



MALAYSIAN COMMUNICATIONS AND MULTIMEDIA COMMISSION
SURUHANJAYA KOMUNIKASI DAN MULTIMEDIA MALAYSIA

DIGITAL SOCIETY RESEARCH GRANT 2024

APPLICATION GUIDELINE CYCLE 1, MARCH 2024

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DSRG

DIGITAL SOCIETY RESEARCH GRANT

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SECTION 1: ABOUT THE DIGITAL SOCIETY RESEARCH GRANT

1.1 Introduction

- 1.1.1. The Malaysian Communications and Multimedia Commission (MCMC) Digital Society Research Grant (DSRG) was conceived to contribute toward enhancing necessary information resources and in line with changing community expectations as we navigate the transition towards a sustainable digital civil society.
- 1.1.2. In meeting these aspirations, beyond the provisioning of infrastructure and communications services, there is a corresponding imperative that users possess the knowledge, skills, and attitudes to harness the potential of digital media and communications effectively. Accordingly, digital media literacy has increasingly become a key competency for citizen and user participation across the economy and society in the twenty-first century. This requirement has become exceedingly clear in the wake of the pandemic, which has heightened our dependence on digital technologies.
- 1.1.3. An important consideration that underpins MCMC's initiatives has been to ensure that all Malaysians equally share the access and benefits of the Information Age. More than ever, coherent and intelligent insights are required to address inequitable opportunity, access, knowledge, and skill issues. The efforts must be directed at ensuring the readiness and resilience of communities as the nation strives to overcome the challenges wrought by a global pandemic.
- 1.1.4. The research outcomes should nonetheless align with MCMC's National Policy Objectives to promote a civil society where information-based services will provide the basis of continuing enhancements to the quality of work and life post-pandemic, even as we manage the realities of life today.
- 1.1.5. In addressing the research gaps, research outcomes aim to support the strategies and initiatives under the various ongoing National Plans. These include the Malaysia Digital Economy Blueprint (MyDIGITAL), the National 4th Industrial Revolution (4IR) Policy, the 12th Malaysia Plan (RMK-12), and the Malaysian Budget of 2024.

1.2 Objective

1.2.1. This grant aims to grow the evidence base necessary for the nation to optimise the advancements made in communications infrastructure and service deployment. This base will assist the development of policy, programmes, and interventions to promote the inclusion and participation of all population segments as the nation transitions towards being a fully digitally connected and informed society.

1.3 Frequency

1.3.1. For 2024, two (2) Call for Proposals (CFP) cycles were planned, with the first cycle to be issued on 1 March 2024 and the second to be issued on 1 August 2024, respectively.

1.4 Research Focus Areas

1.4.1. The research proposals are guided by the following two (2) Focus Areas:

- i. Digital Citizenship & Cyberwellness (DCC): Aims to elicit research clarifying regulatory and developmental gap areas influencing participation, positive uptake and wellness in an increasingly digitally dependent world; and
- ii. Digital Inclusion (DI): Seeks to clarify regulatory and developmental gaps in areas related to factors that impede equality of access and challenge the paradigm of ensuring that no one is left behind or is deprived of digital connectivity and its benefits.

Table 1 – Framework for DSRG Focus Areas

DSRG Focus Areas	
<p style="text-align: center;">Focus Area 1 Digital Citizenship and Cyberwellness (DCC)</p> <p style="text-align: center;"><u>Sub Focus Area 1</u></p> <ul style="list-style-type: none"> i. Competencies and literacies ii. Risks and potential harm iii. User rights and protection iv. Consumer experience and protection v. Awareness and self-regulation vi. Adoption vii. Interventions viii. Programme evaluation, assessment, and impact ix. Policy and regulatory implications x. Validation and improvement xi. Communication strategies 	<p style="text-align: center;">Focus Area 2 Digital Inclusion (DI)</p> <p style="text-align: center;"><u>Sub Focus Area 2</u></p> <ul style="list-style-type: none"> i. Empowering productive use of services for "at-risk and excluded groups" ii. Access to health and assisted living services iii. Adoption iv. Interventions v. Programme evaluation, assessment, and impact vi. Policy and regulatory implications vii. Validation and improvement viii. Communication strategies

1.4.2. For DSRG 2024 Cycle 1, interested researchers are invited to submit project proposals on one of the fourteen (14) research titles below:

Table 2 - List of Guided Research within the Digital Citizenship and Cyberwellness (DCC) and Digital Inclusion (DI) Categories

No.	Code	Research Title	Research Category and Gap/Developmental Area
1.	DCC-1	Optimising Cybersecurity: A Comparative Analysis of Threat Intelligence Mechanisms for the Communications and Multimedia Industry	The research falls within the Guided Research Category. It addresses the gap area pertaining to the Communications and Multimedia industry network security practices in minimising risks and potential harm and ensuring optimal levels of user protection and cybersecurity.
2.	DCC-2	Communications and Multimedia Industry Environmental, Social, and Governance (ESG) Adoption Factors and Practices	The research falls within the Guided Research Category. It addresses the gap area of ESG adoption for the Communications and Multimedia industry.
3.	DCC-3	Sentiment and Behavioural Exploration of Social Media Users on Radio Frequency Electromagnetic Fields (RF-EMF) Emission-related Contents	The research falls within the Guided Research Category. It addresses the gap area of end-user perception and understanding of the risks and potential harm of RF-EMF and recommendations on communications approaches.

No.	Code	Research Title	Research Category and Gap/Developmental Area
4.	DI-1	Analysis of Consumer Behaviour on 5G Adoption in Malaysia	The research falls within the Guided Research Category. It addresses the gap area of consumer behaviours pertaining to the adoption and uptake of 5G services.
5.	DI-2	Free-To-Air Channel: Uses, Motivations and Gratifications in the Southern Region of Peninsular Malaysia	The research falls within the Guided Research Category. It addresses the gap areas pertaining to the state of adoption of Free-To-Air (FTA) television platforms and channels amongst Malaysian users located throughout the Southern region of Peninsular Malaysia.
6.	DI-3	A Study on the Marketability and Preparedness of Agriculture Technical Vocational Education and Training (ATVET)	The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements of Technical Vocational Education and Training programmes for competency-building targeted at the agriculture sector relevant to ongoing digitalisation and automation efforts.
7.	DI-4	Recommendations for the Improvement of the Methodology and Data Used to Calculate the Percentage of Malaysia's Internet Coverage in Populated Areas	The research falls within the Guided Research Category. It addresses the population gap areas of validation and improvements to network coverage measurement methodology for populated areas.
8.	DI-5	A Study on Public Higher Educational Institution Users' Broadband Services Quality of Experience and Adoption Factors	The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements to broadband service provisioning and take-up.
9.	DI-6	An Investigation on the Role and Challenges of State Government and Local Authority (PBT) in Facilitating the Adoption of GPP-I and Gazettement of UBBL Amendment 2021	The research falls within the Guided Research Category. It addresses the gap areas of adoption and implementation of GPP-I and UBBL 1984 Amendment 2021 at state and local governments.

No.	Code	Research Title	Research Category and Gap/Developmental Area
10.	DI-7	A Study on the Feasibility of Ensuring Communications Service Readiness for New and Existing Development Areas	The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements in ensuring communications service readiness for new and existing development areas.
11.	DI-8	Streamlining Cashless Adoption in Malaysia: An Evaluation of MCMC's Cashless Society Programme Effectiveness and Impact	The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements to the MCMC Cashless Society Programme.
12.	DI-9	A Study of the Feasibility of Generative Artificial Intelligence (AI) and Large Language Model (LLM) Adoption to Enhance MCMC Knowledge Management Practices	The research falls within the Guided Research Category. It addresses the gap areas of feasibility assessment of the adoption of Generative AI and LLM for MCMC's knowledge management practices.
13.	DI-10	Impact Study on the Effectiveness of Cloud-Based Productivity Tools amongst Organisations within the Communications and Multimedia Industry	The research falls within the Guided Research Category. It addresses the gap areas of the adoption of cloud-based productivity tools amongst organisations within the Communications and Multimedia Industry.
14.	DI-11	Considerations for a Conceptual Framework on Technical Vocational Education and Training Adoption of the Metaverse for Communications and Multimedia Capacity Development	The research falls within the Guided Research Category. It addresses the gap areas of the adoption of Metaverse for TVET programmes for communications and multimedia capacity development.

1.4.3. The above research titles are categorised as Guided Research, where the predetermined Research Objectives (ROs) are to be achieved with researchers expected to propose a research design incorporating suitable theoretical or conceptual frameworks, development of research questions, research instruments and methodology.

1.4.4. For further information on the gap area, targeted research subjects, research problem and context, and desired research aims and objectives, please refer to **Appendix 1**.

1.5 Duration of Project

1.5.1. All research must commence within two (2) weeks of signing the Letter of Award (LOA) and stamping¹ the same.

1.5.2. The term of a project is up to nine (9) months, including six (6) months of research activities until the submission of the research report at the end of the sixth month. The flow of the six (6) month project period can be referred to in Figure 2 in Section 3.

1.5.3. The project shall be completed according to the duration and deadlines stipulated in the LOA. Applicants shall indicate the project duration in the proposal, including each phase of work.

1.6 Grant Amount

1.6.1. The grant amount shall depend on the type and scope of the research project and subject to the guidelines herein and may be of a sum of up to Ringgit Malaysia ten thousand (RM10,000).

1.7 Matching Grant/Additional Fund

1.7.1 Researchers can source matching grants/additional funds from their universities or other funding bodies for the expenses not covered by DSRG or as additional funding for their projects.

¹ Stamping will be performed by MCMC.

SECTION 2: APPLICATION PROCESS AND PROCEDURES

2.1 Eligibility Criteria

2.1.1. The grant is open to full-time academic faculty members in schools of communications, social sciences, humanities, or related fields of private and public Higher Educational Institutions (HEI). Each proposal must have a Lead Researcher, subject to the general terms and conditions for granting.

2.1.2. The following rules apply to the applicant:

- i. Lead Researcher must hold a doctoral degree;
- ii. Lead Researcher must have an appointment with a local HEI for (at least) the duration of the proposed research project;
- iii. The salary of the researcher(s) cannot be financed from this grant;
- iv. The researcher(s) may request the grant on her/his behalf and on behalf of any possible project consortium; and
- v. The researcher(s) is responsible for research and financial matters.

2.1.3. Researcher(s) can only submit one (1) proposal as the Lead Researcher within this call, and each researcher can act no more than twice as an applicant (as Lead Researcher or co-researcher).

2.1.4. The research team must comprise at least two (2) researchers (a Lead Researcher and a co-researcher). Researcher(s) in professions other than academia are allowed to be part of the research team to complement the expertise and with the expectation that the product of the research will contribute to the broader body of knowledge on the topic specified.

2.2 Research Proposal

2.2.1 The DSRG proposal submission form is available for download on the MCMC website.

2.2.2 The research proposal must also consider and include a contingency plan for disruptions to mitigate such risks. Any requests for extension of project deadlines are discouraged, and all reasonable attempts must be made to preserve the timely completion of deliverables.

2.3 Expenditure Details

2.3.1. Remuneration and Allowances

The wages and allowance are only for temporary and contract personnel directly engaged in the project. The period of employment and hourly/monthly rate for the research assistant(s) must be clearly stated and justified.

2.3.2. Travel and Transportation

Only travel expenses (domestic) directly related to the project are claimable.

2.3.3. Rental

Only rental expenses for building space, equipment, transportation and any other item(s) directly related to the project are claimable.

2.3.4. Research materials and supplies

Only extends to expenses for research materials and supplies directly related to the project, such as books, magazines, computer software, photocopying, printing, binding, filming, consumables (stationeries, etc.), charges from postage, telephone, fax and other expenses necessary to complete the project. The purchase of assets and electronic gadgets, such as computers, tablets, phones, printers, etc., is not claimable.

2.3.5. University Management Fees

Payment made to Lead Researcher's HEI to conduct this research (if required).

