20to%20develop%20a,for%20suitable%20green%20economy%20policies%20to%20Sarawak%E2%80%99s%20Government.

UK PACT. (n.d.-b). *Supporting the Sarawak state government in Malaysia to develop a Greenhouse Gas Inventory and governance framework for Carbon Trading*. https://www.ukpact.co.uk/sss-support-sarawak-goverment-ggi-and-carbon-trading

Umpang, M. (2025a, March 12). *Sarawak to expand STEM Catalysts Raspberry Pi programme to reach 6,000 rural primary school pupils*. The Borneo Post. https://www.theborneopost.com/2025/03/12/sarawak-to-expand-stem-catalysts-raspberry-pi-programme-to-reach-6000-rural-primary-school-pupils/

Umpang, M. (2025b, May 28). *S'wak's economy stays resilient with strong sector growth, continued investments despite global risks, says Uggah*. Borneo Post Online. https://www.theborneopost.com/2025/05/28/swaks-economy-stays-resilient-with-strong-sector-growth-continued-investments-despite-global-risks-says-uggah/

Umpang, M. (2025c, May 29). *Sarawak surpasses 2030 renewable energy target 5 years early, hits 70 pct green power mix*. The Borneo Post. https://www.theborneopost.com/2025/05/29/sarawak-surpasses-2030-renewable-energy-target-5-years-early-hits-70-pct-green-power-mix/

University of Technology Sarawak. (n.d.). *Transfer Degree Programme.* https://www.uts.edu.my/transfer-degree-programme-2/

Sarawak State Secretary Office. (n.d.). *Industrial Estate by Division*. The Official Portal of Sarawak Government. https://www.sarawak.gov.my/web/home/article_view/211/227/

Varkisa, A. (2025). Community leaders urged to instil Sarawakian values in youth amid brain drain concern. Sarawak Tribune. https://www.sarawaktribune.com/community-leaders-urged-to-instil-sarawakian-values-in-youth-amid-brain-drain-concern/

Wong, J. (2023, October 9). *Sarawak digitalising power plants and water supply system.* The Star. https://www.thestar.com.my/business/business-news/2023/10/09/sarawak-digitalising-power-plants-and-water-supply-system

Wong, J. (2024a, December 28). *Sarawak investment policy boosts industries*. Sarawak Tribune. https://www.sarawaktribune.com/sarawak-investment-policy-boosts-industries/

Wong, J. (2024b, October 28). *Sarawak fulfilling its aspiration to be the 'Battery of Asean'*. The Star. https://www.thestar.com.my/business/business-news/2024/10/28/sarawak-fulfilling-its-aspiration-to-be-the-battery-of-asean

Wong, J. (2025, February 19). *Sarawak SMEs still struggle digitally*. Borneo Post Online. https://www.theborneopost.com/2025/02/19/sarawak-smes-still-struggle-digitally/

Yayasan Sarawak International Secondary School. (n.d.). Admission: Fee Structure. https://ysiss.edu.my/admission/

Yunus, A., Tan, T., & Gimino, G. (2025, August 20). Sarawak's internet coverage increased to 91.93% under Jendela, says Fahmi. The Star. https://www.thestar.com.my/news/nation/2025/08/20/sarawaks-internet-coverage-increased-to-9193-under-jendela-says-fahmi

6 APPENDIX

6.1 Key Stakeholders for Advanced Manufacturing

The following outlines the key stakeholders between the UK and Sarawak in relation to advanced manufacturing. Three key areas have been identified in accordance with Sarawak's priorities in this sectoral development, namely industrial policy and ecosystem planning, technical skill development and training, and SMEs capacity building. Meanwhile, stakeholders for potential academic partnerships are detailed in Table A4.

