SKILLS CONDITIONS TOWARDS SARAWAK 2030: PERSPECTIVES FROM POLICY ACTORS

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by

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4IR	Fourth Industrial Revolution
AI	Artificial Intelligence
CIO	Chief Information Officer
CLA	Causal Layered Analysis
CR	Critical Realism
DSTD	Digital Skills and Talent Development
FL	Futures Landscape
FT	Futures Triangle
FS	Futures Study
GETS	Graduates Enhancement Training Sarawak
IoT	Internet of Things
PCDS	Post COVID-19 Development Strategy
PE	Policy Enabler
PM	Policymaker
PoF	Pulls of the Future
PoP	Pushes of the Present
PS	Problem Statement
RO	Research Objective
RQ	Research Question
SCORE	Sarawak Corridor of Renewable Energy
SCS	Sarawak Civil Service
SDE	Sarawak Digital Economy
STEM	Science, Technology, Engineering and Mathematics
ToE	Tetrad of Effects
WoP	Weights of the Past

ICT	Information and Communication Technology
TVET	Technical and Vocational Education and Training

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KONDISI KEMAHIRAN MENUJU KE ARAH SARAWAK 2030: DARIPADA PERSPEKTIF PELAKU DASAR

ABSTRAK

Walaupun adanya penyelidikan yang berfokus kepada kemahiran abad ke-21, terdapat kekurangan yang ketara dalam meneroka a) faktor-faktor kontekstual yang mempengaruhi kondisi kemahiran; b) perspektif pelaku dasar tentang kondisi kemahiran masa depan; dan c) hala tuju kondisi kemahiran masa depan serta kesannya di Sarawak, Malaysia. Oleh itu, objektif utama kajian ini adalah untuk menjelaskan keperluan kemahiran sektor awam di Sarawak melalui perspektif pelaku dasar ke arah tahun 2030. Kajian ini bertujuan untuk a) menghuraikan pemahaman kolektif mengenai **kondisi kemahiran** semasa dalam sektor awam di Sarawak, b) menganalisa keperluan kondisi kemahiran masa depan ke arah Sarawak 2030, dan c) merumuskan keperluan kondisi kemahiran masa depan di Sarawak menjelang tahun 2030. Seramai sebelas individu yang terlibat dalam pembangunan dasar yang terdiri daripada empat pembuat dasar dan tujuh pemboleh dasar telah ditemubual. Data yang diperolehi melalui persampelan tujuan telah dianalisis secara tematik dengan menggunakan gabungan kaedah masa depan Inayatullah (Model Lanskap Masa Depan, Analisis *Causal-Layered*, dan Segitiga Masa Depan), Realisme Kritikal Bhaskar, dan Tetrad Kesan McLuhan. Penemuan ditriangulasikan dengan sumber sekunder, dan selanjutnya ditafsirkan melalui penaakulan retroduktif. Kondisi kemahiran semasa bagi sektor awam di Sarawak terletak di bawah *The Strategy* dan *The Big Picture* dalam Model Lanskap Masa Depan. Perangkaan Model Segi Tiga Masa Depan Kondisi Kemahiran Sarawak 2030 menunjukkan bahawa a) masalah lampau yang terdiri daripada: isu struktur pelantikan, kekurangan tenaga kerja mahir tempatan, dan

kemahiran digital yang rendah; b) pendorong semasa yang merangkumi Ekosistem Inovasi Digital Sarawak, lantikan jawatan Ketua Pegawai Maklumat, dan inisiatif berkaitan STEM; dan c) tarikan masa depan terdiri daripada: penjenamaan "Perkhidmatan Awam Bertaraf Dunia", transformasi digital, dan keterangkuman digital. Keadaan ini selari dengan masa depan Gaia. Hasil kajian mendedahkan bahawa potensi masa depan dijana oleh: kesedaran kepemimpinan dan warisan sebagai identiti (yang empirikal); transformasi digital dan pembangunan dan pentaksiran kemahiran (yang sebenar); dan kecerdasan sosial dan nilai teknologi dan rekaan (yang berkuasa). Tambahan pula, potensi masa depan ini akan a) mengembalikan warisan dalam identiti kondisi kemahiran Sarawak; b) meningkatkan pemerkasaan komuniti dan norma baharu dalam perkhidmatan berkualiti; c) mengurangkan kebergantungan kepada kerajaan serta kemahiran fizikal; dan d) menghapuskan struktur sediaada yang merangkumi penempatan, tatacara, set kemahiran, dan nilai kepemimpinan. Keseluruhan penemuan kajian ini disatukan dalam model Kondisi Kemahiran Sektor Awam: Model Masa Depan Munasabah Sarawak 2030, dan dibincangkan dalam bab terakhir tesis ini. Relevansi ontologi realisme kritikal/epistemologi masa depan dalam kajian dasar kritikal dan komunikasi strategik turut dicadangkan hasil dari penemuan keseluruhan kajian ini.

SKILLS CONDITIONS TOWARDS SARAWAK 2030: PERSPECTIVES FROM POLICY ACTORS

ABSTRACT

Although research on 21st-century skills is reasonably aggressive, deliberation on a) the *conditions* that surround them; b) policy actors' constructions on the conditions' *futures*; and c) how these futures occur and what transpires from those conditions – in Sarawak, Malaysia – are scarce. Thus, the primary purpose of this study is to explain the plausible futures of the Sarawak public sector's skills conditions through policy actors' perspectives towards 2030. The study seeks to a) describe the shared meaning of the current skills conditions for the Sarawak public sector, b) analyse the plausible futures on the skills conditions towards Sarawak 2030; and c) construct the plausible futures of skills conditions for Sarawak 2030. Eleven policy actors were interviewed – four policymakers and seven policy enablers. Data were purposively sampled and thematically analysed based on a combination of Inayatullah's futures methods (i.e., Futures Landscape, Causal-Layered Analysis, and Futures Triangle), Bhaskar's Critical Realism, and McLuhan's Tetrad of Effects. Findings were triangulated with secondary sources and further interpreted through retroductive reasoning. The current skills conditions for the public sector in Sarawak fall under The Strategy and The Big Picture in the Futures Landscape Model. The construct of the *Sarawak 2030 Skills Condition Futures Triangle Model* indicates that a) the weights of the past consist of issues with appointment structure, low local skilled workforce, and low digital skills; b) the pushes of the present are the Sarawak Digital Innovation Ecosystem, the appointment of Chief Information Officers, and STEM-related initiatives; and c) the pulls of the future comprise branding of a "World Class

Civil Service", digital transformation, and digital inclusivity. This signals a Gaia future. Results reveal plausible futures generated from leadership consciousness and heritage as identity (the empirical), digital transformation and talent development and assessments (the actual), and social intelligence and the values placed on creation and technology (the real). Furthermore, these plausible futures will a) retrieve heritage as an identity to Sarawak skills conditions; b) enhance community empowerment and new norms of quality services; c) decrease government dependency and physical skills; and d) make current structures of postings, processes, skill sets, leadership values obsolete. These findings are put together as the *Skills Conditions in the Public Sector: Sarawak 2030 Plausible Futures Model* and discussed in the final chapter of the thesis. Ultimately, the study suggests the relevance of *critical realism ontology/futures epistemology* in critical policy and strategic communication research.

