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MALAYSIAN COMMUNICATIONS AND MULTIMEDIA COMMISSION, 2023

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ABOUT

Digital Society Research Grant

The Digital Society Research Grant (DSRG) was conceived to contribute towards the enhancement of information resources that are necessary and in line with changing community expectations as we navigate the transition towards a sustainable digital civil society. 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 segments of the population as the nation transitions towards being a fully digitally connected and informed society.

Malaysian Communications and Multimedia Commission

The Malaysian Communications and Multimedia Commission (MCMC) is a statutory body established under the Malaysian Communications and Multimedia Commission Act (MCMCA) 1998 which implements the government's national policy objectives for the communications and multimedia sector. MCMC regulates and develops the communications and multimedia industry, which includes telecommunications, broadcasting, online activities, postal services, and digital certification. The Communication and Multimedia Act (CMA) 1998 provides that MCMC undertakes the policy implementation role, while policy decision-making is vested with the Minister. MCMC also has the responsibility for postal services and digital certification under the Postal Services Act (PSA) 2012 and the Digital Signature Act (DSA) 1997.

MESSAGE FROM THE CHAIRMAN

“DIGITAL LITERACY: THE KEY COMPETENCY THAT EVERYONE NEEDS”

**TAN SRI MOHAMAD SALIM BIN
FATEH DIN**

Chairman



Digital literacy has progressively become a key competency in the 21st century’s economic and social setting. The requirement for this competency has become exceedingly clear in the wake of the COVID-19 pandemic, where physical movement restrictions on a global level have heightened our dependency on digital technologies, thus forever changing the way we do things.

Beyond the provisioning of infrastructure and services facilitating digital technologies, MCMC is fully aware of the corresponding need for the Rakyat to be equipped with the right set of knowledge, skills, and confidence to harness the potential of digital tools effectively. In this regard, the Digital Society Research Grant was launched in June 2020 to encourage research in the fields of Digital Citizenship and Cyber Wellness (DCC) and Digital Inclusion (DI) to better comprehend and address the gaps and issues in reaching a digitally connected and informed society.

This year, I am pleased to introduce the fifth edition of Media Matters, a compilation of the findings and recommendations from 10 research projects that were awarded under the DSRG 2021, Cycle 1. The overarching theme of the studies conducted for this cycle was the impact of the COVID-19 pandemic, information security, privacy and personal data protection, and improvement in MCMC’s programmes and initiatives. The theme of these studies reflects our commitment to addressing the challenges and opportunities presented by the evolving media landscape.

MESSAGE FROM THE CHAIRMAN

There were three studies related to the COVID-19 pandemic: a study on Public Service Announcements to understand the public's information-seeking pattern during the pandemic, a study on psychological distress among women who are working from home and the role of social media, and a study conducted to explore the relationship between psychological flexibility and digital literacy.

Besides leveraging the pandemic to gain unique insights and data, Cycle 1 of DSRG 2021 awarded grants to studies related to policy and governance frameworks in relation to information security and personal data protection. The studies conducted were on the information security risks among SMEs as business activities move towards online platforms, the mapping of national plans and policies against the desired outcomes of the ASEAN Digital Masterplan 2025, a study on the security and privacy challenges of Big Data adoption, and research on developing a governance framework for the protection of personal data used in AI systems. We also took this opportunity to evaluate the effectiveness and impact of MCMC's in-house initiatives and programmes; research grants were awarded to studies focusing on the continuous

improvement of *Pusat Ekonomi Digital*, Malaysia ICT Volunteers, *Klik Dengan Bijak*, and the viewership pattern and adoption of myFreeview TV.

In line with MCMC's responsibility for economic and social regulation of the communications and multimedia sectors, the findings from these studies provide an evidence base to assist in developing policies, programmes, and interventions to encourage the inclusion and participation of all population segments in a digitally connected and informed society.

Finally, I would like to congratulate the researchers and all individuals involved in DSRG 2021, Cycle 1. Your dedication and hard work have contributed to the successful outcome of this cycle and I look forward to witnessing the continued success of our endeavours in future cycles.

Thank you.

**TAN SRI MOHAMAD SALIM BIN
FATEH DIN**

*Chairman
Malaysian Communications and
Multimedia Commission*

EXECUTIVE SUMMARY

Digital media literacy has become essential for society in a borderless and digitally connected world. The importance of being digitally competent has taken on greater importance since the COVID-19 pandemic when the world went into physical lockdown and many human-to-human interactions moved online. Beyond infrastructure and communication services, users must also have the necessary knowledge, mindset, and skills to ensure their effective use of digital media and communications technologies.

As a government agency mandated to regulate the country's communications and multimedia landscape, MCMC understands that periodic examinations of how society is coping with ever-changing digital developments are crucial in nurturing a digitally proficient society. Therefore, through the Digital Society Research Grant (DSRG), MCMC invited the submission of project proposals and engaged with researchers from local universities to study the developments taking place in the digital world where policies, governance, and technologies intersect, especially in the context of socio-behavioural norms that may have evolved due to the pandemic.

Impact of the Pandemic

During the pandemic, Public Service Announcements (PSAs) became a tool for the public to be kept abreast of the latest updates. A study was conducted on PSAs to evaluate the public's information-seeking behaviour and

found that communication gaps could be narrowed by ensuring PSAs were tailored according to targeted demographics. The results also demonstrated that PSAs can potentially serve a higher social purpose by enhancing the understanding of those unexposed to PSAs previously.

The next new norm that has come into immediate adoption is Working From Home (WFH). The study conducted on the practice of WFH assessed how social media helped women who were working from home cope with psychological distress, especially as they had to juggle work and family commitments simultaneously. The study found that social media was an outlet to assist many as they took to various platforms to openly express their feelings. Therefore, it was recommended that relevant parties form a centralised support system and establish fair WFH policies to better support working women in achieving a good state of mental health.

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Lastly, a study was performed on the relationship between psychological flexibility and digital literacy. Psychological flexibility, which refers to the ability to practically react to stimuli in a given setting, is an important element in achieving good digital media literacy. Therefore, it was recommended that psychological flexibility be introduced via digital media outlets to lighten the psychological and emotional stress caused by social isolation.