2.3.6. Special Services

Translation, license for Grammarly², incentives for data collection, data gathering, and processing costs are claimable.

2.3.7. Proofreading and editorial services

Payment made specifically for qualified proofreading services for the research report and project manuscript. This expenditure is not to be used as payment to research members or assistants.

2.3.8. Conference

Specifically, to defray conference costs for the Lead Researcher to acquire related knowledge on research or disseminate research findings.

² Please note that license from Grammarly is renewable on a yearly basis. The disbursement from the grant can be only used for the license procured during the first six (6) months of research activities.

2.3.9. *Publication*

Specifically, to defray costs for publications in relevant academic, indexed and/or peer-reviewed journals.

2.4 **Proposal Submission**

2.4.1. The proposal(s) verified by the respective University Research Management Centres may be submitted in English or Malay and shall be presented clearly and submitted together with the following:

- i. Curriculum vitae of the Lead Researcher and team member(s) involved;
- ii. Certified true copies of the highest academic certificates;
- iii. A copy of the latest published research paper or article by the Lead Researcher; and
- iv. Other relevant materials to support the proposal.

2.4.2. The electronic copy of the proposal and other documents should be emailed to the Secretariat with '**DSRG 2024/1 SUBMISSION**' in the subject line and addressed to dsrg@mcmc.gov.my **no later than 5:00 pm, Thursday, 1 April 2024.**

2.4.3. An acknowledgement receipt will be sent once the Secretariat has received the proposal. Those who have submitted the proposals and have NOT received an email confirmation within a week should contact the Secretariat.

2.4.4. All applicants are advised to adhere to the stipulated requirements. Submissions that do not follow the criteria will risk being disqualified from consideration. **Submissions received after the deadline will not be considered.**

2.5 **Evaluation of Proposals**

2.5.1. The proposals will be evaluated by the DSRG Technical Panel based on open competition and merit and taking into consideration the following criteria:

- i. *Quality*: Rationale and justification are presented coherently and logically within the research focus and key growth areas. Ethical considerations have also been identified and addressed;
- ii. *Impact of research*: The research problem analysis identified an opportunity to contribute to implementing or evolving one or

more MCMC policies or initiatives. The proposed study is also potentially significant for offering new insights into the subject area and other relevant sectors;

- iii. *Alignment to internal requirement:* The need and relevancy of the research in contributing towards departmental specific works and potentially provides valuable and relevant data for the knowledge base;
- iv. *Suitability of applicant:* The degree to which the researchers have the experience, expertise, skills and knowledge in the proposed area of research and with the proposed methodology to accomplish the stated aims of the project; and
- v. *Feasibility:* The appropriateness of the proposed activities, methods, planned activities, and resources to accomplish the project within the stated timeframe. The proposal also identifies the project's challenges and measures to overcome those challenges.

2.5.2. The Lead Researcher may be invited to present their proposal to the Technical Panel as part of the evaluation process.

2.6 Award/Rejection of Proposals

2.6.1. The various factors contributing to the poor suitability of submitted proposals include the following aspects:

- i. Researcher(s) do not understand MCMC's role and functions, thereby submitting proposals outside of MCMC's regulative scope or too remote in impacting key regulatory partners or stakeholders;
- ii. The proposed research is based on the study of research questions with existing high research work and publications and does not provide new insights, value or new knowledge;
- iii. Research scope may not be feasible given the grant amount and limited duration allowed for under the DSRG;
- iv. Researchers' expertise does not match the research field of the proposal and/or lacks past research experience in the proposed area of study;
- v. The literature review and theoretical and/or conceptual frameworks underpinning a proposed study were not included; and
- vi. Submissions were of non-research proposals, such as the prototype or application development.

2.6.2. The Technical Panel reserves the right to consider any other factors it may deem relevant in the evaluation process. The Technical Panel also reserves the right to reject proposals that do not meet the submission and evaluation criteria.

2.6.3. Successful applicants will be informed via email. The Technical Panel may suggest changes to the proposals, including cost/funding, scope, and research timelines. The successful applicant must sign the Letter of Award (LOA) and re-submit it to the Secretariat to indicate the acceptance of the grant and the terms and conditions thereof.

2.7 Submission, Evaluation and Award Process Timeframe

2.7.1. An overview of the DSRG 2024, Cycle 1 timeframe is as tabulated below:

Table 3 – DSRG 2024, Cycle 1 Timeframe

No.	Process	Tentative Date*
i.	Issuance of Call for Proposal	1 March 2024
ii.	Deadline for submissions	5:00 pm, 1 April 2024
iii.	Information session with researchers	First week of March 2024
iv.	Evaluation process	First week of April 2024 to second week of May 2024
v.	Notification period	Third week of May 2024
vi.	Execution of LOA	Fourth week of May 2024
vii.	Project commencement	First week of June 2024

**Timeline may be affected by public holidays*

2.7.2. Figure 1 below shows the flowchart for the submission, evaluation, and award process of DSRG.

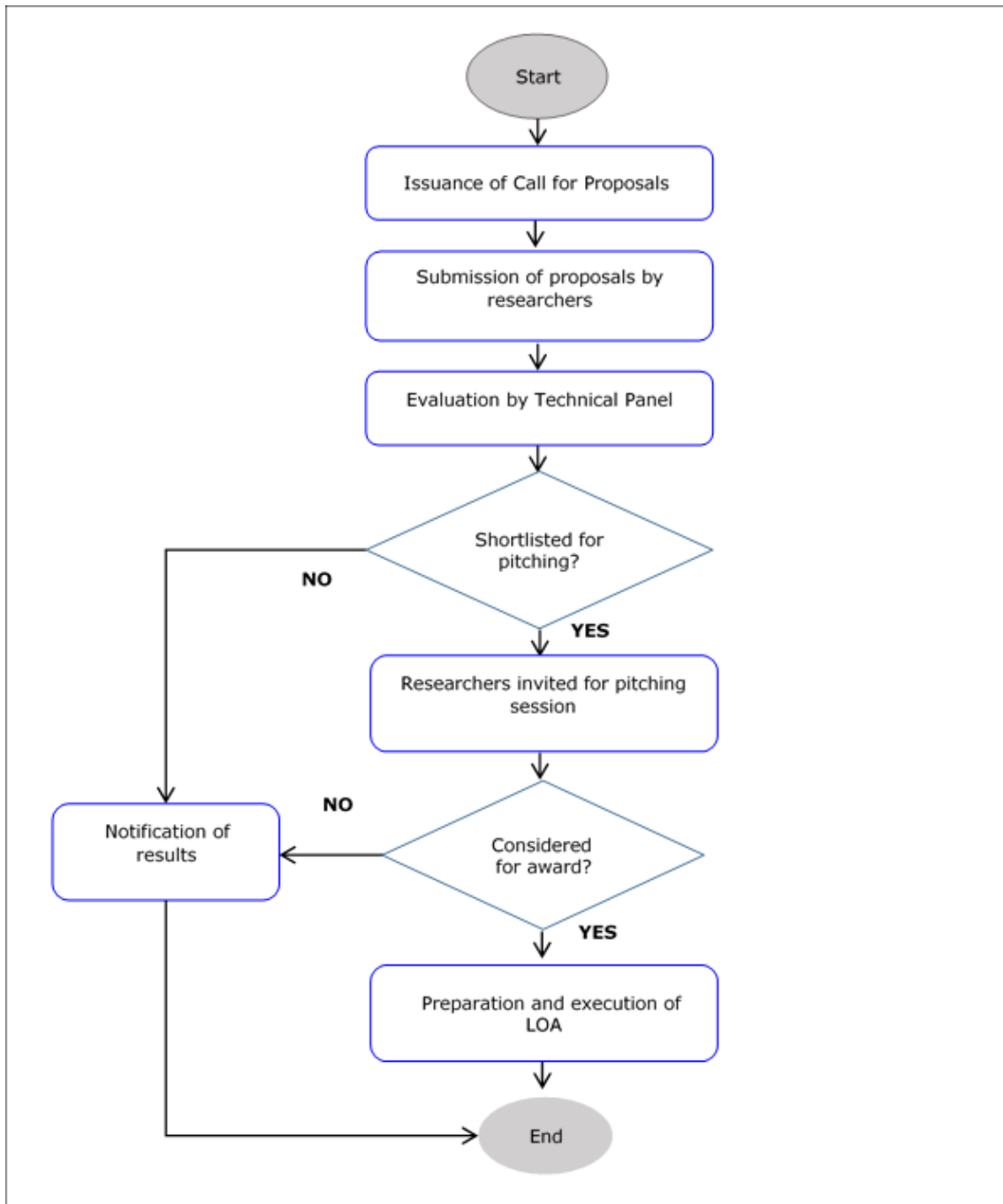


Figure 1 – Process Flow Chart for Submission, Evaluation and Award of DSRG

SECTION 3: PROJECT IMPLEMENTATION AND MONITORING

3.1 Disbursement of Funds

3.1.1. The grant will be disbursed according to the following schedule:

Table 4 – Grant Disbursement Schedule

No.	Disbursement phase	Description	Quantum (%)
i.	First disbursement	Upon submission of the signed Letter of Award to the Commission ³	50
ii.	Second disbursement	Upon submission of the verified Interim Report, subject to the satisfaction of the Commission (<i>disbursement subject to the Researcher's request</i>)	40
iii.	Final disbursement	Upon submission of the verified Research Report and no later than one (1) month after the completion of research activities, subject to the satisfaction of the Commission (<i>disbursement subject to the Researcher's request</i>)	10

3.2 Submission of Reports and Project Manuscript

3.2.1 Interim Report (IR)

- i. The Lead Researcher is responsible for successfully implementing the project according to agreed timelines and for the timely submission of the IR. It is required for the IR to be submitted at the end of the 3rd month from the project commencement date and upon achieving 50 per cent of the project completion target;
- ii. The IR is to be submitted together with the financial status update as per the templates provided by the Secretariat; and
- iii. The reports will be evaluated against the deliverables to determine whether the project is on track and whether the conditions for disbursement are met.

3.2.2 Research Report (RR)

- i. The RR must be submitted by the end of the 6th month from the project commencement date and upon achieving 100 per cent of the project completion target.

³ The signed Letter of Award will then be submitted to the Corporate Advisory Department, Malaysian Communications and Multimedia Commission for the stamping process.

- ii. The RR shall include (but is not limited to) the following and per the template provided by the Secretariat:
 - Abstract;
 - Introduction;
 - Research Objectives (ROs);
 - Literature Review;
 - Methodology;
 - Findings;
 - Direct outputs of the research;
 - Achievements based on the original ROs;
 - Implications and recommendations for regulatory and policy considerations; and
 - Recommendations for future research.
- iii. The updated and finalised RR based on the feedback and comments provided must be submitted within the 8th month of the project commencement date.

3.2.3 Presentation Slides

- i. The updated presentation slides based on the Final RR must be submitted within the 8th month from the project commencement date.

3.2.4 Project Manuscript⁴

- i. The project manuscript will be published in MCMC's research publication known as Media Matters;
- ii. The project manuscript is required to be submitted as per the templates provided by the Secretariat after the RR is approved;
- iii. Researchers who have conducted the research and submitted the reports in Malay shall translate and submit the project manuscript in English.

3.2.5 Financial Report (FR)

- i. The FR is to be submitted by the end of the 9th month from the project commencement date, as per the templates provided by the Secretariat and supported with a verified financial statement from the HEI.

⁴ The project manuscript is an abridged version of the Final Research Report which will be published as part of MCMC's Media Matters.

3.3 Dissemination of Findings

3.3.1 The MCMC may elect to publish and distribute all or portions of the research report and/or project manuscript without restriction.

3.3.2 The researcher(s) will be invited to present their findings at MCMC meetings/seminars/symposiums. They may be invited to participate in media engagement activities arranged by MCMC as a spokesperson for the research project.