CHAPTER 1

INTRODUCTION

1.1 Chapter Overview

For Sarawak to become a developed State in Malaysia by 2030, it is strategic to study the right skills conditions created and enabled by policy actors. The consciousness of policy actors would reveal narratives and mechanisms beyond the much-stated vision towards achieving the desired skills conditions for Sarawak 2030. Therefore, this study is dedicated to explaining, through the lens of policy actors, the public sector skills conditions for Sarawak 2030 by exploring their attributes, generative mechanisms, and their effects should the future occur.

This chapter introduces the study in eight sections. It begins with the study's background – in which we delve into the context of the study, namely the 4IR skills and conditions, the Sarawak Digital Economy blueprint that led to the Sarawak 2030 aspiration, and, thus, the significant need for the public sector skills' transformation. The background of futures study and critical realism are subsequently introduced in the context of the thesis. Next, the chapter lays out the problem statement, bringing out the five research questions of the study. The chapter continues to map them with three research objectives and study rationale. It also defines several concepts that operate the study and its theoretical framework. Finally, the scope and significance of the study are addressed.

> For any adequate answer to the critical meta question: 'What are the conditions of the plausibility of an account of science?' presupposes an account capable of thinking of those conditions as special cases.
>
> Roy Bhaskar, in *A Realist Theory of Science (2008)*

1.2 Fourth Industrial Revolution Skills and Conditions

As famously addressed by Schwab (2017), the Fourth Industrial Revolution (4IR) will inevitably impact developing economies.

Few Southeast Asia nations have examined this. For example, Malaysia and Thailand are optimistic about how the 4IR could help them escape the middle-income trap (Lee et al., 2020). With the increasing wages, Malaysia's electronic and Thailand's auto clusters are capitalising on 4IR to progress into higher-end segments of the global value chain. Jones and Pimdee (2017) find that regardless of how much funding is poured into Thailand, its plan to advance to 4IR can succeed with qualified workers, researchers, engineers, technicians, and teachers to put unicorns into action, train innovative farmers or support digital entrepreneurs. However, a case study by Kim et al. (2019) in the Philippines offers an alternative perspective to Schwab's assertion that everyone is prepared to join the 4IR. The results reveal that the Philippines will have a different experience of the 4IR, at least initially, due to their varying economic situations and restricted access to technological advancements.

Thus, the effect of this revolution will differ depending on each country's available resources and the level of human capital. The 4IR will not automatically benefit developing economies because of the numerous limitations preventing them from competing in the digital industrial landscape. Local institutions have a crucial role in ensuring a positive impact in the face of 4IR by focusing on providing training and upskilling opportunities for their workforce (Lee et al., 2020). If a competent and

visionary government encouraged entrepreneurship, developing economies could accelerate their development by taking advantage of the ongoing uncertainty and rapid environmental change Lee et al. (2020). These findings merit further studies on how the 4IR may affect the developing world, especially its workforce.

In 2030, the world of work will be very different from what it is now. People tend to work extended hours and may even hold multiple jobs with more than one boss in more than one career (Thomas & Gunson, 2017). Such conditions must begin with understanding what is needed to move with those changes. Syntheses examining the impacts of 4IR highlight the significance of the Internet of Things (IoT) (i.e., Roblek et al., 2016) and automation (i.e., Khalid, 2022) in the working milieu. One of the most significant trends influencing the future of employment in 4IR is revolutionising the job market by requiring the workforce to acquire more complex skills. myForesight (2017) predicts that by 2050, Malaysian users' creativity and talents will be vital to the growth of products and services, influencing research, development, and marketing. Internet and offline tools enable customers and manufacturers to create, customise and change products and services. Autonomous systems, artificial intelligence (AI), and robotics, which are decades old by 2030, will continue to evolve. More intuitive emergent AI could modify speech and conversational software with unparalleled precision, aiding millions of people and rethinking computer command and interaction.

On the downside, up to 800 million jobs will be lost globally by 2030 due to global automation, and 14% of existing jobs will become obsolete in the next 15 to 20 years. One in every three jobs will change due to automation, and many will be replaced and become obsolete. However, up to 890 million new jobs will be created;

thus, 4IR has the potential to raise income levels and improve quality of life, particularly for those with digital access (Khalid, 2022).

In other words, 4IR expects to automate processes that require workers to be as automatic. Despite this, little cross-disciplinary research has identified the skills needed to "automate" workers in 4IR. Chaka (2020) identifies 4IR skills, competencies, and literacies from 64 peer-reviewed journal papers from multiple topic fields. Three findings are noteworthy. First, 4IR is associated with generic soft skills, including communication, creativity, and problem-solving. Second, the reviewed papers emphasise programming abilities as 4IR hard skills. Third, 4IR papers rarely mention information literacy, which proves significant to the findings of this thesis (more explanation on this in Chapters Three and Seven).

Thus, 4IR *as a context,* presents windows of opportunity and significant obstacles to policies and interventions in establishing the right conditions for sustainable human capital and development. The key to boosting the local economy lies in the partnership between public and private organisations, which should work together to offer training and education programs for the local workforce. This will enable them to enhance their skills and abilities, contributing significantly to the growth and development of the local economy, especially in the 4IR era. Lee et al. (2020) further argue that centralisation is crucial in coordinating the understanding of the wholesome nature of 4IR, which necessitates policy response from multi-ministries and agencies in Malaysia. From this, Sarawak as a State in Malaysia provides an inviting and fitting premise for the study.