Development of Policy and Governance Frameworks in Relation to Information Security, Privacy, and Personal Data Protection

The need to develop effective policy and governance frameworks for important areas such as information security, privacy, and personal data protection, which are all critical components of a nation's digitalisation journey, continues to grow. In fact, one of the studies conducted found that Malaysia would benefit from the creation of a matrix that would map its national digital policies and plans to the ASEAN Digital Masterplan 2025 (ADM 2025) for better alignment and greater effectiveness of initiatives.

As more businesses go online, there remain significant information security risks, especially for Small and Medium Enterprises (SMEs) that may allocate resources to other priorities. A study

evaluated SME readiness to adopt technological enhancements to mitigate information security risks. It was found that to survive, SMEs needed to form strategies to optimise their information security practices, human capital capability, and technology to gain a competitive advantage.

With Big Data adoption becoming much more prevalent, a study was conducted to investigate security and privacy challenges for data users and data subjects in telecommunications services. Researchers conducted a comparative evaluation of codes of practice and standards utilised by local and international telecommunications providers. The outcome of the study, while not exhaustive, can serve as a guide for regulators, service providers, and stakeholders to create more secure Big Data systems and promote best security practices within the telecommunications industry.

Researchers also tackled the challenges in addressing data privacy risks in the deployment of artificial intelligence (AI) systems with machine learning capabilities in innumerable data-intensive sectors. The research proposed the creation of a robust data privacy governance framework to protect personal data used in the development of AI systems.

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Continuous Improvement of Programmes and Initiatives

In an era of emerging technologies and systems, manpower and skills are equally or more important for this digitalisation journey. The continuous improvement of education programmes and initiatives is a crucial process to ensure the relevance of information, proficiency, and skills among the public.

The government and its related agencies acknowledge that digital competency is needed to transform communities to be economically competitive. To expose the people to digitalisation, especially the rural communities, *Pusat Ekonomi Digital Keluarga Malaysia* (PEDi) were built to function as digital transformation hubs at over 900 designated locations nationwide. Research showed that access to PEDi and the services they provide needs to continue, together with improving their abilities and roles in acting as agents for socioeconomic change, facilitating community engagements, and aiding in the preservation of culture.

MCMC has spearheaded various effective initiatives to raise awareness, empower communities via education and communication, and impart digital knowledge. The research was conducted on one of our key programmes, the Malaysian ICT Volunteers (MIV) programme, to measure, assess, and evaluate its effectiveness. The results

showed that the MIV programme has successfully promoted both ICT Volunteering Behaviour and Digital Literacy Behaviour but can be further elevated through working with relevant parties, including educational institutions, private or government agencies, and non-governmental organisations. Active engagement in social media can also contribute to spreading the programme's messages and ICT knowledge-sharing.

In Sabah, a study was conducted on free-to-air digital channels that are positioned as a platform to engage with viewers. Researchers sought to gain insights into take-up rates, subscription extent, and viewership behaviour. It was revealed that high-quality programmes and channels via myFreeview TV have definitely satisfied the viewers.

Conclusion

MCMC is resolute in its efforts to develop vital initiatives that will help shape the nation's communications landscape to purposefully serve its people. In partnership with various organisations, including educational institutions, it is absolutely necessary that our research be inclusive in the development of policies and the designing of programmes. The recommendations will assist in setting the right path for the nation's seamless transition to a digital-savvy society.

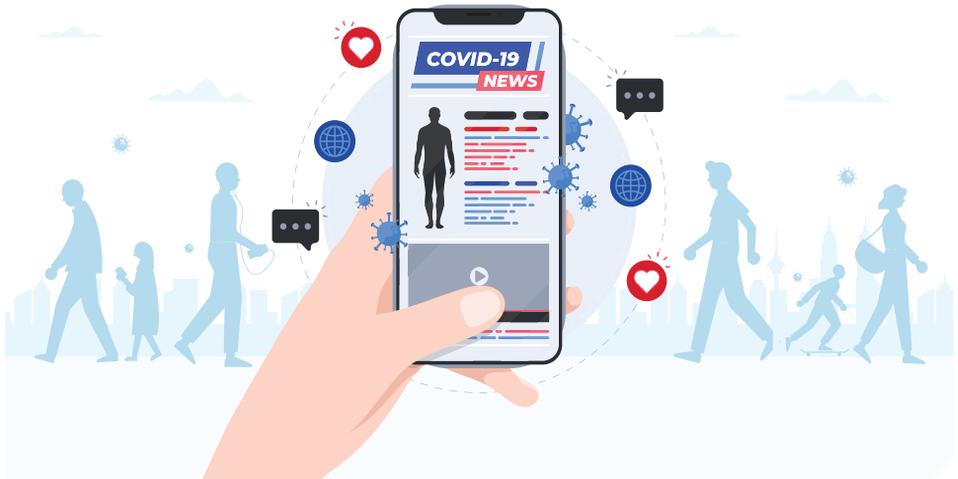
UNDERSTANDING THE PERCEPTION AND ENGAGEMENT OF THE PUBLIC ON PUBLIC SERVICE ANNOUNCEMENTS DURING THE COVID-19 PERIOD

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ABSTRACT

Since the start of the COVID-19 pandemic in December 2019, the Malaysian government, together with relevant parties, began its efforts in curbing the spread of the virus. One of the ways was through the dissemination of information using Public Service Announcements (PSAs) via various media channels. This was an ongoing effort throughout all phases of the Movement Control Order (MCO) and continues today. With every message tailored to each phase of the pandemic, PSAs focused on increasing awareness and knowledge, and recommending solutions. They attempted to persuade public beliefs and attitudes, and stimulate positive behavioural changes. This research was conducted to understand Malaysian society's perceptions and acceptance level of the PSAs directed at it. This research applied a qualitative approach to provide in-depth understanding of questions at hand. The results of this study illustrate the need for relevant agencies to ensure that PSAs released are effectively in line with targeted demographics. This research also shows the ripple effect that these PSAs may have in potentially serving as a social utility to enhance the understanding of those who are unexposed to PSAs.



Keywords: COVID-19, Public Service Announcements (PSAs), Movement Control Order (MCO)

INTRODUCTION

A PSA is an integral communication practice, especially for government campaigns. Focused on issues concerning the public, PSAs aim to increase knowledge and awareness, as well as to offer possible solutions. Moreover, they attempt to influence public beliefs and attitudes, and are capable of stimulating behavioural changes.