3.4 Project Closure Notification

3.4.1 An acknowledgement receipt of project closure will be sent to the Lead Researcher once the requirement for proper project closure and conditions, such as satisfactory submissions of reports and financial statements, are met.

3.5 Project Implementation and Monitoring Process Flow

3.5.1 An overview of the project implementation and monitoring process is provided in Figure 2 below:

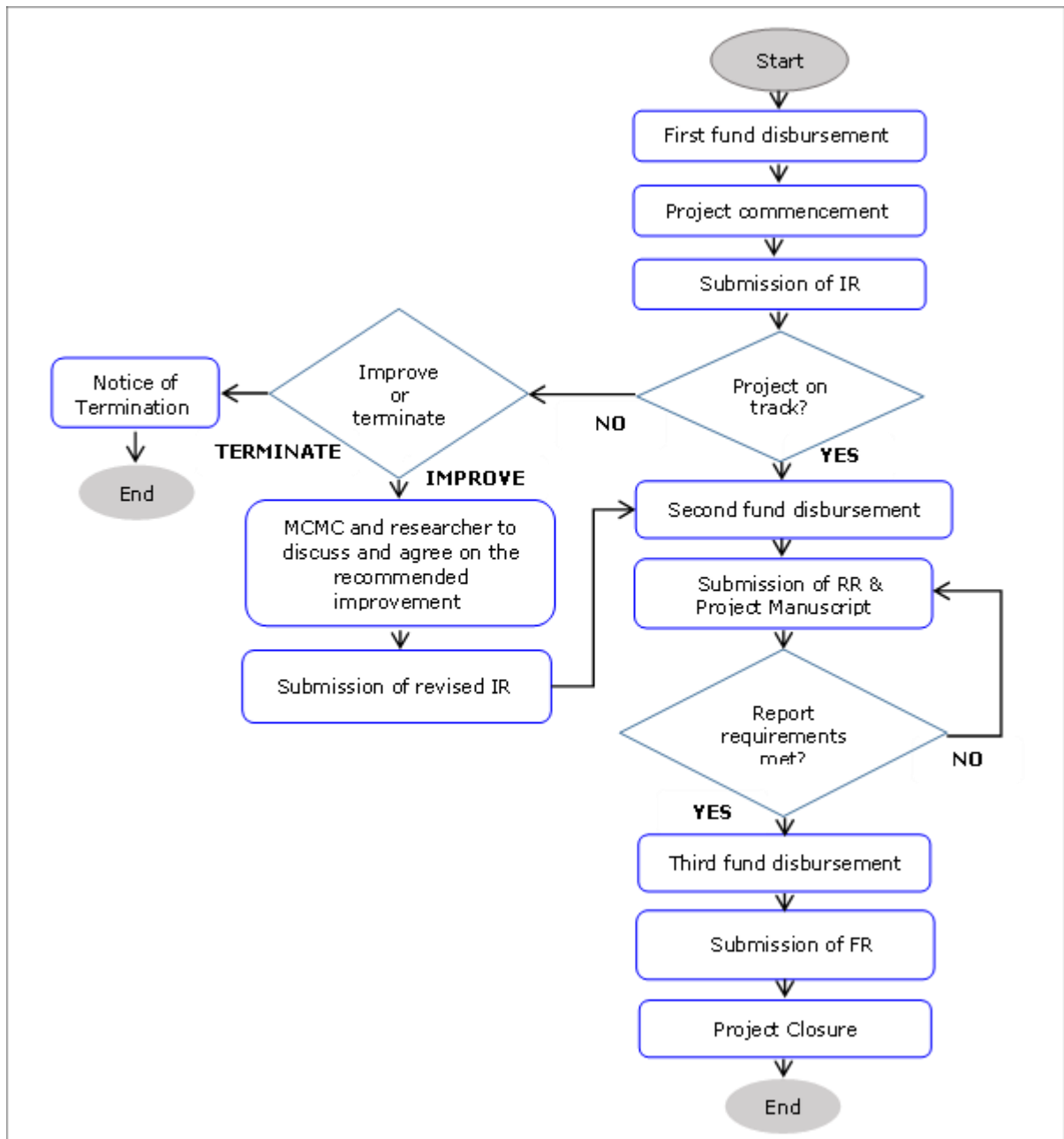


Figure 2 - Process Flow Chart for Project Implementation and Monitoring

SECTION 4: INTELLECTUAL PROPERTY

4.1 Intellectual Property (IP)

4.1.1 Ownership and management of IP, royalties, and any other fees received by the institution resulting from the findings or outputs of the research, such as licensing of the IP or any other forms of commercialisation, shall be governed per the agreed terms and conditions outlined in the LOA.

4.2 Publishing Rights

4.2.1 The MCMC is entitled to publish the research reports in any form deemed fit for education or knowledge transfer. Notwithstanding, the Lead Researcher is required to contribute through publishing and presenting research findings in local or international events/media, subject to the prior approval of the MCMC. Copies of all publications are to be submitted to the Secretariat.

4.2.2 The Lead Researcher shall denote and acknowledge the source of research funding and support for the project and the contribution of the various entities.

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**APPENDIX 1:
DSRG 2024 CYCLE 1 RESEARCH TITLES**

Framework for DSRG Focus Areas

FOCUS AREA 1: DIGITAL CITIZENSHIP AND CYBERWELLNESS (DCC)

Sub Focus Area 1:

- i. Competencies and literacies
- ii. Risks and potential harm
- iii. User rights and protection
- iv. Consumer experience and protection
- v. Awareness and self-regulation
- vi. Adoption
- vii. Interventions
- viii. Programme evaluation, assessment, and impact
- ix. Policy and regulatory implications
- x. Validation and improvement
- xi. Communication strategies

FOCUS AREA 2: DIGITAL INCLUSION (DI)

Sub Focus Area 2:

- i. Empowering productive use of services for "at-risk and excluded groups"
- ii. Access to health and assisted living services
- iii. Adoption
- iv. Interventions
- v. Programme evaluation, assessment, and impact
- vi. Policy and regulatory implications
- vii. Validation and improvement
- viii. Communication strategies

List of Guided Research within the Digital Citizenship and Cyberwellness (DCC) and Digital Inclusion (DI) Category

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2.	DCC-2	Communications and Multimedia Industry Environmental, Social, and Governance (ESG) Adoption Factors and Practices	The research falls within the Guided Research Category. It addresses the gap area of ESG adoption for the Communications and Multimedia industry.	27
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4.	DI-1	Analysis of Consumer Behaviour on 5G Adoption in Malaysia	The research falls within the Guided Research Category. It addresses the gap area of consumer behaviours pertaining to the adoption and uptake of 5G services.	31
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10.	DI-7	A Study on the Feasibility of Ensuring Communications Service Readiness for New and Existing Development Areas	The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements in ensuring communications service readiness for new and existing development areas.	47

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11.	DI-8	Streamlining Cashless Adoption in Malaysia: An Evaluation of MCMC's Cashless Society Programme Effectiveness and Impact	The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements to the MCMC Cashless Society Programme.	51
12.	DI-9	A Study of the Feasibility of Generative Artificial Intelligence (AI) and Large Language Model (LLM) Adoption to Enhance MCMC Knowledge Management Practices	The research falls within the Guided Research Category. It addresses the gap areas of feasibility assessment of the adoption of Generative AI and LLM for MCMC's knowledge management practices.	55
13.	DI-10	Impact Study on the Effectiveness of Cloud-Based Productivity Tools amongst Organisations within the Communications and Multimedia Industry	The research falls within the Guided Research Category. It addresses the gap areas of the adoption of cloud-based productivity tools amongst organisations within the Communications and Multimedia Industry.	58
14.	DI-11	Considerations for a Conceptual Framework on Technical Vocational Education and Training Adoption of the Metaverse for Communications and Multimedia Capacity Development	The research falls within the Guided Research Category. It addresses the gap areas of the adoption of Metaverse for TVET programmes for communications and multimedia capacity development.	61

DCC-1 – Optimising Cybersecurity: A Comparative Analysis of Threat Intelligence Mechanisms for the Communications and Multimedia Industry

- A. Research Field: Malaysian Communications and Multimedia (C&M) Industry Network Security Practices.
- B. Research Focus: Analysis of Network Security Threat Intelligence Mechanisms for the Communications and Multimedia Industry.
- C. Research Sponsor: Network Security Management Department, Network and Information Security Management Division.
- D. Contact persons for queries on this research area:
 - i. Mr. Mohd Firhan Mohd Samian, Deputy Director, Network Security Management Department, firhan.samian@mcmc.gov.my
 - ii. Ms. Fatin Nabiha Ab Aziz, Deputy Director, Network Security Management Department, fatin.aziz@mcmc.gov.my
 - iii. Ms. Aina Syafiqah Aris, Assistant Director, Network Security Management Department, syafiqah.aris@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap area pertaining to the Communications and Multimedia industry network security practices in minimising risks and potential harm and ensuring optimal levels of user protection and cybersecurity.
- F. The research targets the following groups⁵:
 - i. Regulator for C&M industry (MCMC);
 - ii. C&M licensees' network security managers and specialists (identified categories and type);
 - iii. Government Network Security Specialists (*Bank Negara Malaysia*, Securities Commission and Cybersecurity Malaysia); and
 - iv. Network security vendors/providers that provide network security services to the Malaysian C&M industry.

⁵ Respondents' organisations and identities are to be kept in the strictest confidence, and responses will be anonymised.

Research Problem/Context

A key outcome of MCMC's network security management strategy is contributing to the enhanced cyber resilience of the C&M industry through industry adoption of threat intelligence practices, information sharing and MCMC strategic monitoring. This is necessary to keep up with the rapid evolution and unprecedented connectivity of the C&M industry, accompanied by increased exposure to network security threats.

In addressing these threats, organisations across the C&M industry have implemented a slew of threat intelligence mechanisms to proactively defend against cyber threats by providing actionable insight, context and relevant information about potential risk. However, the threat intelligence landscape is vast and constantly evolving, presenting a challenge for organisations to identify, implement, and optimise the most effective mechanisms for their specific needs. The problem lies in the lack of a comprehensive understanding of the efficacy of different threat intelligence mechanisms within the communications and multimedia industry context. Organisations often struggle to choose and implement the most suitable solutions, as a dearth of research systematically compares and evaluates the performance, adaptability, and real-world effectiveness of threat intelligence mechanisms.

Addressing the unique characteristics and vulnerabilities of the C&M industry requires tailored approaches addressing the different threat actors, motivations, techniques and vectors. Finally, identifying the best practices that can be adopted is essential to optimise cyber resilience in the C&M industry.

Research Aims

The research aims to provide data on C&M industry threat intelligence mechanisms, industry challenges, practices, rationale, and threat management efficacy.

Ultimately, these will allow the C&M industry to understand better the threat intelligence mechanism well suited to the organisation's needs, function, and requirements to defend against cyber threats.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – **To assess the current and developing cyber network threat landscape** necessitating industry monitoring, risk mitigation and response and recovery planning and processes;
- ii. RO2 – **To identify, analyse and compare threat intelligence mechanisms** suitable for the C&M industry and consider their respective strengths and weaknesses;
- iii. RO3 – **To identify organisational challenges** faced **and propose the best threat intelligence mechanisms** that suit their organisation's needs;
- iv. RO4 – **To gain insights into the effectiveness, scalability, adaptability, and real-time responsiveness** of threat intelligence mechanisms and procedures; and
- v. RO5 – **To determine industry best practices and provide recommendations** for implementing and optimising threat intelligence mechanisms.