Stakeholder	Agency	Description
Key area: Industrial Planning and Ecosystem Development		
Sarawak	Economic Planning Unit (EPU) Sarawak	Oversees strategic planning and economic policymaking on a macro level, with direct reporting lines to the Office of the Premier.
	Ministry of Industrial and Entrepreneur Development (MINTRED)	Oversees investment promotion, SME development, and the management of industrial parks.
	InvestSarawak	Trade and investment promotion agency that is responsible for attracting and facilitating domestic and international investments
	Industrial Park Management Committee (IPMC)	Pilot committee established in Samajaya Free Industrial Zone and Demak Laut Industrial Park to facilitate public-private coordination and partnership within the respective industrial park.
	Regional Corridor Development Authority (RECODA)	Develops and manages the Sarawak Corridor for Renewable Energy (SCORE). Works with regional development authorities to manage individual industrial parks such as the Samalaju Industrial Park.
	Sarawak Economic Development Corporation (SEDC)	State-owned company that plays a cross-cutting role in developing state-owned industrial land, providing infrastructure support, and engaging in joint ventures with foreign investors.

UK	Department for Business and Trade (DBT)	Main government department responsible for economic growth via supporting businesses to invest, grow, and export, ultimately creating jobs and opportunities across the UK.
	Industrial Strategy Advisory Council (ISAC)	Independent, non-statutory, expert committee that advises the UK government on industry strategy planning, implementation, and monitoring.
	UK Science Parks Association (UKSPA)	UKSPA is the national association for the Science Park and Innovation Location sector in the UK. It represents and supports members from science parks, research campuses, city-based innovation districts, as well as technology incubators and innovation centres, among others.
	Harworth Group	Harworth Group is the developer of the Advanced Manufacturing Park (AMP) located at Waverley. The AMP emerged to rejuvenate the South Yorkshire area from the decline in traditional industries. The AMP currently hosts the world's biggest manufacturers, including Rolls-Royce, Boeing, McLaren Automotive, as well as research institutions from the University of Sheffield and the UK Atomic Energy Authority.
	Institute for Manufacturing (IfM), University of Cambridge	Policy research institution that focuses on applied research into technology and innovation policy to enhance the global manufacturing landscape. It works with governments around the world to support the development of evidence-based manufacturing and innovation policies.
	National Manufacturing Institute Scotland (NMIS)	Specialised, industry-led centre of manufacturing expertise based in Scotland. NMIS aims to make Scotland a global leader in advanced manufacturing by bringing together industry, academia, and the public sector to drive innovation, improve productivity, and develop skills.
Key area: Technical Skills Development and Training		
Sarawak	Ministry of Education, Innovation and Talent Development (MEITD)	Tasked with workforce development, with the goal of cultivating 500,000 skilled workers by 2030. Frequently collaborates with industry and MEITD to support advanced manufacturing talent development.
	Centre for Technology Excellence Sarawak (CENTEXS)	State-owned skills and vocational training institute focusing on high-tech sectors, such as automation, drone technology, aerospace, and digital economy skills.

	Sarawak Skills Development Centre (PPKS)	State-supported training and education provider focused on delivering technical and vocational programs directly aligned with industry demands.
	SMD Semiconductor	Sarawak's state-owned semiconductor corporation was incorporated in November 2022, driving local R&D, talent training, and technology partnerships.
	AirBorneo (formerly MASWings)	Full-service airline recently acquired by the Sarawak Government to kickstart the domestic aerospace and aviation industry.
UK	British Standards Institution (BSI)	National standards body that creates technical standards and provides services like certification, auditing, and training. to businesses worldwide
	Engineering Council	Professional regulatory body for the engineering profession, which sets standards for engineers and technicians.
	UK Research and Innovation (UKRI)	National funding agency in the UK that invests in research and innovation and brings together the seven Research Councils, Innovate UK, and Research England.
	Institute for Apprenticeships and Technical Education (IfATE)	Executive non-departmental public body focused on developing and overseeing apprenticeships and technical education sponsored by the Department for Education.
	Innovate UK	Agency that focuses on driving innovation and technological advancement within businesses. Innovate UK often targets its efforts on key sectors, such as advanced manufacturing and clean technology.
	Institutes of Technology (IoTs)	National network of experienced education providers and leading industry employers across England, working in close partnerships to deliver world-class technical education and training. Supported by the UK Department of Education, it aims to deliver world-class higher technical education to increase the supply of high-skilled technicians across key industries, including engineering and manufacturing.
	National Manufacturing Institute Scotland (NMIS)	Specialised, industry-led centre of manufacturing expertise based in Scotland. NMIS aims to make Scotland a global leader in advanced manufacturing by bringing together industry, academia, and the public sector to drive innovation, improve productivity, and develop skills.