In Malaysia, PSAs are commonly related to programmes run by the government or voluntary agencies on health issues such as anti-smoking, obesity, and cancer awareness among others. In a time of crisis like the current COVID-19 outbreak, PSAs are widely used, with the aim of improving awareness, prevention and intervention strategies through the use of mass and digital media. Messages on preventive measures such as frequent hand washing, social distancing and regular sanitisation were the main focus of these PSAs. Some other messages shared by various organisations during the outbreak of COVID-19 were on mental health issues caused by the pandemic. Just like any other advertising messages that are developed and disseminated via the media, it is important to understand the outcome of the communication efforts of these PSAs.

Furthermore, media consumption patterns among Malaysians seem to have changed, particularly during the implementation of the MCO. Being confined at home for longer hours with family members has altered the way people engage with the media. Although social media is known to be very popular among the public as a platform to obtain information, among other various reasons, it also has a reputation stemming from issues such as fake news from unreliable sources. As a result, this concern has made television a more credible source of information.

Problem Statement

The government has taken numerous initiatives to disseminate correct and useful information to society. Since the COVID-19 outbreak, the use of PSAs to disseminate information nationally has consistently increased. The purpose of having these PSAs during the pandemic was not only to inform society, but also to create a specific effect by modifying behaviours by focusing on enhancing, understanding, and ultimately protecting the community from COVID-19.

PSAs play an important role in impacting public behaviour, especially when behavioural changes result from knowledge gained and effectively allow people to distinguish reliable

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information received via social media. With the vaccination programme rolled out, we may see more PSAs being developed and disseminated through the media to reach the public. Despite the government spending millions of Ringgit on these PSAs, the level of acceptance (towards the message) can still be considered low among our society.

The main challenge in our digital society today is the engagement with media outlets, and the way these outlets are used to retrieve information. This engagement can greatly impact the target audience, especially in crucial matters related to health.

Thus, the role of national agencies such as MCMC is not only to monitor and safeguard appropriate media usage and engagement, but also to ensure health information (in this case, on COVID-19) crafted by the government is disseminated strategically and efficiently.

Therefore, this study aims to explore and understand the engagement and perception of the public on COVID-19-related PSAs. It is also to better understand PSA approaches used and their efficiency in delivering intended messages to a multicultural Malaysia as well as other demographics including children, the special needs community, and the elderly.



Research Objectives

- 1** To investigate the public's information-seeking behaviours during the pandemic and their relationship with behavioural change.
- 2** To investigate user perceptions and indicators of PSAs, which include trust, confidence, and desire to use and share, and normalising new norms.
- 3** To determine the effectiveness of PSAs as a communication platform to convey important information throughout the different MCO phases.

LITERATURE REVIEW

A Perfect Storm: Widespread Existential Crisis during COVID-19 Pandemic

All countries around the world have felt the wrath of the novel coronavirus, which was first detected at its epicentre, Wuhan, China. This alarming situation has prompted the World Health Organization (WHO) to declare a worldwide health crisis due to the number of infected cases showing an upward trend at an unprecedented rate (Velavan & Meyer, 2020). The coronavirus is an enclosed, positive single-stranded large RNA virus that passes on a disease to humans, and also to a wide range of animals. The virus receives its name based on its characteristics as spherical viral particles with a central shell and surface projections resembling a solar corona. Novel coronavirus SARS-CoV-2, or most commonly known around the world as COVID-19, occurred when the virus seemingly was able to make a transition from animals to humans in the Huanan seafood market in Wuhan. Initially, pneumonia was identified as the earliest clinical sign of a COVID-19-related disease. Apart from that, some recent cases reported symptoms that are related to gastrointestinal, and also asymptomatic infections which are more prominent, especially among young children (De', Pandey & Pal, 2003).

To curb the spread of COVID-19, the Malaysian government has imposed a Movement Control Order (MCO) on all government offices, businesses, and public places, which were ordered to cease operations until further notice. The changes were sudden and abrupt, leaving organisations and the public with barely enough time to plan, prepare and implement new setups and arrangements, leaving them to adjust and find alternative approaches (Lohani, 2019). Other than that, the citizens were obliged to practise safe social distancing measures when in public, and to always practise good hygiene such as wearing a face mask at all times and using hand sanitiser. Additionally, the MCO has resulted in the transition from face-to-face to online-based communication, whereby most people have taken to the Internet and Internet-based services to communicate, interact, perform tasks, and continue with their job responsibilities from home. According to Mathew (2020), the increase in such practices is due to the enormous change in usage patterns and user behaviour. Working from home has become a norm during the MCO period. Employees are adapting to the 'new normal' with meetings going completely online, office work relocated to the home, and getting

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familiar with emerging patterns of working. Most organisations, whether in industry, culture, or government, have also undergone similar changes.

Consequently, the lockdown has necessitated a rise in the usage of information systems and networks. This situation has led to an exponential surge in Internet usage. In Malaysia, compliance with the MCO by staying indoors at all times saw users record 23.5 percent higher internet traffic (fixed and mobile broadband) nationally during the MCO's first week, while the MCO's second week saw a further 8.6 percent rise (MCMC observed High Internet Usage in Malaysia during MCO Period, n.d.). The implementation of the MCO has made Malaysians rely heavily on their smart electronic devices to carry out daily tasks such as Internet banking, online shopping or donating to charitable causes and local causes. Unfortunately, those with ill intentions have also exploited the current situation's uncertainty. Further aggravated by isolation due to social distancing, some have resorted to spreading fake news, and to tricking individuals into exposing their Internet banking information. Unsuspecting individuals who lack awareness and are careless eventually fall victim, and they end up losing more, amid an already difficult situation (Adolph et al., 2020).

Threat of Human Security Ramping Up during Pandemic Crisis

The crisis of cybersecurity and the spreading of fake news have been rampant, particularly during the COVID-19 pandemic. Malaysians are prone to being victims of cybersecurity if they are not aware and careful enough. Hackers will use this situation to their advantage by breaching the user's personal terminal (Yar, M, 2017). The attempted violations can take on several forms, from corporate-looking email phishing scam attempts to clicking on apparently harmless malware-laden links. Those who are unaware will eventually fall victim to the aforementioned threats. This situation demonstrates that irrespective of how advanced your perceived computer security is, humans are the weakest link when it comes to preventing cybercrime. A fair number of fraudulent cases during the MCO in Malaysia are phishing and email scams claiming to contain COVID-19 content, which are similar to those faced by Australian web users. Malaysiakini also reported on a similar story. The spike in Internet usage provides an opportunity for 'black hat' hackers, criminals who break into computer networks with malicious intent, using their proficiency in computer knowledge

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to acquire user data and encrypted data, resulting in security breaches, including phishing, in various ways (Bogart, S, 2017).