DCC-2 – Communications and Multimedia Industry Environmental, Social, and Governance (ESG) Adoption Factors and Practices

- A. Research Field: Malaysian Communications and Multimedia (C&M) industry Environmental, Social and Governance (ESG) adoption.
- B. Research Focus: Wider adoption of ESG practices amongst all C&M industry segments (including listed and non-listed companies).
- C. Research Sponsor: Market Intelligence Department, Industry Research and Data Analytics Division.
- D. Contact persons for queries on this research area:
 - i. Ms. Monalisatul Akida Mohd Khamis, Deputy Director, Market Intelligence Department, mona@mcmc.gov.my
 - ii. Ms. Farah Farnida Fadhli, Assistant Director, Market Intelligence Department, farah.fadhli@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap area of ESG adoption for the Communications and Multimedia industry.
- F. The research targets the following groups⁶:
 - i. Malaysian Communications and Multimedia Commission (MCMC) C&M licensees.
 - ii. ESG Policy Makers and Regulatory Bodies; and
 - iii. Other interested parties in ESG adoption include investors, auditors, academicians and scholars from Higher Educational Institutions (HEIs), environmentalists, etc.

Research Problem/Context

ESG stands for Environmental, Social, and Governance, representing the three (3) pillars in ESG frameworks for all organisations' reporting purposes. It is currently evolving and has gradually become an essential aspect across various industries in determining a company's ability to make decisions and act responsibly, as well as creating value to ensure the viability and sustainability of the company. Consequently, ESG has become an investor priority.

⁶ Respondents' organisations and identities are to be kept in the strictest confidence, and responses will be anonymised

In December 2023, Bursa Malaysia officially launched its ESG Reporting Platform for companies listed on the Main Market and ACE Market⁷. However, these requirements are placed on publicly listed companies and are not required for non-public listed companies/smaller businesses. Increasingly, as organisations see the positive benefits of ESG adoption in terms of improving their reputation, building customer and stakeholder trust and meeting the expectations of consumers who are now more conscious about their purchasing decisions, it is becoming more critical for smaller businesses and Small and Medium Industries (SMEs) to implement ESG practices⁸.

Research Aims

The research aims to extend research into ESG adoption amongst C&M industry players through their comparative ESG Ratings and ESG Disclosure Scores.

This research focuses on gauging companies' focus areas in implementing their respective ESG frameworks, which then indicates the materiality of each investment made. MCMC also seeks to identify the risks and challenges associated with ESG implementation and aims to provide guidelines to companies that have yet to embark on their ESG journey.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – **To identify the key challenges/risks** in the ESG and mitigation approaches;
- ii. RO2 – **To understand how licensees allocate spending across the three ESG pillars** and allocation rationale;
- iii. RO3 – **To analyse Licensees' ESG Ratings against ESG Disclosure Scores** and propose different measurement indices for each ESG pillar; and
- iv. RO4 – **To recommend an ESG adoption guide** for industries to determine priority areas and help identify best practices for adoption.

⁷ Tan Zhai Yun, Bursa Malaysia introduces mandatory ESG reporting platform for PLCs, *The Edge Malaysia*, 5 December 2023 accessed on 29 January 2024 at <<https://theedgemalaysia.com/node/692660>>

⁸ CIMB, *Sustainable Business Insights: Maximise your Business Potential Through ESG: A Guide For SME*, 26 June 2024 accessed on 29 January 2024 at <[28](https://www.cimb.com.my/en/business/business-insights/sustainable-business-insights/esg-for-sme-sustainable-business.html#:~:text=ESG%20practices%20can%20improve%20your%20company%27s%20reputation%20helping,more%20likely%20to%20support%20businesses%20that%20prioritise%20ESG.>></p></div><div data-bbox=)

DCC-3 – Sentiment and Behavioural Exploration of Social Media Users on Radio Frequency Electromagnetic Fields (RF-EMF) Emission-related Contents

- A. Research Field: Communications and Multimedia (C&M) Users' Risks and Potential Harm.
- B. Research Focus: Social Media Users' Sentiments and Behaviours towards Radio Frequency Electromagnetic Fields (RF-EMF) emission-related contents.
- C. Research Sponsor: Technology Development Department, Technology and Standards Division.
- D. Contact person for queries on this research area:
 - i. Mr. Mohd Shamsul Izuan Che Musa, Assistant Director, Technology Development Department, shamsul.musa@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap area of end-user perception and understanding of the risks and potential harm of RF-EMF and recommendations on communications approaches.
- F. The research targets Malaysian social media users.

Research Problem/Context

Statista estimates that at the end of 2024, there will be 17.08 billion connected devices, which will double to 29.42 devices by 2030.⁹ This massive number of devices reflects the increasing prevalence of Radio Frequency Electromagnetic Field (RF-EMF) emissions from modern communication technologies. This will also lead to the spread of social media usage and the availability of RF-EMF content from multiple information sources on multiple platforms.

The interplay between RF-EMF exposure, its related contents, users' sentiments & perceptions, public discourse and other associated behaviours has widespread implications in the field of public health and in developing communication approaches.

Ultimately, in exploring these correlations, the findings shall be the basis for improved stakeholder engagements and information campaigns and bolstering public and media RF-EMF savviness.

⁹ Lionel Sujay Vailshery, Number of IoT connected devices worldwide 2019-2023, with forecasts to 2030, *Statista*, 27 July 2023 accessed on 29 January 2024 at < <https://www.statista.com/statistics/1183457/iot-connected-devices-worldwide/>>

Research Aims

This study aims to explore social media users' behavioural patterns and responses to social media content in relation to RF-EMF emissions, investigating the potential associations between exposure levels and various aspects of online behaviour.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – **To identify and list the types of RF-EMF content available** on social media platforms and the **users' content preferences**;
- ii. RO2 – **To identify and analyse the trend of current and potential responses to each content type and preference** (including types of discussion, information sources, information formats and other identified variables);
- iii. RO3 – **To identify and study the correlations between types of contents, preferences, sentiments and perceptions** (including well-being, stress & anxiety levels and overall satisfaction with communications & multimedia services); and
- iv. RO4 – **To recommend in detail communications approaches and strategies** for instilling/increasing awareness at targeted demographics (including personas such as work-at-home spouses, digital workers/students, and rural entrepreneurs).

DI-1 – Analysis of Consumer Behaviour on 5G Adoption in Malaysia

- A. Research Field: Malaysian Communications and Multimedia (C&M) consumer behaviours.
- B. Research Focus: Analysis of consumer behaviours related to 5G adoption.
- C. Research Sponsor: Market Intelligence Department, Industry Research and Data Analytics Division.
- D. Contact persons for queries on this research area:
 - i. Mr. Nor Faiz Razali, Deputy Director, Market Intelligence Department, norfaiz.razali@mcmc.gov.my
 - ii. Ms. Nur Syahirah Ramlee, Assistant Director, Market Intelligence Department, nursyahirah.ramlee@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap area of consumer behaviours pertaining to the adoption and uptake of 5G services.
- F. The research targets the following groups¹⁰:
 - i. Network service providers¹¹;
 - ii. Applications service providers¹²; and
 - iii. Mobile subscribers¹³.

Research Problem/Context

In line with the 12th Malaysia Plan, MyDIGITAL Blueprint and *Pelan Jalinan Digital Negara* (JENDELA), 5G is identified as an important facilitator in digitalisation. The 5G network implementation in the country is being actively conducted by *Digital Nasional Berhad* (DNB), and the government targets completing 7,509 5G sites covering 80 per cent of populated areas nationwide by 2023.

¹⁰ Respondents' organisations and identities are to be kept in the strictest confidence, and responses will be anonymised.

¹¹ Network Service Providers – provide the basic connectivity and bandwidth to support a variety of applications. Network services enable connectivity or transport between different networks. A network service provider usually owns or deploys the said network facilities. However, a licensee providing connectivity services may use the network facilities owned by another licensee.

¹² Applications Service Providers – provide particular functions such as voice services, data services, Internet access and electronic commerce. Applications services are essentially the functions or capabilities; which are delivered to end-users.

¹³ Mobile users include all mobile users including those using 2G, 4G and 5G devices and networks.

As the 5G supply-side requirements are being met and coverage is growing, it remains to be seen if user demand growth can grow apace. As of October 2023, 3.6 million 5G service subscriptions correspond to 10.8 per cent of the Malaysian population¹⁴.

It is imperative that the 5G demand catches up with the supply side to ensure that 5G services are able to be adequately monetised and sustainable moving forward. To that end, it is important to understand 5G consumer behaviour and the factors promoting and hindering adoption and provide actionable research findings relevant to ensuring 5G consumer take-ups.

Research Aims

The research aims to gauge the take-up rate of 5G in Malaysia, particularly on the type of usage and consumer experience. In addressing 5G take-up, the research wishes to discover the pre-existing 4G subscribers' willingness to upgrade to 5G networks and devices.

The research also addresses the consumer behaviour of those with 5G subscriptions to better understand their 5G network usage patterns and gain insights into their underlying motivations and perceptions related to user experience, satisfaction, affordability and usefulness.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – **To identify factors contributing to** and hindering **5G** consumer **take-up/subscription**;
- ii. RO2 – **To understand users' motivations and willingness** to take up **5G subscriptions** and for existing subscribers to migrate up to 5G subscriptions from 4G subscriptions:
 - a. *RQ1: To understand user preferences on 5G service bundling, data packages/speed, pricing tiers, and 5G service plus device packages; and*
 - b. *RQ2: To gauge future spending behaviour on 5G subscriptions (for example, when they anticipate subscribing to 5G networks and their planned device and monthly network subscription expenditures).*

¹⁴ Editor, 5G Subscribers Touch 3.6 Million, *Business Today*, 28 November 2023 accessed on 24 January 2024 at < <https://www.businesstoday.com.my/2023/11/28/5g-subscribers-touch-3-6-million/>>

- iii. **RO3 – To understand subscribers' 5G mobile data usage and consumption** of different contents (for example, time and pattern of usage for video streaming, online shopping, e-government, e-commerce/entrepreneurial activities, social media, mobile gaming, knowledge acquisition and others);
- iv. **RO4 – To measure 5G consumers' user experiences, satisfaction, and gaps** (for example, 4G vs 5G user experiences on speed and coverage); and
- v. **RO5 – To recommend the main factors impacting 5G consumer take-up** according to user personas or demographic categories (for example, by university students in their 20s, office worker age, digital nomad/consultant, and so on).

DI-2 – Free-To-Air Channel: Uses, Motivations and Gratifications in the Southern Region of Peninsular Malaysia

- A. Research Field: Addressing the digital divide by delivering inclusive digital services.
- B. Research Focus: Indicator of acceptance and adoption of digital television technology within the Southern region of Peninsular Malaysia.
- C. Research Sponsor: Broadcast Industry Development Department, Industry Digital Ecosystem Development Division.
- D. Contact person for queries on this research area:
 - i. Mr. Tham Yoong Cheong, Director II, Broadcasting Industry Development Department, yctham@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap areas pertaining to the state of adoption of Free-To-Air (FTA) television platforms and channels amongst Malaysian users located throughout the Southern region of Peninsular Malaysia.
- F. The research targets the following groups (for this research, users comprise both FTA viewers and potential Small to Medium Enterprises (SMEs) advertisers):
 - i. FTA viewers in Johor;
 - ii. FTA viewers in Melaka; and
 - iii. SMEs in the Southern region (to provide input on regional content and advertisement on FTA TV at an affordable price).

Research Problem/Context

In line with Malaysia's National Digitalisation Broadcasting Project, MCMC completed the Analogue Switch-Off (ASO) of terrestrial FTA broadcasts on 31 October 2019, with all Malaysian television broadcasts switched to digital TV (DTV) using the DVBT-2 digital format. The switch to DTV is accompanied by various benefits, including superior image resolution, enhanced audio quality, HD television, and the potential for interactive services. Additionally, DTV offers a broader range of channels compared to analogue terrestrial TV, enabling the delivery of targeted regional content through regional broadcasts.

MCMC would like to attain information on FTA TV viewership on digital TV platforms, which is important for us to gauge the connectivity of digital TV among the audience and to narrow the country's digital divide between urban and remote areas, allowing equal access to information with TV broadcasting services.

MCMC has entered research collaborations for television uses, motivation and gratifications of users in Sabah (2021), Sarawak and the East Coast region (2023) and is currently conducting research in the Northern region, scheduled for completion in 2024. MCMC would now like to expand the research to the Southern region comprising the states of Johor and Melaka.