	UK Aerospace Research Consortium (UK-ARC)	Network of top UK universities, specialising in aerospace research, including the University of Cambridge, Imperial College, the University of Manchester, and the University of Sheffield. It connects industry players with the UK's aerospace research capabilities to foster research collaborative projects.
	University of Nottingham Institute for Aerospace Technology	Leading research centre advancing aerospace and space innovation with cutting-edge projects in manufacturing, propulsion, materials, and sustainable aviation.
	Rolls-Royce Holdings	British multinational aerospace and defence company. It specialises in aero engineering, advanced machining, aerospace MRO, etc.
Key area: SMEs Capacity Building		
Sarawak	Ministry of Industrial and Entrepreneur Development (MINTRED)	Oversees investment promotion, SME development, and the management of industrial parks.
	InvestSarawak	Trade and investment promotion agency that is responsible for attracting and facilitating domestic and international investments
	Sarawak Business Federation (SBF)	Umbrella body representing Sarawak's major industry association that advocates for private sector interests and foster business-to-government collaboration.
	SME Association of Sarawak	Business association dedicated to advancing the interests of small and medium enterprises by facilitating capacity building, policy advocacy, and cross-sector collaboration.
	Sarawak Economic Development Corporation (SEDC)	State-owned company that plays a cross-cutting role in developing state-owned industrial land, providing infrastructure support, and engaging in joint ventures with foreign investors.
UK	Department for Business and Trade (DBT)	Government department responsible for economic growth via supporting businesses to invest, grow, and export, ultimately creating jobs and opportunities across the UK.
	ADS Group	National trade association for aerospace, defence, security, and space.
	TechWorks UK	Leading industry association championing on deep tech ecosystem and skills development.

	Compound Semiconductor Applications Catapult	UK's centre of excellence to accelerate the commercialisation of compound semiconductor technologies
	Rolls-Royce Holdings	British multinational aerospace and defence company. It specialises in aero engineering, advanced machining, aerospace MRO, etc.

Table A1: Key Stakeholders between Sarawak and the UK in the Advanced Manufacturing Sector

6.2 Key Stakeholders for Renewable Energy

The following outlines the key stakeholders between the UK and Sarawak in relation to renewable energy developments. Three key areas have been identified in accordance with Sarawak's priorities in sectoral development, namely energy governance, business and investment, and research and development. Meanwhile, stakeholders for academic partnerships are detailed in Table A4 under the Education and Human Capital.

Stakeholder	Agency	Description
Key area: Energy Governance		
Sarawak	Economic Planning Unit (EPU) Sarawak	Central planning agency responsible for formulating and coordinating Sarawak's medium to long-term economic development policies, notably the Post COVID-19 Development Strategy (PCDS) 2030.
	Ministry of Energy and Environmental Sustainability (MEESty)	Ministry responsible for driving Sarawak's energy agenda and ensuring environmental sustainability. Its mandate includes the development of policies and regulatory mechanisms for renewable management and promoting environmental best practices.
	Ministry of Utility and Telecommunication (MUT)	Ministry responsible for regulating essential utility services, including electricity, water, gas, and transportation services within Sarawak. In the context of energy, MUT oversees energy distribution and grid infrastructure to ensure reliable energy supply.
	Sarawak Energy Berhad (SEB)	Sarawak's sole electricity utility provider, responsible for power generation, transmission, and distribution. It also provides technical expertise, often playing an operational and advisory role in the planning and execution of major energy infrastructure projects.
UK	Scottish Government (Cabinet Secretary for Climate Action and Energy and Cabinet Secretary for Finance and Local Government)	Devolved administration from the UK Government for governing Scotland and managing the welfare of its citizens. It handles devolved matters including environment, land use planning, local government, some forms of taxation, and transportation (UK Government, n.d.).
	UK Department for Energy Security & Net Zero (DESNZ)	Ministerial department responsible for setting the overall strategic direction, policy, and legislative framework for energy security and achieving net-zero emissions.