In addition, Open Government Asia reported a total of 838 cybersecurity occurrences between 18 March and 7 April 2020. Apart from cybersecurity issues involving money scams, cyber intrusion has also been rampant during the MCO. Cyber-attacks, including data breaches and distributed denial of service (DDoS) attacks, have affected local organisations with a representation of 18 percent of the total reported cases. Additionally, other reported incidents include individuals within larger organisations or targeting persons in terms of accessing illegal data or interfering with and creating mischief within the processes of the corporation. On the other hand, phone scams showed a 20 percent increase during the period of the MCO and Conditional Movement Control Order (CMCO) from 18 March until 18 May 2020, with losses amounting close to RM500,000. Cyber harassment and fraud also demonstrated a significant surge, together with online sexual extortion. According to CyberSecurity Malaysia, cybersex extortion occurred during a video call with a scammer, whereby the user is either conned into performing lewd activities in front of a camera or blackmailed by cybercriminals.

Scammers carry out their crimes by threatening unsuspecting victims through email, usually claiming to possess embarrassing videos of the victim watching pornographic material after gaining access to the victim's webcam. The increase in 'sextortion' cases comes in light of higher online traffic to the pornographic website Pornhub.

Furthermore, there have been numerous fake news cases which led to new threats as people used the right of 'freedom of expression' intensively to provoke society. For instance, believing fake news has been found to increase anxiety, stress, and even depression, as well as staying at-home, curfews, working from home, unemployment and closing of essential businesses (Dutta & Bandyopadhyay, 2020). According to Leong (2020), the spread of misinformation has done its fair share of damage in Malaysia such as sparking panic buying and panic evacuation from the city, promoting false treatments and fiddling millions of Ringgit off of buyers desperate to get their hands on surgical masks. However, the pattern of the spread seems to be interesting. Apart from Malaysia, countries worldwide have dealt with the same trends, with fake news incidents reaching a surge during lockdown. For instance, in India, studies revealed that during the COVID-19 enforced lockdown,

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fake news incidents reached an all-time high, with 88.4 percent cases reported to be primarily sourced from WhatsApp. In Malaysia, even though the MCO managed to cut down the crime rate by half, the spread of fake news has in turn caused media fatigue, seen through the suspension of healthy behaviours to protect individuals (Mazumder, Hossain & Tasnim, 2020). Fake news also promotes fear, as people become afraid about losing their jobs due to the recession following the coronavirus pandemic (Kulkarni et al., 2020).

Raising Awareness and Educating the Public through PSA Campaigns

Effective public service awareness campaigns are critical for raising concerns on social security and encouraging preventive measures, as well as health-promoting action. As the national issue of COVID-19 increases, it is vital to raise awareness and preparedness among targeted community members, especially the less-informed. According to Noel (2020) educational interventions are urgently needed to reach the targeted residents beyond borders and further measures are warranted. The media as a social organisation may play a vital role because it endorses adaptive measures to promote awareness and knowledge about health-related issues and encourages compliance

with precautionary actions. The media enjoys widespread rapid access, and therefore serves as the major source of information for the general public during the infodemic of COVID-19. An infodemic, as defined by the WHO, requires a decrease in the transmission of false information to the general public (Ahmed et al., 2020). This is an important goal, as defective and fabricated information will create panic among the masses and affect the psychological well-being of society.

Zamost and Schlesinger (2020) highlighted the point that the synergy between the government and the media has to address the challenge of information inequality. There is a need for guidance to recognise the importance of the media in disseminating information related to the coronavirus and social security. Lack of mediated awareness campaigns leads to communication breakdown, and thus makes it very challenging to measure the response rate of the message. Furthermore, the spread of fake news among the public has led to worldwide concern. According to Naughton (2020), part of what makes this epidemic/pandemic different from its predecessors is the prevalence of social media in today's world. Although some online information is potentially reliable, it is more than likely that the majority of

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it would be the opposite. As people retweet links without looking at the site, they are exposed to threats and manipulation for the perpetrators' economic gains. Users can also be ideologically influenced, which will in turn affect their psychological behaviour.

For this reason, a PSA is more effectively delivered in changing behavioural intention when it uses an evaluative message – which is designed specifically for a particular audience group – rather than a belief message. Moreover, public advocacy campaigns are designed to reflect general beliefs, and to show that the message needs to target a particular audience. A study has also shown a subjective norm to influence behavioural intention more than attitude (Morris, 2013), which indicates that affecting the audience using social pressures may be more effective than only expressing individual values in PSAs.

The various platforms of PSAs through both traditional and digital advertising media have benefited from the increase in message dissemination directly to the target audience. This is because content and message appeals play a vital role to trigger an audience's emotion. According to Choudhary et al. (2016), there are many types of message appeals to choose from, ranging from both positive and negative to rational/argument appeals. For positive messages, advertisements will provide support or try to create self-efficacy. On the other hand, negative emotional appeal messages try to spark fear as the motivator. In Bagozzi and Moore's experiment (1994), they found that the greater the magnitude of the negative emotions, the stronger the empathic response. In some cases, negative emotions can be good in the sense that they motivate the recipient to act and enhance the decision to help. Rational/ argument appeals try to focus on factual benefits. The more facts that are claimed in an ad, the more the ad is thus focused on an argument appeal.

METHODOLOGY

Research Approach

This research employed a qualitative research design in achieving its outlined objectives, whereby the perceptions and motives of the perceived information received from PSAs were taken as indicators for the modification of behaviour. The research design also allowed the effectiveness of PSAs run by selected government agencies on COVID-19 to be determined, whereby these PSAs could potentially serve as ammunition to address misinformation and fake news circulated within society.