The new research is expected to identify and investigate the motivational factors for audiences to access digital TV in the Southern region. The study will also identify the motivational factors impacting potential regional advertising spending and the preferences of potential advertisers operating in the region.

The findings gained on user preferences and behaviours in the Southern region will provide inputs to MCMC and broadcasters in the areas of broadcasting development and content provisioning. The research results will also provide useful indicators of audience and advertisers' receptivity to the potential of future regional broadcasting and targeted content by region.

Research Aims

The research is expected to explore and investigate the issues, capture the main features of FTA channels' viewers, and provide a market context and perspective. The outcome should facilitate a better understanding of consumption patterns and motivations behind using FTA channels in the Southern region of Peninsular Malaysia. In relation to the potential provisioning of specific regional content, the research findings are also expected to gauge the audiences' preference for targeted content by region.

The research results will provide inputs on the following (for this research, users comprise both FTA viewers and potential SME advertisers):

- i. Users' preference for FTA TV broadcasting services;
- ii. Users' FTA content preference;
- iii. Users' experience and perception of DTV connectivity;
- iv. Users' spending behaviours of disposable income in relation to television advertising; and
- v. SMEs' receptivity to regional advertising spending.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. **RO1 – To identify the usage pattern** of FTA TV among the audience in the Southern region:
 - a. *RQ1: To understand the factors contributing to Set-Top-Box (STB) ownership and usage;*
 - b. *RQ2: To identify the motivational factors of FTA TV users; and*
 - c. *RQ3: To understand the receptivity and acceptance of FTA TV users to regional programmes/local dialect/local-specific content.*

- ii. **RO2 – To identify the gratification level** of FTA TV among audiences in the Southern region:
 - a. *RQ 1: To understand user preferences and appreciation towards having Southern local dialect/local-specific content on FTA TV.*

- iii. **RO3 – To identify the demographic profile of the audience and content preference:**
 - a. *RQ1: To examine the relationship between usage patterns, motivational factors, and gratification level of FTA TV;*
 - b. *RQ2: To examine FTA TV user spending patterns with respect to their disposable income; and*
 - c. *RQ3: To examine FTA TV user spending patterns in relation to advertising on different types of FTA TV channels (i.e. national vs regional content).*

- iv. **RO4 – To identify the advertising potentials** from the perspectives of FTA Users (Audience and SMEs); and

- v. **RO5 – To provide general recommendations to promote FTA TV viewership** and positive responses to content and advertising amongst users.

DI-3 – A Study on the Marketability and Preparedness of Agriculture Technical Vocational Education and Training (ATVET)

- A. Research Field: Industry Development via Digital Enablement.
- B. Research Focus: Agricultural Sector Digitalisation and Competency Building.
- C. Research Sponsor: Industry Development Sector, Stakeholder Digital Enablement Division.
- D. Contact person for queries on this research area:
 - i. Mr. Vignesh R. Puvanesuaran, Director II, Industry Development Sector, vignesh.puvanesuaran@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements of Technical Vocational Education and Training programmes for competency-building targeted at the agriculture sector relevant to ongoing digitalisation and automation efforts.
- F. The research targets the following groups:
 - i. **Agriculture Technical Vocational Education and Training (ATVET) graduates:** These are the individuals whose marketability is being researched. Understanding their experiences, career aspirations, challenges, and skills will be crucial for formulating effective recommendations;
 - ii. **Agricultural industry employers:** These are the potential employers of ATVET graduates. Insights into their specific skill requirements, hiring practices, and perceptions of ATVET graduates will be vital for aligning training programmes with industry needs;
 - iii. **ATVET institutions and instructors:** Persons responsible for designing and delivering ATVET programmes. Their needs and perspectives regarding curriculum development, resource allocation, and industry collaboration will be vital to improving programme effectiveness;
 - iv. **Non-ATVET institutions and instructors:** Persons who are responsible for designing and delivering agriculture-related non-ATVET certificates, diplomas or degree programmes at Higher Educational Institutions (HEIs), and their perspectives on meeting industry requirements and possible niche or specialist roles to be played by both ATVET and Non-TVET institutions; and
 - v. **Government agencies:** This includes agriculture, education, and workforce development ministries. Providing them with research-based evidence can inform policy decisions and resource allocation for ATVET programmes.

Research Problem/Context

According to Rais Hussin of Emir Research, "Malaysia's food security issues continue to be a ticking time as the food crisis that already has caused inflationary pressure worldwide appears to be only brewing."¹⁵ The author advocates for prioritising a shortened national Food Supply Chain (FSC) leveraging digitalisation and automation to ensure a 4IR-enabled agriculture sector can contribute to enhanced food security.

To bring about this desired change, the development of Malaysia's agriculture sector is targeted in both the 12th Malaysia Plan¹⁶ (RMK-12) and the National Agrofood Policy 2.0 (NAP 2.0) (*Pelan Tindakan Dasar Agromakanan Negara 2021-2030 - DAN 2.0*).¹⁷ Both documents highlight the skills element required to achieve this target, with RMK-12 emphasising the role of Technical Vocational Education and Training programmes to escalate up the value chain and NAP 2.0 stressing the need to forecast demand and develop a better-skilled workforce for the agrofood sector.

In bridging the competency addressing Malaysian's Agricultural Sector Needs, numerous Institutes of Agriculture under the Department of Agriculture (DOA) through the Malaysian Agricultural Skills Training Programme (*Program Latihan Kemahiran Pertanian Kebangsaan - PLKPK*) produce ATVET graduates.

Presently, however, a concerning misalignment persists between the skills offered by ATVET graduates and the specialised demands of industry leaders. This mismatch undermines both the immediate marketability of ATVET graduates, hindering their seamless transition into the workforce, and the long-term competitiveness of the agricultural sector in achieving its projected contributions to national food security and economic growth.

Research Aims

The research aims to analyse existing ATVET programmes and elicit insights from industry leaders to decipher crucial skill gaps in digitalisation, advanced technologies, and precision agriculture. The research results will provide inputs to formulate actionable recommendations for curriculum reforms, upskilling opportunities, and policy adjustments.

¹⁵ Rais Hussin, Malaysian Food Security: Building Holistic Farm-to-Table Food Supply Chain

¹⁶ Economic Planning Unit, 12th Malaysia Plan, *Ministry of Economy*, 16 July 2021 accessed on 31 January 2024 at

<https://rmke12.ekonomi.gov.my/file/download/2021092722_twelfth_malaysia_plan.pdf?path=fileUpload/2021/09/2021092722_twelfth_malaysia_plan.pdf&name=Twelfth%20Plan%20Document.pdf>

¹⁷ Bahagian Dasar dan Perancangan Strategik, Ringkasan Eksekutif Dasar Agromakanan Negara 2.0 2021-2030: Pemodenan Agromakanan Menjamin Masa Depan Negara, *Kementerian Pertanian dan Industri Makanan*, 24 October 2021, accessed on 30 January 2024 at <<https://www.pmo.gov.my/wp-content/uploads/2022/02/Ringkasan-Eksekutif-Dasar-Agromakanan-Negara-2.0-2021-2030.pdf>>

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – **To conduct a comprehensive stocktake of agriculture programme offerings** and suitability to address 4IR's digitalisation, automation, and modernisation agenda:
 - a. *RQ1: Overview of ATVET programme offerings;*
 - b. *RQ2: Overview of non-ATVET agriculture-related short programme offerings; and*
 - c. *RQ3: Overview of agriculture-related non-ATVET diploma and degree programmes.*

- ii. RO2 – **To evaluate the efficacy of existing ATVET programmes** in equipping graduates with the necessary skills, knowledge, and entrepreneurial competencies for employability and work readiness in agriculture:
 - a. *RQ1: To study employer perception/biases on skills and ATVET programme gaps;*
 - b. *RQ2: To study graduate perceptions/job-seeking experiences and perspectives;*
 - c. *RQ3: To study governmental/policy perspectives; and*
 - d. *RQ4: To study ATVET providers and faculty perspectives.*

- iii. RO3 – **To assess the factors hindering the successful integration of ATVET graduates into** the increasingly modern/digitalised **Malaysian agricultural workforce**; and

- iv. RO4 – **To formulate recommendations for curriculum improvements, industry-academia partnerships, and career guidance initiatives** aimed at aligning ATVET programmes with real-world demands and ensuring the successful integration of graduates into the thriving agricultural landscape.

DI-4 – Recommendations for the Improvement of the Methodology and Data Used to Calculate the Percentage of Malaysia's Internet Coverage in Populated Areas

- A. Research Field: Communications and Multimedia (C&M) network planning and monitoring.
- B. Research Focus: Methodology and population data used to calculate Internet coverage in populated areas.
- C. Research Sponsor: Mobile Network Planning Department, Digital Infrastructure Planning Division.
- D. Contact person for queries on this research area:
 - i. Mr. Mohd Nazrul Anuar, Assistant Director, Mobile Network Planning Department, nazrul.anuar@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the population gap areas of validation and improvements to network coverage measurement methodology for populated areas.
- F. The research targets the following groups:
 - i. **Stakeholders involved in communications infrastructure planning and monitoring:** Parties include policymakers, urban planners, service providers and researchers involved in digital infrastructure development and population studies; and
 - ii. **Population data providers:** The organisations that collect population data and maintain population databases.

Research Problem/Context

The percentage of Internet coverage is one of the key targets under the JENDELA, and the target is to achieve 100 per cent Internet coverage in populated areas by 2025. The Mobile Network Planning Department (MNPDP) is responsible for calculating the percentage for the reporting. Meanwhile, MNPDP faces challenges in validating accurate measurements for Internet coverage in populated areas and planning for the remaining 3 per cent of the nation without network coverage.

Currently, measurements have been calculated using a population database, which we obtain from various sources, including DOSM and third-party map providers. Population data from these providers differs based on how it is collected, the frequency with which it is collected, the geographic definition of population data boundaries (enumeration block boundaries vs polygon/granular

boundaries), age and recency of data (real-time vs annual projections), among other factors.

Current methodology and population data have led to questions on the extent of measurement accuracy of Internet coverage percentage calculations in populated areas. Therefore, it is crucial to identify the most viable methodology and data to ensure accurate Internet coverage measurement in populated areas.

Research Aims

The research aims to identify the most accurate measurement methodology and data to be used to measure Internet coverage in populated areas precisely. Different technologies, such as mobile networks (4G, 5G), might require different methodologies compared to satellite technology (Starlink Internet service, Broadband Wireless Access (BWA), etc.)

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – **To identify best practices for measuring the percentage of Internet coverage** in populated areas. (The minimum acceptable benchmark would be against other countries' regulators or respective authorities in determining their method for measuring internet coverage in populated areas and how their methodologies align with International Telecommunication Union (ITU) standards);
- ii. RO2 – **To validate existing methodology** used in measuring the Internet coverage in populated areas and by different types of technology;
- iii. RO3 – **To analyse and validate the level of accuracy of the available Malaysian population data sources** by comparing the data sample with the actual number of populations on the ground; and
- iv. RO4 – **To recommend the most viable population data source and measurement methodology** to calculate Internet coverage in populated areas.

DI-5 – A Study on Public Higher Educational Institution Users' Broadband Services Quality of Experience and Adoption Factors

- A. Research Field: Communications and Multimedia (C&M) service delivery and user take-up.
- B. Research Focus: Broadband services, Quality of Experience (QoE) and adoption factors.
- C. Research Sponsor: Digital Infrastructure Data Management Department, Digital Infrastructure Planning Division.
- D. Contact person for queries on this research area:
 - i. Ms. Lim Yee Chih, Deputy Director, Digital Infrastructure Data Management Department, yylim@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements to broadband service provisioning and take-up.
- F. The research targets the following groups:
 - i. **Public Higher Educational Institution Administrators and Faculty:** This group comprises employees of public higher educational institutions who consume and/or subscribe to broadband services for work or personal purposes at their place of work, at home, or whilst travelling;
 - ii. **Public Higher Educational Institution Students:** This group comprises students currently enrolled at Public Universities and Tertiary Education Institutions who consume and/or subscribe to broadband services for work or personal purposes at their place of study, in dormitories, residences, at home or whilst they are travelling; and
 - iii. **Broadband service providers:** The companies that provide fixed and/or mobile broadband services available at public higher educational institutions.