	UK Partnering for Accelerated Climate Transitions (UK PACT)	Government-funded programme that works with developing and emerging economies (partner countries) to tackle climate change. It funds long-term capacity building projects, leveraging UK expertise in areas such as green finance, energy market reform, and renewable energy integration.
	Office of Gas and Electricity Markets (Ofgem)	Great Britain's independent economic regulator for gas and electricity markets, with primary roles of setting energy price control, ensuring energy security, administering environmental schemes, within the policy framework set by DESNZ and NESO's plans.
	National Energy System Operator (NESO)	Independent, publicly owned body, established by DESNZ and regulated under Ofgem, serves as the operational and strategic planner for the entire energy system (electricity, gas, hydrogen, etc.) of Great Britain to meet DESNZ's energy goals.
Key area: Financing and Investment		
Sarawak	Economic Planning Unit (EPU) Sarawak	Central planning agency responsible for formulating and coordinating Sarawak's medium to long-term economic development policies, notably the Post COVID-19 Development Strategy (PCDS) 2030.
	Ministry of Energy and Environmental Sustainability (MEESty)	Ministry responsible for driving Sarawak's energy agenda and ensuring environmental sustainability. Its mandate includes the development of policies and regulatory mechanisms for renewable management and promoting environmental best practices.
	Invest Sarawak	Sarawak's investment promotion agency is responsible for attracting and facilitating domestic and foreign investments.
	Sarawak Economic Development Corporation (SEDC) Energy	Subsidiary of SEDC focused on driving Sarawak's participation in energy ventures, including renewable energy, hydrogen, and oil and gas development.
	Petroleum Sarawak Berhad (PETROS)	Sarawak-owned oil and gas company, overseeing resource management and spearheading CCUS development.
	Sarawak Energy Berhad (SEB)	Sarawak's sole electricity utility provider and a government-owned company that is responsible for the generation, transmission, and distribution of power. It is also a key player in Sarawak's renewable energy development.

UK	Department for Business and Trade (DBT)	Government department focused on economic growth through business support, investment, and trade, which directly impacts the commercial viability and expansion of energy businesses.
	Ministry of Energy and Environmental Sustainability (MEESty)	Ministry responsible for driving Sarawak's energy agenda and ensuring environmental sustainability. Its mandate includes the development of policies and regulatory mechanisms for renewable management and promoting environmental best practices.
	UK Export Finance (UKEF)	Ministerial department and export credit agency that provide exporters with access to working capital and help de-risk investment, especially in the absence of a government guarantee.
	National Wealth Fund	Government's principal investor and policy bank to drive clean energy projects in UK by moblising public and private funds.
	UK Partnering for Accelerated Climate Transitions (UK PACT)	Government-funded programme that works with developing and emerging economies (partner countries) to tackle climate change. It funds long-term capacity building projects, leveraging UK expertise in areas such as green finance, energy market reform, and renewable energy integration.
	Green Finance Institute	UK-based independent advisor to governments that provides advisory on green financial solutions.
	Renewable Energy Association (REA)	UK's largest renewable energy and clean technology body, representing around 500 member companies.
	RenewableUK	Trade association that supports the UK's renewable energy sector by providing insights, data, and business intelligence on industry developments. It also plays an advocacy role—engaging the public and policymakers to promote supportive policies and address key sectoral challenges.
	BP P.L.C	British multinational oil and gas company expanding into low-carbon energy, with a focus on hydrogen to decarbonise industries and transport. The company operates one of the UK's largest low-carbon hydrogen production facilities, H2 Teesside, and has a global footprint with projects in Germany, Spain, Australia, and the U.S.
	Hydrogen UK	Trade association that focuses on the development and deployment of hydrogen solutions. It brings hydrogen businesses together into working groups that focus on multiple subsectors, including electrolytic and CCUS hydrogen production, network and storage, transport, and power.

	Shell/Shell Energy	Global energy and petrochemical company with a wide range of operations in the UK, including oil and gas, wind, hydrogen, EV charging, and CCUS. The company also has experience providing clean energy solutions to help businesses decarbonise.
	Drax Group	British renewable energy company with a global presence, focusing on carbon removal, biomass, and pumped storage hydro solutions.