Consequently, the qualitative approach also aided in the mapping of the objectives, the desired outcome and further recommendations on the best approaches for demographic-led PSAs. This will in turn assist in more effective budget allocations by the government to systematic programmes that are relevant to the receivers' psychographics. The result from the analysis opened up spaces for interpretation on comprehensive recommendations towards effective integrated marketing communications besides PSAs where the sole aims of creating awareness and modification of behaviour among Malaysians could be further realised.

The data collection was based on the enquiries using: (i) qualitative content analysis (QCA) of selected PSAs, and (ii) focus group discussions (FGDs) with selected audiences from various demographics and backgrounds at the receiving end of the intended messages (in this case, the PSAs). The QCA was selected based on the most popular PSAs according to the viewership and ratings (approximately 4-5 selected PSAs as suggested by the research sponsor). The FGDs, on the other hand, were conducted with selected target groups that met the criteria of having been exposed to the PSAs in the media. The target groups were those between the ages of 18 and 60 years old, and each session was held in a group of six to eight people. Although the composition of gender was not included as part of the criteria, the research ensured a balanced mix of genders, ethnicities and social and cultural backgrounds.

Research Instrument

The collected data was analysed by using NVivo 12. Verbatim analysis was utilised to determine the themes and sub-themes to fulfil the objectives of this research. In order to understand the dynamic landscape among digital natives and digital immigrants, the analysis intentionally focused on the

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discourses made by these age groups across the FGD sessions. The software then further analysed and provided comprehensive data on the co-occurrences analysis that reported on the frequency, which offered another dimension to the outcomes.

Sampling: Focus Group Discussion (FGD)

Informants	Malaysians exposed to the selected PSAs
<p>Number of groups</p>	<p>Four (4) groups, comprising:</p> <ol style="list-style-type: none"> 1. <u>Urban - Klang Valley and major towns in Peninsular Malaysia</u> Consisting of eight (8) participants - three (3) males and five (5) females. 2. <u>Semi-rural – semi-rural towns in Peninsular Malaysia</u> Consisting of eight (8) participants - four (4) males and four (4) females. 3. <u>Orang Asli</u> Consisting of eight (8) participants - five (5) males and three (3) females. 4. <u>Sabah & Sarawak and specially abled persons</u> For Sabah and Sarawak participants, there were six (6) participants with four (4) males and two (2) females. As for the participants from the specially abled group, there were three (3) male participants.
<p>Group composition</p>	<ol style="list-style-type: none"> 1. Six (6) to eight (8) per group 2. Ages 18 and above (a balanced mix of digital natives and digital immigrants) 3. A good mix of genders (male and female) 4. A good mix of ethnicities

METHODOLOGY

Data Collection

The QCA primarily involved analysing the context and content of the selected PSAs through a rigorous study. This study was based on relational analysis to examine the relationship among concepts in a given PSA, which included exploring the usage of semiotics and symbols. Data was collected using pre-determined open-ended questions during the FGD sessions. The sessions were conducted online using either Google Meet or Zoom, or face-to-face interactions at designated venues depending on the COVID-19 situation and as per government regulations. All FGDs were conducted between December 2021 and February 2022.

Data Analysis

The collected data was analysed by using NVIVO 12. Verbatim analysis was utilised to determine the themes and sub-themes to answer the objectives of this research. In order to understand the dynamic landscape among digital natives and digital immigrants, the analysis intentionally focused on the discourses made by these age groups across the FGD sessions. The software further analysed and provided comprehensive data on the co-occurrences analysis that reported on the frequency, which would provide another dimension to the outcomes.

FINDINGS AND DISCUSSIONS

Research Approach

A total of 397 quotations were manifested from four focus group discussions conducted with a total of 33 informants from urban areas (FGD 1); semi-rural towns from the northern territory of peninsular Malaysia (FGD 2); native people (FGD 3); and a mixture of East Malaysians (Sabah and Sarawak) and specially abled persons (FGD 4). Eight sub-themes were abstracted for further analysis alongside three predetermined themes based on the objectives: (i) to investigate the public's information seeking behaviours during the pandemic and their relationship with behavioural change; (ii) to investigate user perceptions and indicators of PSAs which include trust, confidence and desire to use and share and normalising new norms; and (iii) to determine the effectiveness of PSAs as a communication platform to convey important information with regard to the pandemic throughout the different MCO phases.

FINDINGS AND DISCUSSIONS

The three predetermined themes were Public Information Seeking Behaviour, Perceptions and Indicators of PSA and Effectiveness of PSA as Communication Platform. Each of these three predetermined themes resulted in a total of nine sub-themes that further reinforced the findings.

For Theme 1, the sub-themes were: 1) Cognition; 2) Internet Usage; and 3) Social Utility, with each yielding 18, 114, and 155 quotations, respectively. The first sub-theme, Cognition, saw two emergent codes – 1) Beware Surveillance; and 2) Instrumental Surveillance. Beware surveillance referred to information seeking activity on more threatening information, while instrumental surveillance referred to information gathering that is useful and helpful in daily life. The second sub-theme, Internet Usage, saw three emergent codes – 1) Duration (which referred to the duration of Internet usage) with 36 quotations; 2) Platform Preferences (the participants preferring online platforms) with 59 quotations; and 3) Radio (listening while using the Internet) with 19 quotations. The third sub-theme saw three emergent codes – 1) Conversational Currency (using media as part of contact with other people) with 16 quotations; 2) Parasocial Relationship (being able to relate to characters or presenters

on media) with 12 quotations; and 3) Animated with 13 quotations, across four FGDs.

Total of
397

quotations were manifested from four focus group discussions.

8

sub-themes were abstracted for further analysis alongside three predetermined themes based on the objectives.

3

predetermined themes: Public Information Seeking Behaviour, Perceptions and Indicators of PSA and Effectiveness of PSA as Communication Platform.

FINDINGS AND DISCUSSIONS

For Theme 2, the sub-themes manifested were: 1) Information Overload with three quotations; and 2) Media Consumption with four emergent codes – 1) Newspaper; 2) Preference with two emergent sub-codes (digital and print) representing five quotations; and 3) SMS with a total of 39 quotations, from four FGDs. Each of these five codes included sub-codes describing detailed information on the codes. Social media was the fourth sub-theme with 29 quotations, followed by 5) Infographics (11 quotations); 6) MySejahtera (one quotation); and 7) Video with five quotations.