Research Problem/Context

In today's digital age, Internet access is indispensable for effective learning access and delivery. The quality of Internet connectivity plays a pivotal role in enabling students and faculty to access information from anywhere. Unfortunately, disparities exist in the quality, affordability, and availability of broadband services, particularly in the surrounding areas of campuses where students and faculty from Public Higher Educational Institutions (PHEI) utilise broadband services.

Despite work and improvements by broadband providers, complaints persist from PHEI students and staff regarding the quality of broadband network services in the surrounding areas of these campuses. However, a lack of comprehensive data makes it difficult to fully grasp the specific issues and challenges faced by students and staff in the IPTA. Without this data, it is challenging to accurately assess the situation and take necessary actions to improve internet access in these vital educational spaces.

User perspective on levels of service quality is referred to as Quality of Experience (QoE) measurements and has been defined by the International Telecommunication Union (ITU) as "the overall acceptability of an application or service, as perceived subjectively by the end-user."¹⁸ "QoE is a measure used to help understand the individual experiences of actual users when interacting with an application or service. Thus, QoE takes the user's viewpoint while assessing the quality of a product or service. Most importantly, it aims to answer the question, "Did this product or service deliver a sufficient or good experience to end users, and to what extent?"¹⁹

Therefore, MCMC desires to understand PHEI users' broadband services' quality of experience and adoption factors.

Research Aims

The research aims to investigate and understand the extent to which students utilise various broadband services, including public Wi-Fi, fixed broadband, and mobile broadband, and to assess their overall satisfaction and user experience to identify potential areas for improvement and optimisation in providing broadband access to support their educational and personal needs.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. **RO1 – To assess PHEI users (faculty and students) QoE in utilising fixed and mobile broadband services** at PHEIs campuses and in surrounding areas (identified by location, i.e. administrative block, hostel, cafeteria, lecture theatres and surrounding area off-site student accommodations):
 - a. *RQ1: To identify user perspectives on coverage;*
 - b. *RQ2: To identify user perspectives on service quality;*

¹⁸ Rahul Awati, Quality of Experience (QoE or QoX), *Tech Target* accessed on 5 January 2024 at <<https://www.techtarget.com/searchcustomerexperience/definition/Quality-of-Experience-QoE-or-QoX>>

¹⁹ *ibid*

- c. RQ3: To identify user perspectives on service reliability; and*
 - d. RQ4: To identify user perspectives on service usability.*
- ii. **RO2 – To identify PHEI users’ preferences and usage (faculty and students):**
 - a. RQ1: To identify the types of services preferred (Public Wi-Fi, Fixed Broadband, Mobile Broadband); and*
 - b. RQ2: To identify how users are utilising services and indicators of associated connectivity requirements (upload and download speeds and data caps/quotas, etc.).*
- iii. **RO3 – To determine the correlation between the quality/availability of broadband services and users’ satisfaction** (i.e., university services, administrative work, overall teaching/learning experiences, etc.); and
- iv. **RO4 – To identify adoption factors and recommend potential service improvements and offerings** (e.g. the provisioning of campus-wide fibre broadbands).

DI-6 – An Investigation on the Role and Challenges of State Government and Local Authority (PBT) in Facilitating the Adoption of GPP-I and Gazettement of UBBL Amendment 2021

- A. Research Field: Communications and Multimedia (C&M) services provisioning.
- B. Research Focus: Facilitating factors for the adoption of *Garis Panduan Perancangan Infrastruktur Komunikasi* (GPP-I) by local government and gazettement of amendment to the Uniform Building By-Laws (1984) (UBBL) on the development of communications infrastructure.
- C. Research Sponsor: Infrastructure Strategic and Management Department, Digital Infrastructure Planning Division.
- D. Contact person for queries on this research area:
- i. Ms. Raihan Rahmat, Deputy Director, Infrastructure Strategic and Management Department, raihan.rahmat@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap areas of adoption and implementation of GPP-I and UBBL 1984 Amendment 2021 at state and local governments.
- F. The research targets the following groups:
- i. **State Government:** This group comprises states across Malaysia that are moving forward in adopting the UBBL (1984) amendments 2021 at the state level;
 - ii. **Local Government (*Pihak Berkuasa Tempatan* - PBT):** This group comprises 155 local authorities responsible for facilitating the development of communications infrastructure across Malaysia;
 - iii. **Network Facilities Providers (NFPs):** These companies are owners or providers of any network facilities such as satellite earth stations, broadband fibre optic cables, telecommunications lines and exchanges, radio-communications transmission equipment, mobile communications base stations, and broadcasting transmission towers and equipment. They are the fundamental building blocks of the convergence model upon which networks, applications, and content services are provided; and
 - iv. **Network Service Providers (NSPs):** These companies provide the basic connectivity and bandwidth to support various applications. Network service enables connectivity or transport between different networks. A network service provider is typically also the owner of the network facilities. However, these services may also be provided by a person using network facilities owned by another.

Research Problem/Context

Communications and broadband services play a vital role in our daily lives and in bolstering economic activities, as well as providing important consideration in ensuring the injection of domestic and foreign investments (domestic direct investments and foreign direct investments) throughout Malaysia.

To facilitate the development and roll-out of communications infrastructure, the government has also taken proactive steps to introduce the GPP-I to assist state and local governments. Additionally, through an amendment to the Uniform Building By-Laws (1984) (UBBL)²⁰, the status of communications services has now been designated as a public utility along with electricity and water.

The GPP-I and UBBL have been approved at the federal level. Despite this approval endorsement, there is still a lack of awareness and implementation by the state and local government authorities. This has impacted the rollout of communications infrastructure, leading to service provision delays. This research aims to investigate challenges faced by the state government and local authority in implementing GPP-I and gazetting the UBBL amendments 2021.

Research Aims

The research aims to investigate the role, issues and challenges of state government/local authorities (PBT) in facilitating the adoption of GPP-I and the gazettment of UBBL (amendment 2021).

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – **To identify the issues, challenges and experiences faced** in adopting GPP-I and the gazettment of UBBL (amendment 2021):
 - a. RQ1: *State Governments’ perspectives; and*
 - b. RQ2: *Local Governments’ perspectives.*

- ii. RO2 – **To identify the issues, challenges, and experiences in locations and states that** have implemented or not implemented GPP-I and UBBL (amendment 2021) and any combination thereof:
 - a. RQ1: *NFPs’ perspectives; and*
 - b. RQ2: *NSPs’ perspectives.*

- iii. RO3 – **To recommend prioritisation of successful factors facilitating State and Local Government adoption** of GPP-I and gazettment UBBL (amendment 2021).

²⁰ Amendment 2021, *Uniform Building By Law (1984)* p.10 accessed on 5 January 2024 at <<https://jkt.kpkt.gov.my/sites/default/files/2022-10/UKBS%201984%201C.pdf>>

DI-7 – A Study on the Feasibility of Ensuring Communications Service Readiness for New and Existing Development Areas

- A. Research Field: Communications and Multimedia (C&M) services provisioning.
- B. Research Focus: Feasibility of ensuring communications services for new and existing development areas in line with the reclassification of communication services as a public utility under the Uniform Building By-Laws (1984) (UBBL).
- C. Research Sponsor: Infrastructure Strategic and Management Department, Digital Infrastructure Planning Division.
- D. Contact person for queries on this research area:
- i. Mr. Mohd Hamizan Hashim, Assistant Director, Infrastructure Strategic and Management Department, hamizan.hashim@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements in ensuring communications service readiness for new and existing development areas.
- F. The research targets the following groups:
- i. **Property Developers:** This group comprises companies and agencies involved in developing new areas and ensuring the public utility service readiness in these areas;
 - ii. **Joint Management Bodies (JMB), Management Committees (MC) and Joint Management Committees (JMC):** This group comprises JMBs, MCs and JMBs serve to represent all strata unit owners and decide how to manage the strata development best;
 - iii. **Development Professional Practice Board:** This group comprises professional boards involved in property development, such as the Real Estate Housing Developers' Association (REHDA), *Lembaga Arkitek Malaysia* (LAM), *Lembaga Perancang Bandar Malaysia* (LPBM), *Lembaga Jurutera Malaysia* (LJM) etc.;
 - iv. **Local Government:** This group comprises 155 local authorities responsible for facilitating the development of communications infrastructure across Malaysia;
 - v. **Network Facilities Providers (NFPs):** These companies are owners or providers of any network facilities such as satellite earth stations, broadband fibre optic cables, telecommunications lines and exchanges, radio-communications transmission equipment, mobile communications base stations, and broadcasting transmission towers and equipment. They are the fundamental building blocks of the convergence model upon which networks, applications, and content services are provided; and

- vi. **Network Service Providers (NSPs):** These companies provide the basic connectivity and bandwidth to support various applications. Network service enables connectivity or transport between different networks. A network service provider is typically also the owner of the network facilities. However, these services may also be provided by a person using network facilities owned by another.

Research Problem/Context

A utility provider supplies communities with electricity, gas, water, or sewerage. In Malaysia, examples of these include *Tenaga Nasional Berhad* (TNB), Sabah Electricity Sendirian Berhad (SESB) and Sarawak Energy Berhad (SEB) and the respective state water authorities, such as *Pengurusan Air Selangor Sendirian Berhad* (Air Selangor) and *Syarikat Air Johor Sendirian Berhad* (SAJ).

Property and home buyers have a reasonable expectation that public utilities such as water and electricity are available for new and existing properties. The onus for ensuring the readiness of these public utilities lies upon the property developer, who works closely with the respective local authorities and utility companies.

After Amendment 2021 of the UBBL (1984)²¹, communication services have now been redesignated for inclusion as a public utility, and state governments across the Peninsular are at various stages of having these services gazetted under their respective states' legal frameworks.

Unlike other public utilities, which are usually delivered by a single entity (such as TNB for electricity in peninsular), competing entities provide network facilities and network services for communications. Thus, a company may provide infrastructure, but a different company might provide the end services to the users. Another dimension is ensuring the type of communications services which are being delivered. There are different requirements for both fixed and mobile connectivity.

Despite the availability of the *Garis Panduan Perancangan Infrastruktur Komunikasi* (GPP-I)²² to assist state governments and local governments in the development of communications infrastructure, implementation problems persist. The different permutations of companies providing infrastructure, different types of services and business considerations for rollouts in new areas pose issues for planning and deploying communications services.

²¹ Amendment 2021, Uniform Building By Law (1984) p.10 accessed on 7 January 2024 at <<https://jkt.kpkt.gov.my/sites/default/files/2022-10/UKBS%201984%201C.pdf>>

²² Garis Panduan Perancangan – Infrastruktur Komunikasi, Malaysian Communications and Multimedia Malaysia, 30 November 2022 accessed on 5 January at <<https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/Garis-Panduan-Perancangan-Infrastruktur-Komunikasi-GPP-I.pdf>>

Unlike water and electricity which are available once a new owner has taken possession of the property, the availability of communications services usually lags behind other utilities. The waiting list for fixed and mobile services for new development areas can sometimes take months and involve various processes.

For example, where there is insufficient mobile coverage for a new development area, residents are polled by the JMC for their agreement to ensure that a majority of residents/homeowners support the installation of a communications tower at the development. With regards to fixed connectivity, an improvement area would be the availability of fixed broadband connectivity as soon as a property purchaser or renter takes possession of a property, as currently, the last mile services depend on the availability and different roll-out schedules of the different providers.