Table A2: Key Stakeholders between Sarawak and the UK in the Renewable Energy Sector

6.3 Key Stakeholders for Digital Transformation

The following outlines the key stakeholders between the UK and Sarawak in the digital transformation sector. The table is organised into three tiers reflecting Sarawak's governance structure – policy direction, programme oversight, and project implementation. At the apex is the Sarawak Multimedia Authority (SMA), which provides central coordination and policy leadership. It is supported by inter-agency committees and project-level working groups aligned to priority domains (Economic Planning Unit Sarawak, 2023b). This structure provides clear accountability while allowing sector-specific flexibility in digital rollout. Stakeholders from academic institutions are detailed separately in Table A4.

Stakeholder	Agency	Description
Key area: Policy and Strategic Oversight		
Sarawak	Sarawak Multimedia Authority (SMA)	Statutory body overseeing Sarawak's digital economy strategy. Provides strategic direction, formulates policy, and monitors implementation. The Premier of Sarawak chairs the Authority, reflecting the high-level political backing for digital transformation.
	Digital Infrastructure Committee	Chaired by the Minister for Utility and Telecommunication. Advises on digital infrastructure priorities, including broadband rollout, tower construction, and connectivity gaps. Supported by SMA as secretariat.
UK	Council for Science and Technology (CST)	Reports to and advises the Prime Minister on policy issues related to science, engineering, technology, and mathematics across government.
	Department for Science, Innovation and Technology (DSIT)	Ministerial department supported by 16 agencies and public bodies. It is responsible for accelerating innovation, investment, and productivity through science; ensuring the safe development and deployment of new and existing technologies across the UK; and advancing a modern digital government to better serve its citizens.
Key area: Programme Governance and Inter-agency Coordination		

Sarawak	Digital Economy Executive Council	Chaired by the Sarawak State Secretary, this council oversees the execution of digital economy initiatives across sectors and ensures strategic coherence between ministries, agencies, and programmes.
	Digital Government Committee	Chaired by the State Secretary, this committee focuses on transforming public sector service delivery, digital identity, and system integration across ministries and departments.
UK	Building Digital UK	Supports the expansion of fast and reliable broadband and mobile coverage to hard-to-reach areas across the UK, contributing to improved connectivity.
	Government Digital Service (GDS)	Sets the digital strategy for the UK government, leads the digital and data function, and drives efficiency by managing performance. It also maintains best practice guidance, delivering key products and platforms, such as GOV.UK, GOV.UK One Login, AI tools, geospatial data systems, and the National Data Library.
	UK Research and Innovation (UKRI)	National funding agency that invests in research and innovation. It brings together the 7 Research Councils, Innovate UK, and Research England.
Key area: Project Delivery and Working-Level Implementation		
Sarawak	Multiple Sectoral Working Groups	Chaired by Permanent Secretaries or Heads of Department, these groups oversee project-specific implementation, performance tracking, and coordination with private sector partners. Includes subgroups on business development, digital government, technology adoption and cybersecurity, digital infrastructure, economic sectors, and talent/R&D.
	Ministry of International Trade & Industry	Leads business development initiatives in the digital sector and supports Sarawak's integration into regional and global markets.
	Sarawak Civil Service Digital Unit	Drives digital transformation within the Sarawak civil service.
	Sarawak Multimedia Authority	Oversees technology adoption and cybersecurity within Sarawak's digital economy strategy.
	Ministry of Utility and Telecommunication	Oversees digital infrastructure development and policy.