Finally, Theme 3 was represented by four sub-themes with the omission of Affiliation as it yielded no quotations: 1) Diversion with 12 quotations representing three sub-codes; 2) Expression (6 quotations); 3) Withdrawal (three quotations); and 4) Television with 67 quotations, across the emergent eight sub-themes, respectively. Table 1 below illustrates the abstraction process of the thematic analysis of the study.

TABLE 1: ABSTRACTION PROCESS OF THEMATIC ANALYSIS

	THEMES		
	Public Information Seeking Behaviour	Perceptions & Indicators of PSA	Effectiveness of PSA as Communication Platform
SUB-THEMES			
COGNITION			
<u>Codes</u>			
Beware Surveillance	11		
Instrumental Surveillance	7		

FINDINGS AND DISCUSSIONS

	THEMES		
	Public Information Seeking Behaviour	Perceptions & Indicators of PSA	Effectiveness of PSA as Communication Platform
INTERNET USAGE			
<u>Codes</u>			
Duration	36		
Platform Preferences	59		
Radio	19		
SOCIAL UTILITY			
<u>Codes</u>			
Conversational			
Currency	16		
Parasocial Relationship	12		
Animated	13		
MEDIA CONSUMPTION			
Information Overload		3	
<u>Codes</u>			
Newspaper		4	
Preference		0	
Digital		4	
Print		1	
SMS		12	
Reaction		0	
Negative		19	
Positive		8	
Social media		29	
Infographic		11	
MySejahtera		1	
Video		5	

FINDINGS AND DISCUSSIONS

	THEMES		
	Public Information Seeking Behaviour	Perceptions & Indicators of PSA	Effectiveness of PSA as Communication Platform
SUB-THEMES			
AFFILIATION			0
DIVERSION			2
<u>Codes</u>			
Emotional Release			3
Relaxation			2
Stimulation			5
EXPRESSION			6
WITHDRAWAL			3
TELEVISION			
<u>Codes</u>			
Activities			
Primary			1
Secondary			6
Traditional TV			45
Limited Information			3
Confirmation Tool			2
Annoyance			3
TV on other media			3
PSA approaches			45
Activities			0
GRAND TOTAL: 397			

FINDINGS AND DISCUSSIONS

For context of informants' sentiments across the four FGDs, word frequency analysis was able to prescribe the lateral meaning for the perspectives of the informants pertaining to overall issues discussed throughout the session. It is interesting to observe the extraction of word frequency throughout the conversations and discussions that led to the emergence of Themes 1, 2 and 3. The word frequency saw several words that showed the overall perception and engagement of the participants on the perceptions of the PSAs during the COVID-19 period.

A total of 100 words with five (5) letters were detected in the selected quotations. The top ten (10) words were – *tengok* (look); media; *cakap* (said); *iklan* (advertisement); *mungkin* (maybe); *maklumat* (information); *betul* (correct); social; *lebih* (more); and think. The next ten (10) words were – Facebook; COVID; information; Internet; WhatsApp; video; radio; share; *dengar* (listen); and *sebenarnya* (truthfully). All these words were mentioned between 68 and 335 times in the quotations concerning the discussions on the sub-themes stated above.

These words, which indicated the participants' overall perception of the PSAs with the selected media, reflected the overall look and feel of the COVID-19 PSAs communicated during the first two (2) years of the pandemic that began in December 2019.

THEME 1: PUBLIC INFORMATION SEEKING BEHAVIOUR

A total of 173 quotations were recorded in the abstraction of thematic analysis pertaining to the first theme: the perceptions and indicators of PSAs among 33 informants across four FGDs. In determining Research Question 1 that led to the formation of Theme 1, three sub-themes were employed as predetermined sub-themes.

For Sub-theme 1 (Cognition), the analysis inductively generated two codes (Beware and Instrumental Surveillance) where each garnered 11 and seven quotations, respectively. For Sub-theme 2 (Internet Usage), three codes were manifested, namely

THEME 1: PUBLIC INFORMATION SEEKING BEHAVIOUR

Duration (36 quotations), Platform Preferences (59 quotations), and Radio (19 quotations). Finally, Sub-theme 3 (Social Utility) expanded the discussions to three more codes: Conversational Currency (16 quotations), Parasocial Relationships (12 quotations) and Animated (13 quotations).

The abstraction process for predetermined Theme 1 was aimed at accomplishing Research Objective 1 in understanding the users' information seeking behaviour that was focused on Cognition and the Internet as their main platform. In addition, the motivation was also taken into consideration to inculcate holistic views on learning curves via the PSAs and the subtle interventions they created to promote behavioural change with regard to issues on COVID-19. Table 2 below describes the co-occurrences for Theme 1; meanwhile, Figure 1 provides the bar chart for Theme 1 that shows the frequency of quotations and thematic analysis across four FGDs.

Total of

173

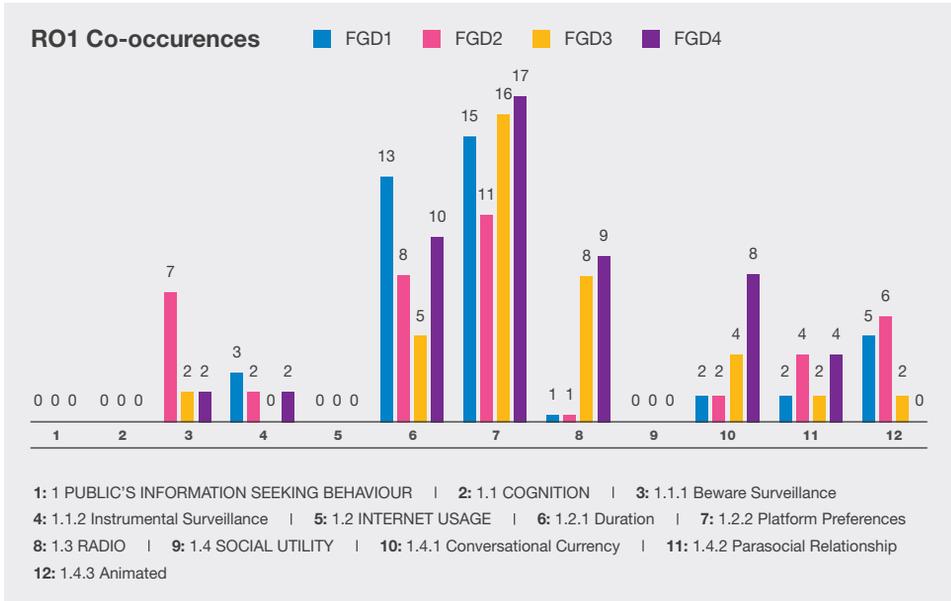
quotations were recorded in the abstraction of thematic analysis pertaining to the first theme.