1.3 Sarawak Digital Economy Blueprint 2018-2022 and the Sarawak 2030 Aspiration

Located just above the Equator in the northwest corner of Borneo, Sarawak is the largest of Malaysia's thirteen states (refer to FIGURE 1.1). The State's economy is the third largest in the nation, contributing 9.50% of Malaysia's Gross Domestic Product (GDP) in 2020[1]. For decades, the Sarawak economy heavily relies on conventional natural resource extraction and exports such as oil, gas and palm oil.

Figure 1.1 Map of Sarawak (Sarawak Government, 2021)

Before 4IR, Sarawak launched a regional development planning initiative named Sarawak Corridor of Renewable Energy (SCORE)[2] in 2008. SCORE projects have impacted the rural economy through physical, social, and economic programmes (Daniel et al., 2018). Industrialisation and foreign investment are SCORE's main benefits, and with this, SCORE faces internal and economic challenges. Apart from environmental issues, Sovacool and Bulan's (2012) study mentions repressive laws,

[1] Data from Department of Statistics Malaysia. (2021).
[2] The Sarawak Corridor of Renewable Energy (SCORE) is one of five economic development corridors created by the Federal Government of Malaysia as part of its plan to stimulate investment-led growth in traditionally rural areas. More information on Sarawak's involvement in SCORE can be found at this website: https://recoda.gov.my/sarawak-corridor-of-renewable-energy/

policies and regulations and cites community relocation, boom-and-bust towns, livelihood hazards, and unequal remuneration as societal issues.

However, since 2016, the 4IR has sparked a general appreciation from Sarawak. The 4IR's impact on government and policymaking lies in the ability of the government to be adaptive and agile (Schwab, 2017). Adaptive government embraces disruptive change within an environment of new and competing power structures. Since regulation plays a decisive role in the adaption and diffusion of new technologies, the government is expected to be agile in changing its approach to continuously create, revise, and enforce such regulations in a fast-changing environment. The age of 4IR does not require more or faster policymaking but resilient frameworks produced by a regulatory and legislative ecosystem. This study positions the 4IR as a driving phenomenon to the conception of future policies in Sarawak.

As a result, the State introduced the Sarawak Digital Economy (SDE) blueprint.[3] in 2017 with a vision to transform Sarawak into a "*new economy powered by knowledge, innovation & digital technology*". With 47 strategic actions, the blueprint aims to speed up the State's economic growth, reduce the socioeconomic divide, and increase youth employment by embarking on a digitised approach to its economy in all economic sectors. Therefore, these 47 strategic actions are designed to accelerate economic growth, reduce the socioeconomic divide, and increase employment opportunities for youth in the State within a five-year timeline. These strategic actions parallel the 4IR's attribute of fusing various technologies to transform production, management, and governance (Schwab, 2017).

[3] From Sarawak Government. (2017).

Sarawak is the first State to embark on a 4IR-related initiative in Malaysia. The universal concept of 4IR is upheld by the current Premier of Sarawak, driven by the prospect of providing higher income to the State[2]. With the commencement of the 4IR at the World Economic Forum at Davos in 2016, the State foresees the opportunity to offer higher income by combining and converting the traditional industries with the new technologies recognised in the 4IR phenomenon. After visiting Finland, Australia, Estonia, Germany, France, and China, the SDE blueprint was formulated to be practical and adaptable to the State of Sarawak.

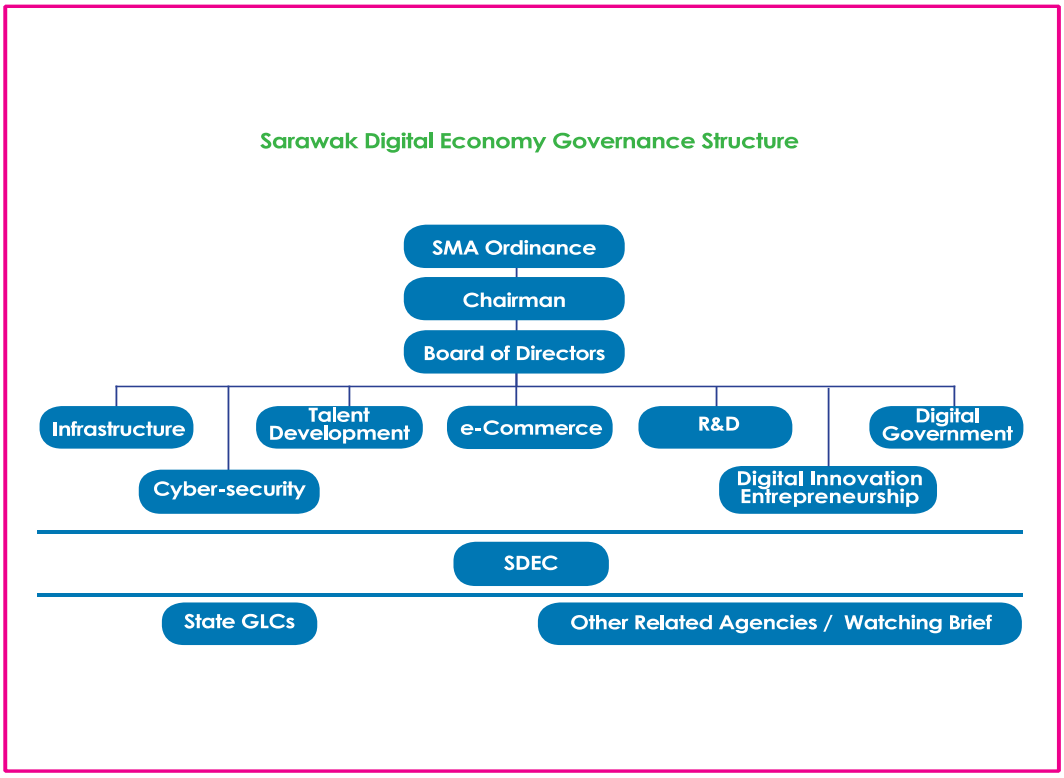

Figure 1.2 SDE Governance Structure (Sarawak Government, 2017)

Sarawak has embraced digital transformation and leveraged technology to drive economic growth and improve public services. The state government has recognised the significance of digital transformation and has implemented various initiatives and strategies to promote it.

Regarding digital infrastructure, the State has been investing in improving connectivity in the State. Just as the Regional Corridor Development Authority oversees SCORE's projects, the Sarawak Multimedia Authority has been tasked with expanding broadband coverage and improving the quality of Internet services for SDE. FIGURE 1.2 illustrates SDE's governance structure.