	Economic Planning Unit Sarawak	Coordinates economic development policy and sectoral growth strategies within the Sarawak government.
	Ministry of Education, Innovation and Talent Development	Responsible for education, talent development, and R&D strategy.
	Sarawak Artificial Intelligence Centre	Focuses on advancing AI research and application in Sarawak.
	Sarawak Digital Economy Corporation	Implements digital economy projects and develops the supporting ecosystem.
	Sarawak Information Systems (SAINS)	Primary technology partner delivering IT solutions and services to the Sarawak government.
	Development Bank of Sarawak	Provides financing aligned with Sarawak's digital priorities, including smart city infrastructure, data centres, and connectivity projects.
UK	Digital Catapult UK	Digital Catapult is a deep tech innovation organisation that helps businesses grow by applying deep tech.
	National Cyber Security Centre	Government agency that helps businesses, the public sector and individuals protect their online services and devices against cyberattacks.
	Innovate UK	Innovate UK is a key agency focused on promoting innovation and technological advancement within businesses. The Innovate UK Business Connect Digital team supports organisations pursuing digital innovation by facilitating access to funding, expert insights, and strategic connections.
	Government Office for Technology Transfer	Drives public sector knowledge of asset management and commercialisation by providing policy guidance, supporting the development of high-potential assets, and managing funds. It also connects organisations with expertise, fosters best practice communities, and builds capability through targeted upskilling.
	AI Security Institute	Directorate of the UK Department for Science, Innovation and Technology, it is the first government-backed organisation dedicated to ensuring advanced AI is safe, secure, and beneficial. It conducts

		research, develops infrastructure to assess AI capabilities and risks, and collaborates with researchers, developers, and international partners to shape the global governance of AI.

Table A3: Key Stakeholders between Sarawak and the UK in Digital Transformation

6.4 Key Stakeholders for Education and Human Capital

The Sarawak government complements Malaysian education policies through educational and workforce development initiatives governed by the Sarawak Ministry of Education, Innovation and Talent Development. The Sarawak Ministry of Education, Innovation and Talent Development oversees several Sarawak-owned agencies and charity bodies in implementing three key areas, namely foundational education (such as DLP and STEM), TVET, and research and development. The following outlines the stakeholder mapping between the UK and Sarawak in the three key areas.

Stakeholders	Agency	Description
Key area: English Language		
Sarawak	Ministry of Education, Innovation and Talent Development	Ministry that oversees the implementation of the Dual Language Programme in primary and secondary schools.
	Swinburne Innovation Sdn. Bhd.	Consultancy owned by Swinburne University that is mandated to implement DLP assessment for Primary 6 and Form 3 in Sarawak schools.
UK	British Council	UK charity body that co-develops and administers IELTS examinations and conducts English language courses for all levels (children to professional working adults).
	Cambridge Press and Assessment	Cambridge University-owned company that develops IGCSE and is currently partnering with MEITD and Swinburne Innovation Sdn Bhd in vetting DLP-UP examination papers.
Key area: TVET Pathways		
Sarawak	Sarawak Skills	Sarawak-owned training institution focusing on higher degrees and short courses in automotive, electronic technology, smart solar, hydrogen technology and more
	iCATS University College	Sarawak-owned higher education institution that offers higher degree courses in aerospace technology, electronic and mechanical engineering, agrotechnology and more.

	Centre for Technology Excellence Sarawak (CENTEXS)	Sarawak-owned training institution focusing on technical and vocational education and training (TVET). It has a dedicated Green Energy Academy and works alongside industry players to provide training courses on renewable energy.
UK	Qualifications Scotland	New statutory body established to replace the Scottish Qualifications Authority. Responsible for designing, assessing, awarding, and regulating Scottish qualifications with stronger representation and accountability for learners and educators.
	SCQF Partnership	Independent charitable organisation that mains and develops the Scottish Credit and Qualifications Framework, which helps learners, employers, and educators to understand, compare, and use the types of Scottish qualifications.
	Skills Federation	Employer-led organisation that offers apprenticeship support solutions to address skills shortage and support workforce development in the UK.
	Skills England	Executive agency, sponsored by the Department for Education, that identifies skills gaps and appropriate training to drive forward the 'Plan for Change' and Industry Strategy.
	Skills Development Scotland	National skills agency that designs and delivers apprenticeship programmes, career guidance, and workforce upskilling initiatives, directly supporting Scotland's TVET pathways by aligning education and training with industry needs.
Malaysia	British Malaysian Chamber of Commerce	Business membership organisation that promotes and facilitates bilateral trade, networking, advocacy, and collaboration between the UK and Malaysia across multiple sectors.
Key Area: Research and Development		
Sarawak	University Malaysia Sarawak (UNIMAS)	Public university that supports Sarawak in research related to PCDS 2030's key areas, such as renewable energy, climate change and commercialisation of innovations and products.
	Universiti Teknologi MARA (UiTM)	Public university in Sarawak that supports research related to PCDS 2030's key area, like microalgae cultivation as a sustainable biofuel.