TABLE 2: CO-OCCURRENCES TABLE FOR THEME 1

THEME 1: PUBLIC INFORMATION SEEKING BEHAVIOUR	FREQUENCY	TOTAL
<u>SUB-THEME:</u> COGNITION		
<u>Codes</u>		
Beware Surveillance	11	
Instrumental Surveillance	7	
<u>SUB-THEME:</u> INTERNET USAGE		
<u>Codes</u>		
Duration	36	
Platform Preferences	59	173
Radio	19	
<u>SUB-THEME:</u> SOCIAL UTILITY		
<u>Codes</u>		
Conversational Currency	16	
Parasocial Relationships	12	
Animated	13	

THEME 1: PUBLIC INFORMATION SEEKING BEHAVIOUR

FIGURE 1: CO-OCCURRENCES BAR CHART FOR THEME 1



Cognition

In seeking information, various media from print to electronic to social media have been selected by relevant government agencies in deploying the PSAs with the aim of creating awareness and educating the public on any COVID-19-related information. It is interesting to note that the Internet and social media paved the way for the selection of various other media when searching for information. Savolainen (2011) stated that with the proliferation of various social media applications, the preparation and dissemination of information has gained much attention

among the public when searching for information due to their ease of use.

The cognitive elements are crucial when searching for information as Instrumental and Beware Surveillance serve as the guides for people to exclusively filter the type of knowledge they acquire upon exposure to any information. In understanding Public Information Seeking Behaviour, the study found that all informants viewed the finding of information within the spectrum of Internet Usage and how it helped them as part of Social Utility. To this, Che Su et al. (2012) argued that the search for information (online

THEME 1: PUBLIC INFORMATION SEEKING BEHAVIOUR

and offline) is motivated by the need to necessitate the application of the information and this involves individual perceptions of their lack of knowledge towards certain issues, which refers to the process of information seeking and the use of the acquired knowledge in their everyday life.

In relation to this, Theme 1 of the study also congruently noted that the Cognition aspect, with 19 co-occurrences across the FGD, serves as an important indicator for PSAs to wholly understand the reason behind the selection of the media type for either everyday use or for keeping updated with the prevailing pandemic issue that is affecting the family, society, and environment. This augurs well with the uses and gratifications theory (UGT) where Johnson (1997) explained that the media user will choose any media channel to seek information in order to satisfy their cognitive and affective needs. The theory also further explains that factors (content, ease of use, exposure) in the media preferences also govern the users to exclusively choose such a medium as the source for information.

In the case of Instrumental Surveillance, the informants echoed the fact that the selection of media in providing gratification on general knowledge was seemingly crucial, albeit straightforward and constant. When

discussing in detail the PSAs and their continued contributions in keeping the public updated with current events, Instrumental Surveillance proved to be invaluable in ensuring households were kept abreast of current situations, and they also served as a social intervention mechanism to repel misinformation. To this, Assemblo (2017) stated that the repetitive (contents in the media) would usher in familiarity to the public. This was crucial in ensuring strict adherence to instructions or standard operating procedures (SOPs) by the Ministry of Health, which were reflected in the PSAs.

Internet Usage

When discussing the Internet as one of the media preferences for Information Seeking Behaviour and its credibility, the informants admitted its importance and significance during the pandemic when the government imposed the MCO, which prevented them from social outings. Subsequently, it contributed to the spike in Internet usage to search for information. This begged the issue on the measurement of the effectiveness to ascertain its credibility, which includes types of media, trustworthiness, and the quality of information provided by the media (Hou & Shim, 2010). Interestingly, past studies also reported that the trustworthiness element often relates very closely with Internet usage in general (Neumark et al., 2013; Rains,

THEME 1: PUBLIC INFORMATION SEEKING BEHAVIOUR

2007; Selsky et al., 2013). Additionally, media preferences become a crucial factor in determining the most effective platforms for the PSAs to be deployed. As such, individuals' experience in using certain media offers important perspectives to various agencies when choosing the right media for PSAs so that the desired results and maximum exposure can be achieved.

While cognitive behaviour allows the informants to seek information, it was the selection of the Internet and its usage that contributed to the incremental factors on the attainment of the various PSAs on COVID-19 that were employed by various relevant agencies. In fact, Papacharissi and Rubin (2000) noted that the primary attraction for people to commune on the Internet and social media is the need to search for information. This concurred with the attainment of Theme 1 as Korgaonkar and Wolin (1999) also stated that information seeking behaviour is the main factor for the increased use of the Internet among people. This further correlates with the UGT on the fulfilment of the cognitive needs where information seeking behaviour is concerned. At the same time, Duration has been identified in the analysis to be the second most discussed and positively agreed upon factor by the informants in all four FGDs.

It was concurrently noted that the reach of PSAs and their duration are crucial to ensure they travel effectively across various types of media, notwithstanding social media. Following this, a study by Graham and Dutton (2019) highlighted that the rapid development of new media technologies around the world proved that the communication ecosystem is becoming more challenging, although it has allowed people to publish, create and retrieve information anytime and anywhere. In fact, it becomes clear that the agencies related to the PSAs must be able to strategically choose the right media to ensure maximum exposure to the public based on the census and preferences. As rightly pointed out by the informants, the duration spent online can become a good indicator for the agencies to selectively determine the most appropriate media for the PSAs.

Social Utility

In facilitating perceptions among users, the informants were found to specifically meet the benefits that could potentially increase their awareness and further educate them following their exposure to the PSAs. This could be materialised through the selection of various social media channels available pre- and post-pandemic. Potentially, it would further inculcate the informants, who were

THEME 1: PUBLIC INFORMATION SEEKING BEHAVIOUR

adults and mature enough to share opinions and leverage social utility to lead the excursion and better understand the pandemic based on the PSAs. Dye (2007) stated that these tendencies would positively form an active community, which then increases social media content and attracts more audiences to participate, converse, and engage in discussions (online or offline).