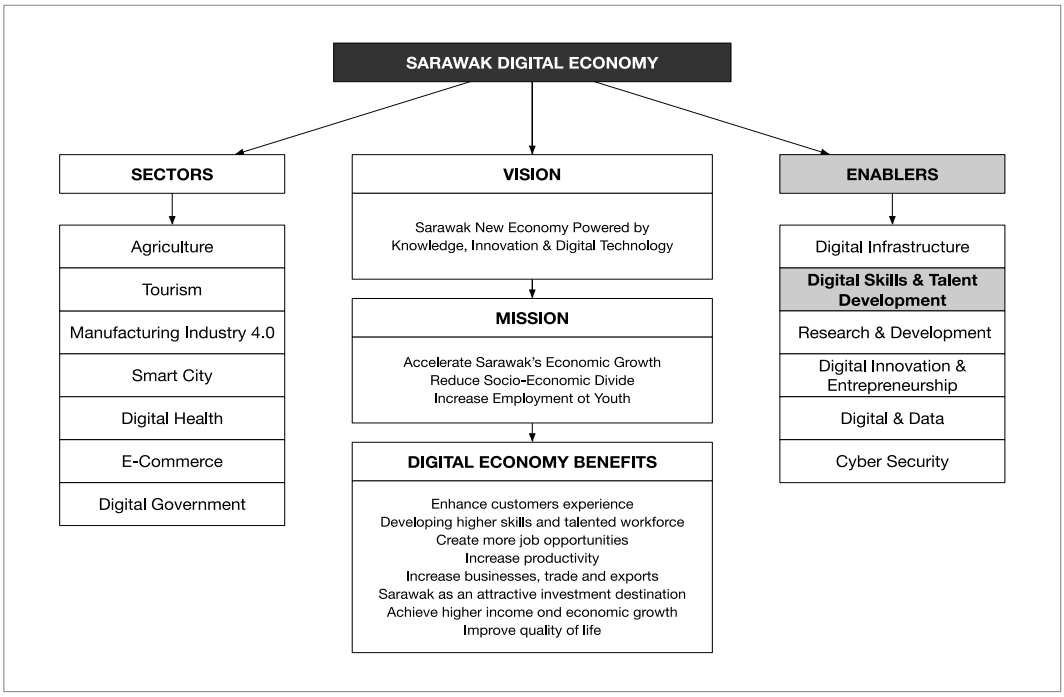

Figure 1.3 SDE Structure (Sarawak Government, 2017)

In addition, FIGURE 1.3 shows the seven key sectors identified in the blueprint: Agriculture, Manufacturing – 4IR, Tourism, Smart City, Digital Health, e-Commerce, and Digital Government. These sectors are supported by six enablers: Digital Infrastructure, Research and Development, Digital Skills and Talent Development, Innovation and Entrepreneurship, Digital and Data, and Cyber Security.

Policymakers recognise that manufacturing generates both income and employment opportunities. However, it is crucial to address safety and risk management concerns, financing product development and commercialisation, market

penetration, and talent development (MIGHT, 2020). In conscious of that, the State has also been developing a digital talent pool. For example, the Sarawak Digital Village Academy and Sarawak Digital Academy were established to provide training in digital skills such as coding and data analytics. The State has also launched various programs to support entrepreneurship and innovation in the digital sector to accelerate Sarawak's economy.

In 2020, however, the State's economy was estimated to contract between 3.5% and 5.0% because of the Covid-19 pandemic[4]. A 24.2% drop in the State's exports led to a less favourable job market. On the national scale, the reports that Malaysia's unemployment rate rose from 3.1% in 2019 to 4.3% in 2020[1]. 723 local workers were laid off within a year, leaving them with no choice but to reskill or retool themselves to survive and sustain their livelihoods.

To retain and rebuild trust, local or national governments must keep up with citizens' expectations, manage financial strains, and address fresh policy concerns. The Covid-19 incident posed a new challenge to confidence levels while highlighting the necessity of a more responsive and flexible public service in times of uncertainty. The OECD (2020) also found that governments with the digital government maturity to act as "digitally enabled states" were better prepared to use digital technologies and data for managing the crisis and, as a result, showed greater resilience and responsiveness. The Covid-19 crisis was examined as a potential catalyst for government transformation.

[4] From Sarawak Government. (2021).

The WEF (2020) reports that technology and the pandemic recession may worsen inequality without effective measures. The first phase of the economic slump hit lower-wage, female, and younger employees worse. The Global Financial Crisis 2008 had a much smaller impact on lower-educated people than the Covid-19 pandemic, which is projected to worsen disparities.

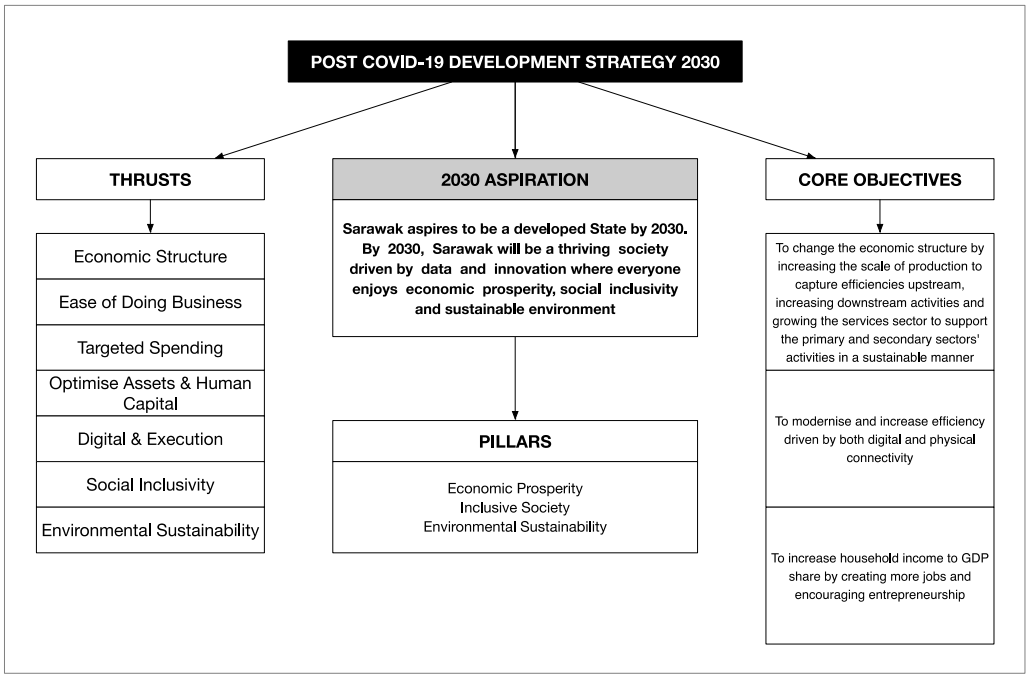

Figure 1.4 PCDS 2030 Structure (Sarawak Government, 2021)

Moreover, laws and policies have shifted during the pandemic. National policies are being developed to address gaps in what would be required to drive a "human-centred" agenda for the future of work while also delivering economic security, equal opportunity, and social justice in the coming years. However, this must also be translated into organisational policies, allowing the right culture and work practises to take root. Rahim (2022) cautions that most organisations have yet to fully develop the necessary policy actions to prepare for the future of work. This invites an exciting case for the Sarawak public sector.