	Universiti Putra Malaysia Sarawak (UPM Sarawak)	Public university in Sarawak that supports research related to PCDS 2030's key areas such as agriculture, forestry and food security.
	Curtin University Malaysia	Sarawak-owned Australian university that supports research related to PCDS 2030's key areas, such as energy mix (hydrogen and solar), green construction, and carbon tracking technologies.
	Swinburne University of Technology Sarawak	Sarawak-owned Australian university that supports research related to PCDS 2030's key areas such as AI, hydrogen energy and biomass.
	Sarawak Research and Development Council (SRDC)	Sarawak-owned research council that offers thematic grant calls in advancing research and development in renewable energy.
	Yayasan Sarawak	Sarawak-owned charity body that provides thematic grants to the Sarawak-owned universities to conduct research projects.
	Sarawak Biodiversity Centre	Sarawak-owned research centre that offers research and development on the environment, biodiversity, and sustainability.
UK	University of Strathclyde – Advanced Forming Research Centre	Leading research centre within the National Manufacturing Institute Scotland, specialising in advanced manufacturing, forging, and forming technologies to support high-value industries.
	Cranfield University – School of Aerospace, Transport and Manufacturing	Postgraduate-only university faculty recognised for applied research and industry partnerships in aerospace engineering, transport systems, and manufacturing innovation.
	University of Sheffield	Home to the Advanced Manufacturing Research Centre (AMRC), it's the top UK institution in engineering research income and investment, with sectoral focuses on aerospace, renewable energy, and advanced materials.
	Cardiff University	Houses the Manufacturing Engineering Centre (MEC), a research hub focused on robotics, sensor systems, rapid and nanomanufacturing, and technology transfer, with strong international collaboration. Also houses the Digital Transformation Innovation Institute. This institute champions responsible and community-centred digital innovation, bringing together social scientists, technologists, and business

		researchers. Its work spans healthcare digitalisation, supply chain logistics, and finance, focusing on ethical and resilient transformation.
	Imperial College London – Energy Futures Lab	Interdisciplinary research hub advancing innovation in sustainable energy systems, low-carbon technologies, and policy solutions to accelerate the global energy transition.
	Oxford University – Smith School of Enterprise and Environment	Focuses on bringing public and private entities into the climate conversation and environmental sustainability**.**
	Durham University – Durham Energy Institute	One of its research areas is on biofuel generation, processing and combustion.
	University of Derby – Zero Carbon Manufacturing, Research and Energy Business Centre	Carries out research into zero or net-zero carbon solutions covering manufacturing, supply chains and materials, including renewable energy generation, dispatchability and storage.
	Loughborough University – Centre for Renewable Energy Systems Technology	Covers research activities related to technical applications of renewable energy such as wind power, solar power, grid connection and integration and energy storage.
	Alan Turing Institute	National Institute for Data Science and Artificial Intelligence, driving research and innovation in AI, machine learning, and data-driven decision-making across industries.
	University of Edinburgh – Bayes Centre	Innovation hub for data science and AI, fostering collaboration between academia, industry, and government to apply data-driven solutions to global challenges.
	University of Glasgow – School of Education	Globally recognised centre for education research and teacher training, focusing on pedagogy, curriculum design, and lifelong learning strategies.
	University of Warwick – Centre for Lifelong Learning	Specialist centre advancing adult education, workforce upskilling, and flexible learning pathways to meet evolving economic and social needs.
	University College London – Institute of Education (IOE)	Leading institution for education research, notably in teacher training, curriculum development, and educational innovation.

	Research England	Research England is responsible for funding, engaging and understanding English higher education institutions.
	British Council	Charity body that offers global partnerships in research through grant calls, capacity building and transnational education opportunities.

Table A4: Key Stakeholders between Sarawak and the UK in Education and Human Capital Development