Essentially, the scenarios and examples above illustrate some of the challenges associated with treating communications as a public utility. In the meanwhile, MCMC and telcos continue to receive complaints due to the lack of communications services. These complaints are not limited to new properties but also include long-completed developments; for example, a given area might have mobile services; however, the availability of the services might differ given specific locations or types of services such as fixed broadband are not readily available or are only available to a limited number of residents.

In the public utility sphere, water and electricity are treated as mandatory requirements to be ready for service before issuing a Certificate of Completion and Compliance (CCC) by Local Authorities as stated in the Housing Development (Control and Licensing) Act, 1966 (Act 118)²³. Given the criticality of communications services and their wide-reaching social and economic implications, it is timely to holistically compile the issues that need to be addressed to ensure that the availability of communications services is on par with that of other utilities.

Research Aims

The research aims to investigate challenges faced by stakeholders in ensuring communications services possess the same levels of service availability as other public utilities. In addressing this complex task, MCMC seeks to compile workable and ethical solutions based on stakeholder feedback and considerations for industry-wide consideration and adoption.

²³ Housing Development (Control and Licensing) Act 1966 (Act 118), *Persatuan Kebangsaan Pembeli Rumah* accessed on 13 February 2024 at <[https://www.hba.org.my/laws/hda/2007/ACT118\(2007\).htm](https://www.hba.org.my/laws/hda/2007/ACT118(2007).htm)>

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – To identify the **issues, challenges, and experiences faced in ensuring the availability of communications services**:
 - a. *RQ1: Property Developers' perspectives;*
 - b. *RQ2: Local Governments' perspectives;*
 - c. *RQ3: NFPs' perspectives;*
 - d. *RQ4: NSPs' perspectives;*
 - e. *RQ5: Development Professional Practice Boards; and*
 - f. *RQ6: JMB, MC and JMC perspectives.*
- ii. RO2 – To **propose a hierarchy of critical considerations, approaches or methodologies and ranking rationale and justification** in considering the feasibility of communications services readiness; and
- iii. RO3 – To **recommend prioritisation** of potential considerations, approaches, or methodologies **to ensure the availability of communications services in new and existing developments.**

DI-8 – Streamlining Cashless Adoption in Malaysia: An Evaluation of MCMC's Cashless Society Programme Effectiveness and Impact

- A. Research Field: Communications and Multimedia (C&M) end-users digital enablement.
- B. Research Focus: Evaluation of MCMC Cashless Society Programme.
- C. Research Sponsor: Community and Digital Inclusion Division.
- D. Contact person for queries on this research area:
 - i. Mr. Mohd Hazwan Halmi, Director II, Community and Digital Inclusion Division, mdhazwan.halmi@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap areas of validation and improvements to the MCMC Cashless Society Programme.
- F. The research targets the following groups:
 - i. **Consumers:** This group comprises Communications and Multimedia end-users and are consumers who utilise cash and cashless payment methods in their financial transactions;
 - ii. **Merchants/traders:** This group comprises businesses and individuals engaged in commerce who accept cash and cashless payments for goods and services;
 - iii. **Digital payments and E-Wallet providers:** This group comprises companies providing digital payment and e-wallet platforms and services to Malaysian consumers; and
 - iv. **Fintech/cashless policymakers, regulators, and associations:** This group comprises agencies, organisations, and industries whose work in fintech is related to the policy, adoption, industry development and/or pursuit of tech advocacy and consumer protection related to Fintech and cashless adoption.

Research Problem/Context

According to a study by Visa²⁴ in 2021, “more than seven (7) in 10 Malaysians (74%) have tried going cashless over the past year. For those who had never tried going cashless, half (50%) said they are confident to live their daily lives without cash for up to a week more.”

The same report cites users’ motivations in adopting cashless bringing about added advantages including “curbing the spread of the virus (58%), providing users with the ability to track financial records easily (54%), lowering the risk of theft (52%), offering users a hassle-free experience, eliminating the need to queue at banks (52%), among others.”²⁵

The figures augur well for an increased adoption of cashless payments. In supporting this increased adoption, Malaysia's national blueprints, such as Ekonomi Madani, MyDIGITAL, and the Financial Sector Blueprint 2022-2026, through their strategic thrusts, collectively emphasise the importance of adopting cashless transactions as a contributing factor in the realisation of aspirations of for the digital economy's anticipated contribution to 25.5 per cent of GDP by 2025.

This has spurred numerous cashless initiatives across various government agencies, including Bank Negara Malaysia (e-Duit programme), the Malaysian Communications and Multimedia Commission (MCMC) (Cashless Society Programme), and the Ministry of Domestic Trade and Consumer Affairs (KPDN) through the Retail Digitalisation Initiative (REDI), as well as state governments (i.e., Kedah Cashless, Cashless Melaka, PahangGo).

MCMC’s Industry Development Sector (IDS) has introduced the Cashless Society Framework under The MCMC Cashless Society Programme (CSP). This framework encourages cashless adoption among consumers and merchants in Malaysia. It aims to establish a sustainable and thriving informed cashless society within local communities, encompassing both the retail and wholesale segments.

The framework is guided by four (4) key pillars: Digital Literacy, Security & Safety, Income Opportunity, and Capacity Building. The success factor of this framework is assessed by the number of community touchpoints that are digital-ready through the implementation of the aforementioned pillars, the number of cashless payments transacted, and the number of traders on-boarded on digital platforms.

The CSP pursues its objectives via a two-pronged approach comprising “policy intervention” and “awareness & promotion.”

²⁴ Majority of Malaysians can go without cash for more than a week as digital payment usage increases – Visa Study, Visa, 13 January 2024 accessed on 7 February 2024 at <<https://www.visa.com.my/about-visa/newsroom/press-releases/majority-of-malaysians-can-go-without-cash-for-more-than-a-week-as-digital-payment-usage-increases-visa-study.html>>

²⁵ Ibid

Implementations of the CSP kicked off in 2023 and include work that will culminate in the release of the “*Melaka Mesra Berniaga*” guideline issued by the *Jabatan Ketua Menteri Melaka*. Article No.9 of the guideline encourages those wishing to renew business licenses in Melaka to ensure that customers are able to use cashless transactions at their respective businesses. In conjunction with this policy intervention, awareness & promotion of CSP were also conducted throughout the state.

With the respective state governments and key stakeholders, MCMC is scaling up the CSP in Johor, Negeri Sembilan and Pahang states.

Research Aims

As the nation moves towards a future economy based on cashless transactions, awareness and adoption of cashless transactions are crucial. The availability of various service providers provides options to consumers and traders; however, this may also create confusion, especially for those unfamiliar with the technology.

This research aims to comprehensively evaluate MCMC's Cashless Society Programme, assessing its alignment with national goals and other similar initiatives by other agencies, its impact on target groups, and its contribution to bridging the digital divide. This research will also investigate the effectiveness of various cashless initiatives among agencies in Malaysia and identify other potential collaborations and other benefits that may be obtained from these initiatives.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. **RO1 – To analyse CSP implementation and effectiveness** (Examine the programme’s policy interventions, awareness and promotion campaigns, state, agencies, and strategic partners selection, and assess its impact on key stakeholders such as users, traders and its supply chain within the wholesale and retail sector);
- ii. **RO2 – To evaluate CSP alignment and contribution** (Assess the programme's alignment with national cashless society strategies and its contribution to national blueprints such as Ekonomi Madani Framework, MyDIGITAL, etc., focusing on specific pillars relevant to digital inclusivity/digital economy);

- iii. **RO3 – To investigate CSP's impact in addressing the digital divide** (Analyse quantitative and qualitative data to understand the programme's impact on bridging the digital divide across access, literacy, usage, capacity, participation, and outcome gaps within various socioeconomic groups); and
- iv. **RO4 – To identify similar or potentially complementary programmes and recommend collaboration** (Analyse potential overlaps/ duplication or complimentary of MCMC's Cashless Society programme with other agencies' initiatives and propose strategies/recommendations for collaboration and streamlining efforts to maximise effectiveness and minimise redundancy).

DI-9 – A Study of the Feasibility of Generative Artificial Intelligence (AI) and Large Language Model (LLM) Adoption to Enhance MCMC Knowledge Management Practices

- A. Research Field: MCMC digitalisation and digital enablement.
- B. Research Focus: Feasibility of MCMC adoption of Generative Artificial Intelligence (AI) Large Language Model (LLM) for enhanced knowledge management practices.
- C. Research Sponsor: Public Sector Development Department, Digital Ecosystem Development Division.
- D. Contact persons for queries on this research area:
 - i. Mr. Mohd Amir Syafiq Ab Halim, Deputy Director, Public Sector Development Department, amir.halim@mcmc.gov.my
 - ii. Ms. Norizan Ab Rahman, Deputy Director, Public Sector Development Department, norizan.rahman@mcmc.gov.my
 - iii. Mr. Muhammad Syafiq Norain, Assistant Director, Public Sector Development Department, syafiq.norain@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap areas of feasibility assessment of the adoption of Generative AI and LLM for MCMC’s knowledge management practices.
- F. The research targets the following groups:
 - i. **Malaysian Communications and Multimedia Commission (MCMC):** This group comprises targeted departments and divisions within MCMC that possess adequate data repositories for which the use of Generative AI and LLM may elicit strong digital dividends and potential benefits from digitalisation, automation and generative AI and LLM aided query-management, process-management and decision-making; and
 - ii. **Generative AI and LLM subject matter experts:** This group comprises experts from academia, industry or specialist Data Management providers who can provide inputs on adoption, best practices and risk management perspectives and experiences concerning the MCMC adoption feasibility of Generative AI and LLM.

Research Problem/Context

Though the terms generative Artificial Intelligence (generative AI) and Large Language Models (LLM) are sometimes used interchangeably, there are differences in what each term means, but there are also overlaps between the three terms.²⁶

Generative AI is a broad term for any AI system whose primary function is to generate content, thus it is different from other AI systems which perform other functions such as classifying data (e.g. assigning labels to images), grouping data (e.g. identifying consumer segmentation of those possessing similar buying behaviours) or choosing actions (e.g. steering an autonomous vehicle). Examples of generative AI include image generators (such as Midjourney), code generation tools (e.g. Copilot), audio generation tools (e.g. VALL-E), and also LLMs (such as GPT-4 PaLM and Claude).²⁷

LLMs such as GPT-4, PaLM and Claude are AI systems that work with language, with each LLM aiming to create a digital representation of a language (i.e. model) with thousands or even millions of parameters (hence the term large).²⁸

The above illustrates how generative AI is the broader concept of AI that can generate various types of new content. These include text or other media forms based on patterns and examples they have been trained on. On the other hand, LLMs are trained on vast amounts of text data and learn the statistical properties of language.²⁹

Therefore, both generative AI and LLMs offer a promising alternative for reshaping data management and insight extraction. However, incorporating either into current data knowledge management raises several complicated issues. Organisations must adjust their methods to use the dynamic potential of generative AI (including LLM) in addressing issues in data synthesis, system learning, and effective knowledge extraction.

The implications for knowledge management extend far beyond just data sorting and traditional knowledge management. It involves creating systems that can learn, adapt, and offer up-to-date, accurate information, directly impacting the performance of AI models. The more refined and current the data these systems are fed, the more precise and valuable the insights they generate. The relationship between AI and knowledge management is not just enhancing how organisations manage and utilise information but also revolutionising it.

²⁶ Helen Turner, What Are Generative AI, Large Language Models, and Foundation Models? *Center for Security and Emerging Technology*, 12 May 2023 accessed on 8 February 2024 at <<https://cset.georgetown.edu/article/what-are-generative-ai-large-language-models-and-foundation-models/>>

²⁷ *ibid*

²⁸ *ibid*

²⁹ Generative AI vs. LLM, What is the big difference? *TechMobius*, 28 November 2023 accessed on 8 February 2024 at <<https://www.linkedin.com/pulse/generative-ai-vs-llm-what-big-difference-techmobius-6o6lc>>

The information or data obtained from Knowledge Management (KM) can enhance decision-making within our organisation. However, despite these efforts, integrating AI and knowledge management requires further exploration to unlock its full potential, revolutionising how organisations manage and utilise information.