The current Sarawak Premier stated that to achieve Sarawak's goal of becoming a developed state by 2030, the State must embrace the 4IR and the digital age (Aubrey, 2017). Because of this, the State government has worked on a development plan called the **Post Covid-19 Development Strategy (PCDS) 2030,** as shown in FIGURE 1.4. While the SDE blueprint lays out the overall digital economy structure, PCDS 2030 is an extension plan to help the economy grow again after the pandemic that embeds digital transformation. Consequently, the Sarawak 2030 Aspiration was born: "*Sarawak will be a thriving society driven by data and innovation, where everyone enjoys economic prosperity, social inclusion, and a sustainable environment*" [3].

One of the greatest highlights of PCDS 2030 is to increase the State's economy from RM136 billion in 2019 to RM282 billion in 2030 by growing the economy at an annual rate of 8.0% from 2021 to 2030[3]. Furthermore, SCORE became part of PCDS 2030[5] in 2021.

With the digital economy vis-à-vis 4IR, there is a promising trend for the services (or public) sector in Sarawak. The working population is 70.2% of the State's 2.82 million people, with the services sector contributing the most to the economy in 2019, followed by manufacturing, mining, quarrying, agriculture, and construction[1]. The services sector calls for innovative solutions via digital means of speeding up services, arguably even more so after the pandemic. Though the State's GDP rate inevitably fell in 2020 because of the pandemic, the services sector suffered the lowest

[5] From RECODA's Annual Report 2021. Available at: https://web.archive.org/web/20230719012321/https://recoda.gov.my/wp-content/uploads/2021/05/AR2021_Final_Website.pdf

by -5.6%, with government services accounting for nearly 20% of Sarawak's RM46 billion GDP[1].

Therefore, public sector services are fundamental in ensuring efficient services for the State's economic revival. However, to what extent is the public sector workforce equipped with the skills to make sense of and use technology to facilitate all economic sectors in Sarawak? This means developing human capital, or skills, is critical to the State's socioeconomic sustainability.

PCDS 2030 intends to use assets and government funding best while developing human capital to support socioeconomic development. To progress, human capital investment should be focused on the appropriate training to meet the State's industrial needs. Hanna (2018) claims that investing in human capital and institutional learning across all sectors will ensure digital dividends and inclusion, which aligns with Sarawak's 2030 social inclusivity goal. To achieve all this by 2030, policy actors will need the technology and the skills to avoid further retrenchments and irrelevance attributed to the new economy.

SDE strives to prepare societies for a more sustainable economy, emphasising digital skills and emerging technologies. These skills and technologies will be embedded in all developmental plans in Sarawak, as in PCDS 2030. In other words, the SDE blueprint acknowledges the importance of skills in the age of the digital economy to be at par with its infrastructural needs.

The PCDS 2030 involves working committees (aligned with the SDE blueprint) that ensure all strategies are implemented in congruence with the 2030 aspirations. Among them is, indeed, the **DSTD** unit, which functions to manage and

develop the skills needed for the strategies. As mentioned, DSTD is listed among the six enabling units for SDE. This study zooms into this unit as the population.

1.4 The Public Sector in Sarawak

In the age of universal digitisation, one of the top priorities is to use digital technology to improve public administration, society, and business interactions with the State and public service quality Kipervar and Mamay (2020). Over the next decade, Tizard (2012) predicts that public services will face significant financial strains, expanding demand, rising public and user expectations, decentralisation and community empowerment, new technology choices, and global competitiveness that may change relations between citizens and the State. One of the notable findings is the call for public service leadership *beyond* the public sector – whereby the economic, public, social, and third sectors require better collaboration. Tizard's reference to sectors is termed as groups in this thesis.

In line with SDE, PCDS 2030 involves four groups: the public sector; the private sectors and industries; the education and higher learning institutions; and the communities (which include non-governmental and non-profit organisations). Therefore, all groups must quickly and effectively learn and apply digital technology in all social and economic sectors. This structure contrasts with the previous but ongoing SCORE initiative in the State, focusing solely on private sectors and industries needing more involvement with other groups.

As SDE is a brainchild of the State and serves to facilitate its digital transformation, skills for achieving the vision must be established by context and examined by its conditions. Therefore, this study zooms into the skills conditions of the public sector in Sarawak.

In Sarawak, the public sector includes ministries, departments, agencies, and offices (refer to FIGURE 1.5) that operate to not only implement SDE but also play an active role in facilitating other groups in achieving Sarawak 2030, which means that there is an ecosystem in the design. In parallel to Sarawak's digital transformation agenda, Hanna's (2018) study suggests four elements to nurturing such an ecosystem: building an innovative digital economy; building an inclusive digital economy; creating digital government capabilities; and learning to master digital transformation. Such transformation calls for adequate skill sets, in which we must first study its condition or landscape.

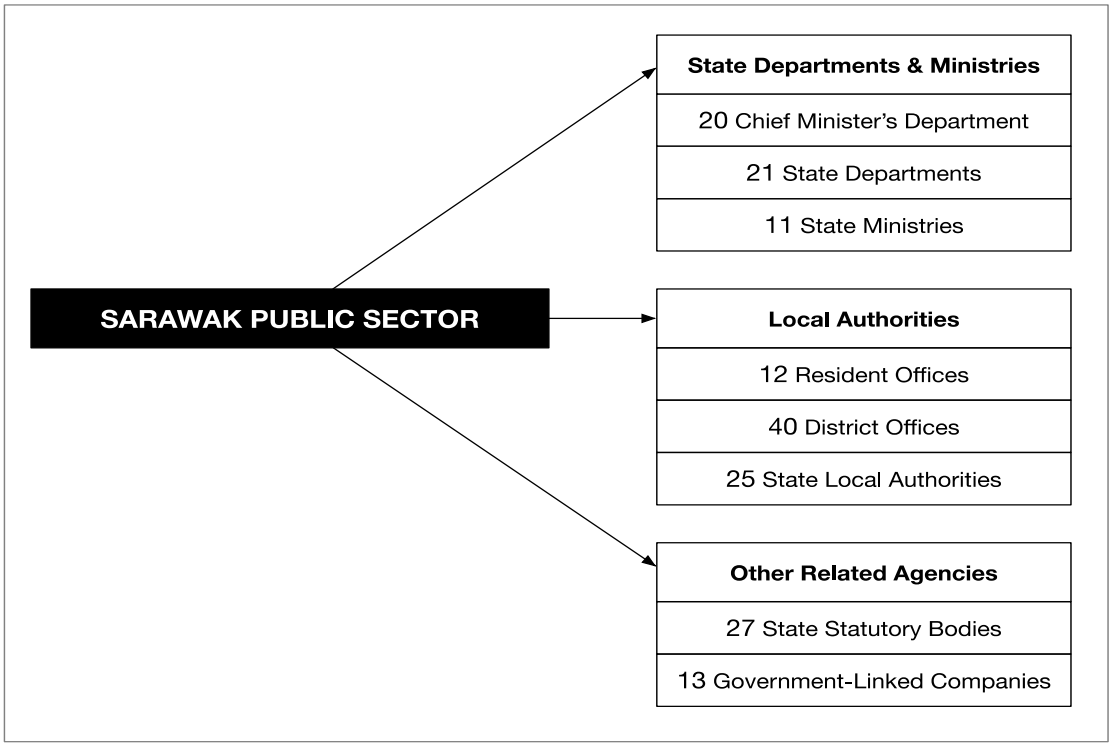

Figure 1.5 Sarawak Public Sector Offices

Given the State's mandate on PCSD 2030 vis-à-vis SDE, the undertaking of the public sector and its leadership is pivotal in driving the digital transformation towards achieving Sarawak 2030. Furthermore, Bose's (2020) study finds that public sector undertakings contribute significantly to the country's economy and are essential

to the public good. However, the sector must be transformed into a dependable and efficient sector by ensuring good governance and implementing a proper assessment system to meet the aspirations of stakeholders (or groups), thereby ensuring accountability (Khalid et al., 2016).

As mentioned, the study zooms to SDE's Digital Skills and Talent Development (DSTD) unit. This unit comprises policy actors from various State organisations, working together to develop and manage skills and talent-related affairs and policies for the State. This thesis establishes the unit as a population and samples the leading State officials from this unit at their respective organisations. This study defines these officials as policy actors.

Policy actors are essential in materialising the Sarawak 2030 aspiration. Their hands-on roles as gatekeepers and implementors provide contextual insights into future skills-related policy developments. However, what *are* the public sector skills conditions, in their views? What condition do they envision for 2030, and how do they get there? This study hopes to answer those questions. Based on their professional and personal experiences and observations about the public sector's skills conditions two years after SDE, their perspectives serve as the subject of this thesis by applying futures study (FS) to explore the landscape, issues, solutions, and trajectories of the skills conditions in Sarawak.

1.5 Futures Study and Critical Realism in Studying Conditions for Policy Development

By 2050, Malaysian leaders must be imaginative and foresighted. This will allow the leader to create future-oriented strategies and actions to meet complex environmental concerns. Most importantly, national leadership and governance must

have high technological skills and business and operations expertise to embrace science and technology to meet future needs (myForesight, 2017). With PCDS 2030, Sarawak's vision aligns with this. What needs to be added is the systematic methods for explaining the vision and how to achieve it.

In doing so, this thesis advocates FS. FS examines potential, probable, and preferred futures and their worldviews and mythologies (Inayatullah, 2007[6]). It progresses from external causes impacting the future (i.e., astrology and prophecy) to structure (i.e., historical patterns of change, nations and systems rising and falling) and agency (i.e., the study and creation of preferred images of the future).

Regarding policy development, Sarawak has established a vision that calls for exploration and further explanation. The case studies gathered by Rijkens-Klomp (2012) show that policymakers prefer process-oriented strategies. The future-oriented and integrated conversations help them understand each other. Theoretically, this influence creates a shared understanding, and subsequent exploration strategies have content-related effects. Thus, FS approaches encourage logical, content-driven policymaking. Structured and transparent processes add more substance and different viewpoints to conversations. Case studies show that process-related and organisational elements are more critical for FS success and that internal organisation influences it the most.

Organisational and national planning departments have embraced FS. Planning and futures frameworks differ – while planning controls and close the future, FS *explores* alternative futures (Inayatullah, 2007[6]). Studies have found that when a

[6] From his presentation: http://irep.iium.edu.my/101719/4/HDU2050%20scenario%20building-slides_compressed.pdf

government agency develops futures exploration methods, it is a huge step, sometimes even a cultural change (i.e., Rijkens-Klomp, 2012; Meissner, 2012). Three-quarters of the world believe FS help innovation, technology, and scientific policy. Most nations are preparing FS to help determine development priorities and programmes in the coming years. This striking link between FS and the nation's innovation performance suggests FS has a long-term impact.

For instance, the UK, Singapore, and the Netherlands have led this trend in applying FS, according to Habegger (2010). The two main contributions of FS to policymaking involve a) informing policy by providing more systematic knowledge about relevant trends and developments in an organisation's environments and b) driving organic mutual social learning processes among policymakers that generate common policy visions.

In Malaysia, FS is acknowledged and applied in various contexts. On a larger scale, a platform called myForesight is initiated by the Ministry of Science, Technology and Innovation in Malaysia for the government, industry, and academia to share their experiences, insights, and expertise on strategic issues.[7]. Using various FS methods, myForesight highlights topics on the futures of society that are affected by technology, including workforce futures in the 4IR[8].