The proposed research addresses these challenges by investigating optimal strategies for integrating generative AI and LLM capabilities into KM, contributing to the evolution of effective knowledge utilisation in the digital era.

Research Aims

The main purpose of this research project is to explore the feasibility of MCMC's adoption of generative AI and LLM capabilities with KM and to identify how its adoption would enhance our organisational decision-making. The overarching aim of the research is to provide inputs in the form of insights and methodologies which facilitate efficient utilisation, organisation, and extraction of knowledge from data, with the primary goal of advancing data management practices in the context of generative AI and LLM capabilities.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – **To analyse the current state of KM practices** via a literature review exploring existing methodologies and frameworks, focusing on generative AI and LLM capabilities application and integration;
- ii. RO2 – **To evaluate the feasibility of current or future adoption of generative AI and LLM in the context of MCMC's KM processes and procedures;**
- iii. RO3 – **To conduct a SWOT analysis on the potential MCMC organisational impact** (with a particular focus on the impact of optimisation and efficiency and accuracy of generative AI and LLM adoption);
- iv. RO4 – **To evaluate the suitability of a KM framework to measure and monitor improvements** in data synthesis, organisation and knowledge extraction; and
- v. RO5 – Where appropriate for adoption **to make recommendations as to the requirements which need to be put in place for generative AI and LLM adoption in MCMC.**

DI-10 – Impact Study on the Effectiveness of Cloud-Based Productivity Tools amongst Organisations within the Communications and Multimedia Industry

- A. Research Field: Communications and Multimedia (C&M) industry digitalisation and digital enablement.
- B. Research Focus: Impact study of cloud-based productivity adoption within the C&M industry.
- C. Research Sponsor: IT Services Management Department, Information Technology Division.
- D. Contact person for queries on this research area:
- i. Mr. Mohd Faizulhayad Mashuri, Deputy Director, IT Services Management Department, faizulhayad.mashuri@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap areas of the adoption of cloud-based productivity tools amongst organisations within the Communications and Multimedia Industry.
- F. The research targets the following groups:
- i. **C&M industry:** This group comprises industry players that are transitioning to and/or have adopted cloud-based productivity tools. The researcher is requested to include representatives from the following samples where possible:
 - a. **Telecommunications companies** (Network Facilities Providers, Network Service Providers);
 - b. **Broadcasting companies** (Content Application Service Providers).
 - c. **Application service providers** (Business entities that provide particular functions such as voice services, data services, content-based services, electronic commerce, and transmission services);
 - d. **Postal and Courier companies** (Pos Malaysia and Courier Service Providers); and
 - e. **Digital Signature certification authorities** (Pos Digicert Sendirian Berhad, MSC Trustgate.Com Sendirian Berhad, TM Technology Services Sendirian Berhad and Raffcomm Technologies Sendirian Berhad).
 - ii. **Cloud computing subject matter experts:** This group comprises experts from academia, industry or cloud-computing vendors who can provide inputs on adoption, best practices and risk management perspectives and experiences; and

- iii. **Malaysian Communications and Multimedia Commission (MCMC):**
This group comprises identified departments and divisions within MCMC that are transitioning and/or those that have adopted cloud-based productivity tools. (Data derived from this group will be for MCMC internal use and reference only).

Research Problem/Context

Cloud computing has transformed the way organisations deploy and manage IT services. It has made it possible for organisations to implement improved IT services at lower expenses and less investment.³⁰ One of the inherent advantages of these cloud services is that these on-demand network-enabled services offer scalable, guaranteed, customisable, relatively affordable services which can be accessed in an easy-to-use manner.³¹

In a 2020 study conducted by Haniyi et al. investigating the impact of cloud computing on Jordan telecom operators, there was a statistically significant impact of using cloud computing technologies on organisational effectiveness (e.g. achieving goals, productivity, and adapting to the work environment).³²

In the Malaysian context, the Malaysian Investment Development Authority (MIDA) announced that a major cloud provider plans to invest over RM25.5 billion over 15 years to establish a new infrastructure "region".³³ Despite its many advantages, transitioning to cloud-based services is not entirely straightforward. IT teams must consider factors like employees' resistance to change and disruptions to ongoing operations. Otherwise, companies will struggle to harness the cloud's full power.³⁴

As organisations ramp up cloud-based productivity tool adoptions to enhance collaboration, streamline workflow and improve productivity and efficiency, it is timely to investigate and assess the impact and effectiveness of these tools on organisations' work environments throughout the Malaysian C&M industry.

³⁰ Uzoma, Benneth & Okhuoya, Bonaventure, December 2022, *A Research on Cloud Computing*, accessed on 8 February 2024 at

<https://www.researchgate.net/publication/366320853_A_RESEARCH_ON_CLOUD_COMPUTING>

³¹ ibid

³² Abu Haniyi, Ahmad & FawziehMasa'd, & WassefHijazeen, Omar. (2020). Exploring the Impact of Cloud Computing on Organizational Effectiveness. Seybold Report. 15. 2464. Accessed on 8 February 2024 at <https://www.researchgate.net/publication/349368865_Exploring_the_Impact_of_cloud_Computing_on_Orga_nizational_Effectiveness>

³³ Simon Ma, To thrive in the digital-first era, cloud needs to be the cornerstone of business practices, *The Edge*, 4 December 2023 accessed on 8 February 2024 at <<https://theedgemalaysia.com/node/692494>>

³⁴ ibid

Research Aims

The main purpose of this research project is to identify gaps and provide recommendations for organisations to optimise the use of cloud-based productivity tools to maximise productivity and efficiency.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 - **To determine the take-up of cloud-based productivity tools** amongst organisations within the Communications and Multimedia industry;
- ii. RO2 - **To identify to what extent the cloud-based productivity tools contribute to organisational efficiency, employee collaboration and productivity** and overall work performance and satisfaction; and
- iii. RO3 - **To identify the factors** influencing these tools' **successful implementation and sustained usage.**

DI-11 – Considerations for a Conceptual Framework on Technical Vocational Education and Training Adoption of the Metaverse for Communications and Multimedia Capacity Development

- A. Research Field: Communications and Multimedia (C&M) industry capacity development.
- B. Research Focus: Considerations for conceptual framework on C&M Technical Vocational Education and Training (TVET) adoption of the metaverse.
- C. Research Sponsor: Capacity Development Centre, MCMC Academy.
- D. Contact person for queries on this research area:
- i. Ms. Dayang Aidah Awang Piut, Deputy Director, Capacity Development Centre, MCMC Academy, dayang.aidah@mcmc.gov.my
- E. The research falls within the Guided Research Category. It addresses the gap areas of the adoption of Metaverse for TVET programmes for communications and multimedia capacity development.
- F. The research targets the following groups:
- i. **Potential TVET students:** This group comprises potential TVET from the following targeted groups:
 - a. **Students who have completed 3rd form school education, aged between 16 to 21** (Age group eligible for entry into TVET Madani programmes);
 - b. **C&M working adults** (Existing workforce requiring and desiring to reskill and to upskill through the acquisition of TVET certifications); and
 - c. **Adults situated at or near *Pusat Ekonomi Digital Keluarga Malaysia (PEDI)* communities** (Potential students from B40 and M40 backgrounds who are considering acquiring TVET certifications).
 - ii. **TVET service providers and institutions:** This group comprises management and faculty responsible for planning and/or implementation of TVET programmes; and
 - iii. **C&M industry:** This group comprises industry human resources and training personnel planning to or are providing staff with TVET training programmes.

Research Problem/Context

The 4th Industrial Revolution witnessed the rapid integration of new smart technology, pushing traditional jobs into the digital age while creating new job roles to meet labour market demand for workers to be proficient in multiple disciplines. This has accelerated the demand for a highly trained and digitally savvy workforce.

Nevertheless, the Department of Statistics (DOSM), Malaysia, reported that for 2022, the number of jobs in the semi-skilled category remained relatively unchanged at 58 per cent, followed by highly-skilled jobs at 30 per cent and unskilled jobs at 12 per cent.³⁵ For Malaysia to remain competitive and escalate up the value chain, it needs to increase the number of highly skilled workers to more than 45 per cent by 2030.³⁶

Hence, under the Vocational Education Transformation Plan introduced in 2012 and the RMK-12, the Government recognises TVET as part of the mainstream education in the country. TVET plays an important role in bridging the talent gap within the industrial sector. Furthermore, a recent Auditor General's Report shows that current employer satisfaction with TVET graduates' outcomes is 88.5 per cent.

As such, the government has allocated RM6.8 billion this year to empower the country's TVET industry to produce more skilled and future-resilient TVET graduates, which would help Malaysia realise its aspiration to become a fully industrialised developed country.³⁷

Nevertheless, Malaysia exhibits a low TVET enrollment rate, possibly due to negative perceptions and misconceptions about the quality of TVET education, fragmented governance, insufficient infrastructure, and lack of reforms. A recent study identified the main issues and challenges in Malaysia; the governance of TVET, the soft skills of graduates, competencies of teaching staff and perceptions towards TVET.³⁸

Furthermore, in considering the development of TVET programmes, MCMC also wishes to explore the potential delivery of programmes utilising innovative Metaverse approaches. Globally, experts predict a 43.76 per cent CAGR growth (from USD1.9 billion in 2023 to forecasted USD24.7 billion in 2030) in the

³⁵ Bernama syndicated news, Sivakumar: Minimum wage order review takes into account socioeconomic indicators, *The Sun* accessed on 5 February at <https://thesun.my/local_news/sivakumar-minimum-wage-order-review-takes-into-account-socioeconomic-indicators-IH11702903>

³⁶ *ibid*

³⁷ Bernama, Budget 2024: RM6.8 Billion For TVET, Local Talent Development, *Ministry of Finance* 13 October 2023, accessed on 9 February 2024 at <Budget 2024: RM6.8 Billion For TVET, Local Talent Development>

³⁸ Bassah, Nur'Adnin Syamim Halik, The issues and challenges of TVET in Malaysia: from the perspective of industry experts, *TVET@asia – The Online Journal for Technical and Vocational Education and Training in Asia*, 6 February 2022 accessed on 9 February 2024 at <https://tvvet-online.asia/18/the-issues-and-challenges-of-tvet-in-malaysia-perspective-of-industry-experts/>>

metaverse education market during the 2023-2030 period.³⁹ This surge can be attributed to the unique benefits of multiverse training, including providing “an immersive, interactive platform that transcends traditional learning boundaries, offering a dynamic and engaging experience.”⁴⁰

MCMC, through MCMC Academy, is highly dedicated to facilitating the national goal of augmenting the number of skilled local workforce, mainly in the C&M industry, that can contribute to the advancement of the country as a developed nation and high-income economy.

Research Aims

The increasing availability of 5G networks and devices in the country is anticipated to stimulate innovation and foster growth across industries and sectors. Thus, this study will aid MCMC in establishing a digital talent ecosystem for the C&M industry that can drive technology-led industries and innovation through the utilisation of disruptive technologies via the continuous improvement of Malaysia's comprehensive TVET framework.

Research Objectives

Researchers are invited to submit proposals guided by the following overarching Research Objectives (ROs) (Researchers are to develop and propose suitable Research Questions (RQs) supporting each RO):

- i. RO1 – **To identify challenges faced** by the institutions **in developing the TVET Metaverse curricula**;
- ii. RO2 – **To identify the TVET demand** among the C&M industry;
- iii. RO3 – **To assess the critical TVET skills and competencies** for the C&M industry;
- iv. RO4 – **To propose critical TVET courses** for Metaverse training delivery for the C&M industry; and
- v. RO5 – **To propose a TVET Metaverse conceptual framework** for capacity development programmes for the C&M industry.

³⁹ Sudeep Srivastava, Metaverse in Training: Top 7 Use Cases and Benefits, *Appinventiv*, 30 November 2023 accessed on 7 February 2024 at <<https://appinventiv.com/blog/metaverse-in-training/>>

⁴⁰ *ibid*