The International Islamic University Malaysia (IIUM) has also introduced FS in its framework.[9], addressing digital transformation (i.e., digital economy, digital education) as a trigger and a pathway towards improving policies in Malaysia. Other

[7] Malaysian Foresight Institute. (2018). *About Us*. https://www.myforesight.my/about-us/
[8] For articles on workforce and skills-related futures, see Saaid (2021a, 2021b); Ramanathan (2021).
[9] IIUM. (2020). *IIUM Futures Studies*. https://www.iium.edu.my/page/IIUM-FUTURES-STUDIES. Other notable universities that adopted FS in their frameworks are University Sains Malaysia (USM) and Universiti Teknikal Malaysia Melaka (UTeM).

policy-related works by FS pertain to studying transformative futures in higher education institutions in Malaysia towards 2050[10], a case study of city futures in Penang, Malaysia[11]. Moreover, the strategic direction process by leaders in public institutions[12] In response to government demands (Karim, 2011) finds that FS prepares leaders to take up strategic actions in the near term.

This study aims to map out the plausible conditions of Sarawak 2030 skills conditions. FS paves the way for exploring this through a Futures Triangle (FT) Model (as shown in FIGURE 1.6).

Policy actors need resources or talents at the individual, organisational, and system levels to design, deploy, and evaluate policies. It comprises learning, adapting, and analysing (Wu et al., 2015). While the FT Model is the primary model used to map the plausible futures for Sarawak 2030 skills conditions, critical realist research concentrates on the fundamental mechanisms. These mechanisms comprise essential and long-lasting connections that replicate social interaction patterns. Additionally, social practices connect and mediate between various institutional elaboration cycles, reproduction, and transformation Malhotra (2017).

Globalisation, as in the case of 4IR, changes sociocultural variables. Paradoxically, it can also induce and challenge globalisation (Martens et al., 2010). One way to mitigate this is to understand the variables that affect such conditions and their generative mechanisms. Roy Bhaskar introduced critical realism (CR) in the late 1970s, influencing sociology, social theory, and organisation studies. CR examines

[10] Ithwin & Inayatullah (2018) published by Universiti Sains Islam Malaysia.
[11] Cruz & Villanueva (2014) published by Journal of Futures Studies.
[12] For example, Futures Thinking and Scenario Planning workshop is organised by the National Institute of Public Administration Malaysia to train public service officials at the national level to strategise initiatives in their respective ministries, agencies or organisations.

causal mechanisms and situations. Retroduction (CR's inferencing method) identifies the contextual conditions for a causal mechanism to work and cause empirical trends. This inferencing connects "*the observable phenomena of social life, as imagined in the experience of the social agents concerned, to the essential relations that necessitate them*" (Bhaskar, 1979).

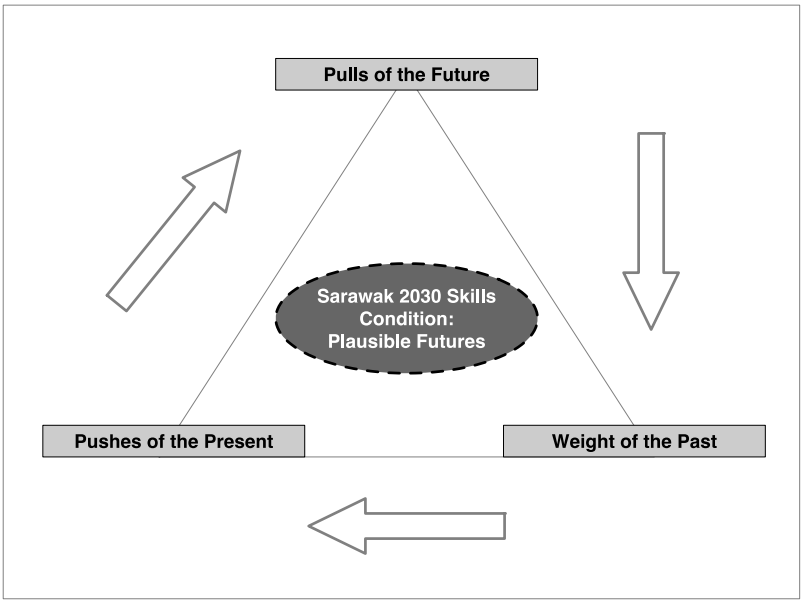

Figure 1.6 Futures Triangle Model (adopted from Inayatullah, 2008)

Fleetwood (2014) articulates Bhaskar's CR as such:

- Ontology, which studies being, existence, or the world, is CR's foundation. CR ontology has stratified, emergent, and transformational things, relations, and processes.
- Ontology influences aetiology, epistemology, methodology, research techniques, mode of inference, objectives, and concepts of explanation, prediction, and theory.[13].

[13] A "*chain of meta-theoretical conceptions*" describes this.

- CR acknowledges that sociology has two opposing ontologies: an empirical realist ontology, characterised by seen, atomic events, and an idealist ontology, represented by entities produced solely by discourse.
- CR interprets and critiques empirical realist and idealist ontologies and related meta-theoretical linkages.

Ontological depth suggests that reality is layered (Bhaskar, 1978). Realist philosophy divides ontologically profound reality into empirical, actual, and real. Empirical is observable, tangible, experienced, describable, and often measurable. The actual includes empirical and activated non-empirical mechanisms. Actual, empirical, and hidden mechanisms are real—iceberg metaphor graphic, as explained by Jagosh (2019). Retroductive theorising helps realism evaluation understand the project and programme causality and capture programme results in an ontologically profound way. Retroductive theorising in realist evaluation starts with effects and works backwards to think about the reality of circumstances that cause them (Jagosh, 2020).

In relevance to this, all social actions (i.e., policymaking on skills), especially in modern organisations (i.e., DSTD unit), require future anticipation (on skills conditions) to remain relevant. Patomäki's (2006) work advocates that CR ontology explains numerous futures. The real world includes unrealised possibilities and unexercised capacities of transcendental structures and mechanisms in open systems (i.e., the Sarawak public sector). FIGURE 1.7 illustrates an overview of this study.

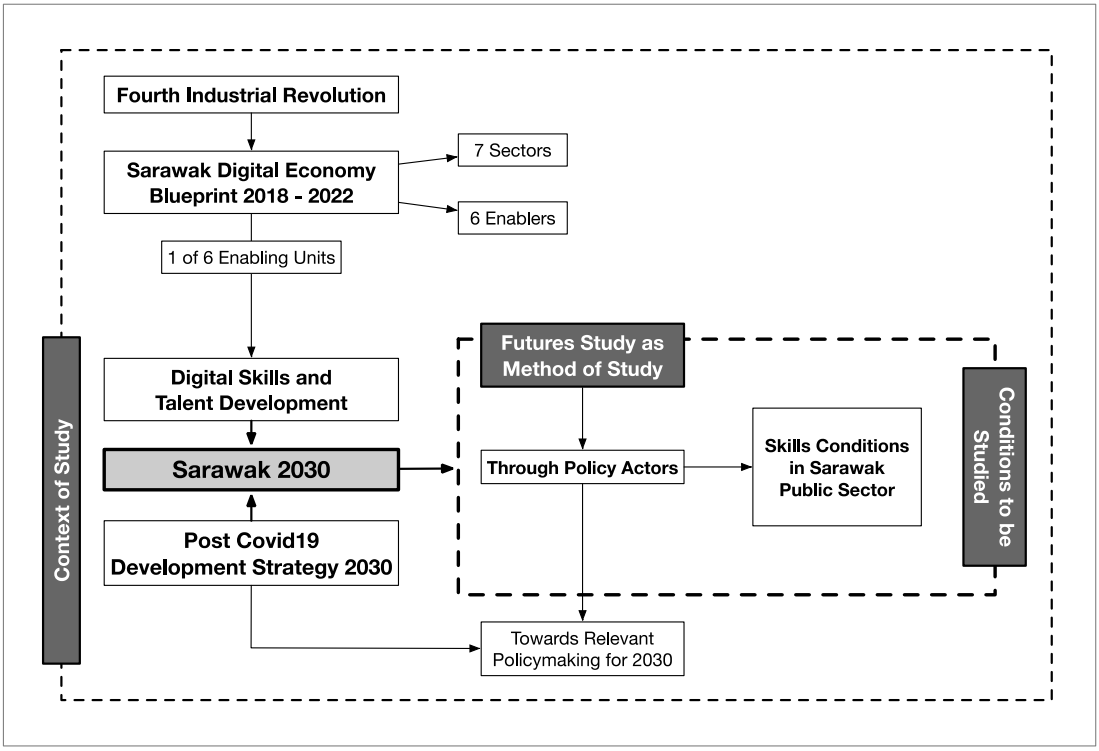

Figure 1.7 Background of Study Overview

As social sciences envision concrete utopias for better futures, futurologists do more than build utopias. This is because FS is also interested in other possible and plausible futures and how our and others' actions, sometimes unintentionally, make some of them actual.

In other words, this thesis intends to answer these questions: What do the plausible futures look like for Sarawak's skill conditions in the public sector in 2030? How will it happen? What can one expect from such conditions? The following section commits to rationalising these questions.

1.6 Problem Statement

Sarawak is unique and diversified; state officials are spread out even in remote areas. Since the call for 4IR Sarawak is a top-down decision – officially endorsed and mandated by the State- policy actors are pivotal in continuously assessing the skills

needed in conjunction with Sarawak's context. However, in developing states, the focus on technology and infrastructures often prevails with people strategies (i.e., skills and talent development). At the same time, the latter should be embedded in the process and usage of the former.

Skills have shifted since the establishment of SDE under 4IR in Sarawak. Based on the initiatives in PCDS 2030, the public sector holds a great responsibility in facilitating digital transformation in almost all economic sub-clusters. The public sector in Sarawak is expected to be digitally adept and agile in ensuring the services provided by the State are incongruent with the digital economy initiatives that should propel the Sarawak 2030 vision into a developed state.

Although research on 21st-century skills is reasonably aggressive around the world, deliberation on a) the *conditions* that surround them; b) policy actors' evaluation of the conditions' *futures*; and c) how these futures occur and what transpires from those conditions – in Sarawak, Malaysia – are scarce. There is no exact way of knowing the current skills conditions in Sarawak's public sector and what is needed (and how) to embark on 4IR at its pace and unique complexity.

Thus, there is a need to have a clear, contextualised, shared meaning of what 4IR skills are to Sarawak's public sector landscape. Until then, Sarawak will conform to the universal meaning of 4IR skills that might not apply to its structure. This will make it hard for policy actors to steer the public sector to function effectively and provide better service to the people by 2030 – regardless of the level of sophistication embedded within the infrastructure provided. To fully explain how Sarawak constructs and establishes the skills conditions in the public sector from in the past, present and desired futures vis-à-vis 2030 aspiration, in-depth critical futures research is required.

Focusing on policy actors' experiences can help develop landscapes and pathways to inform future policy decisions in the public sector of Sarawak.

Therefore, the study seeks to a) describe the shared meaning of the current skills conditions for the Sarawak public sector, b) analyse the plausible futures on the skills conditions towards Sarawak 2030; and c) construct the plausible futures of skills conditions for Sarawak 2030.

1.7 Research Objectives and Study Rationale

The primary purpose of this study is to explain the plausible futures of the Sarawak public sector's skills conditions through policy actors' perspectives towards 2030. Therefore, there are three objectives of this study:

RO1: To describe the shared meaning of the current skills conditions in the Sarawak public sector.

RO2: To analyse plausible futures on the skills conditions towards Sarawak 2030.

RO3: To construct the plausible futures of skills conditions for Sarawak 2030.

TABLE 1.1 maps the research questions and objectives.

Table 1.1 Research Questions and Objectives of Study

Research Questions	Research Objectives
1: How are the current skills conditions seen in the public sector in Sarawak?	1. To describe the shared meaning of the current skills conditions in the Sarawak public sector
2.1: How do policy actors view the barriers to the 4IR skills conditions in Sarawak? 2.2: How do policy actors view the pathways to the 4IR skills conditions in Sarawak?	2. To analyse the plausible futures on the skills conditions towards Sarawak 2030
3.1: How do the plausible futures for Sarawak 2030 skills conditions generate? 3.2: What effects transpire from the plausible future/s for Sarawak 2030 skills conditions?	3. To construct the plausible futures of skills conditions for Sarawak 2030

By integrating Inayatullah's FS with Bhaskar's CR and McLuhan's Tetrad of Effects (ToE) perspectives, the findings of the study have yielded three conceptual mappings, that are:

i) **Sarawak Public Sector's Skills Conditions Landscape** describes the shared meaning of 4IR skills needed and the current skills landscape in Sarawak (see Chapter Three).

ii) **Sarawak 2030 Skills Conditions Transformative Futures Models** show short-term and long-term pathways to skills conditions barriers in Sarawak. This model is categorised into two perspectives: PMs and PEs (see Chapter Six).

iii) **Sarawak 2030 Skills Conditions' Plausible Futures Model** adapts the FT model with two extensions. The extensions feature its generative mechanisms and effects on the plausible futures of skills conditions for Sarawak 2030 (see Chapter Eight).