Subsequently, to ensure the content of the PSAs become part of the Conversational Currency in everyday life, it has to mirror the context of the society among which the PSAs are disseminated. It is therefore evident that in pandemic-related PSAs, the content and context are vital to reinforce the message, where the reachability of the audiences and the building of relationships are able to bridge the gaps among people due to the close proximity of content. The FGD concisely displayed this importance when the informants stated that one of the PSAs with local Sarawakian content allowed for better relatability, which thus aided the recall session. To this, the consistency of message design and the selection of appropriate content must always ensure that they fit within the context of the audiences that the PSAs intend to reach. This is crucial to usher not only awareness, but most importantly, modification of behaviour among the public.

In addition, creative content development also requires consistency in the narratives and the duration to which the public is exposed. It is evidently counterproductive when inconsistency of the content further confuses the audiences, and more damagingly, they are unable to recall the important information of the PSA. Furthermore, creative content calls for effective communication messages with particular target audiences to ensure effectiveness. PSAs with animated features have been found to provide some of the most effective content for top-of-mind recall. Specifically, they remembered not only the characters featured in the PSA, but most importantly, the message it conveyed. This is crucial, especially when dealing with health-related information during COVID-19 as it will not only educate, but also serve as a deterrent to reduce the number of infections.

With the strategic use of animation, the informants' receptions were found to be relatively favourable and positive as it suggested acceptance of the message across demographic groups, not only among children. This shows that the PSAs' message design must contain a creative and interesting narrative where the longevity and retention of COVID-19 information are concerned. A combination of education and entertainment in the

THEME 1: PUBLIC INFORMATION SEEKING BEHAVIOUR

PSAs' storytelling reinforces COVID-19-related information among the public, which creates better understanding. Indeed, when developing a storyboard for COVID-19-related PSAs, relevant agencies must seriously take into account not only the conversation and engagement they create from the PSAs, but also, more importantly, the creative execution that underpins the retention of such vital information during the pandemic.

THEME 2: PERCEPTIONS & INDICATORS OF PSA

TABLE 3: CO-OCCURRENCES TABLE FOR THEME 2

THEME 2: PERCEPTIONS & INDICATORS OF PSA	FREQUENCY	TOTAL
<u>SUB-THEME:</u> MEDIA CONSUMPTION		
Information overload	3	
<i>Codes</i>		
Newspaper	4	
Preference	0	
Digital	4	
Print	1	
SMS	12	97
Reaction	0	
Negative	19	
Positive	8	
Social media	29	
Infographic	11	
MySejahtera	1	
Video	5	

THEME 2: PERCEPTIONS & INDICATORS OF PSA

A total of 97 quotations were recorded in the abstraction of thematic analysis pertaining to the second theme: the Perceptions and Indicators of PSA. These quotations were gathered from the FGDs involving 33 individuals comprising males and females, with participants coming from urban areas and semi-rural areas, including the native *Orang Asli*, indigenous peoples of Sabah and Sarawak, as well as specially abled persons living in Malaysia.

In determining Research Question 2 that led to the formation of Theme 2, Media Consumption was employed as a predetermined sub-theme. Subsequently, the analysis inductively generated 11 codes to accomplish Research Objective 2 in investigating the user perceptions and indicators of PSAs, which included trust, confidence, and desire in using and sharing the information while normalising new norms. The second theme – Perception and Indicators of PSA – saw participants sharing their views on the types of media they consumed during and after the MCO period. This generated the sub-theme Media Consumption, and the 12 codes that emerged under this sub-theme.

As presented in Table 3, the codes were: (1) Newspaper with four quotations; followed by (2) Newspaper preference, either (3) Digital with four quotations, or (4) Print with one quotation. This was followed by (5) SMS with 12 quotations, further broken down into two types of (6) Reactions, either (7) Negative with 19 quotations, or (8) Positive with eight quotations. (9) Social media yielded 29 quotations; (10) Infographic recorded 11 quotations in total; (11) MySejahtera had one quotation; and (12) Video had five quotations in total. Chart 3 below illustrates the co-occurrences of the quotations for Theme 2, on the Perceptions and Indicators of PSA.

Total of

97

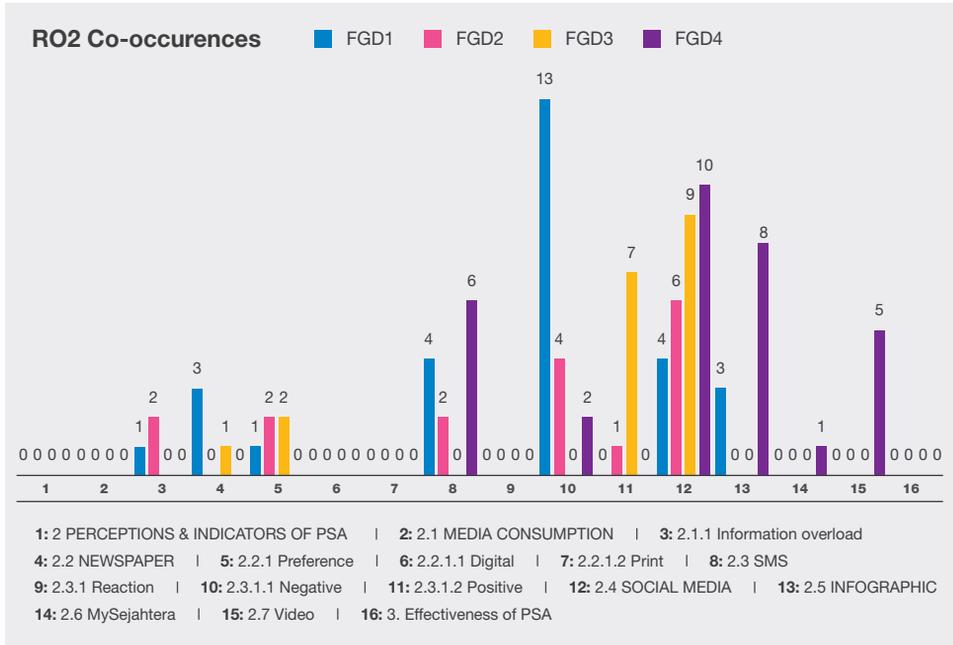
quotations were recorded in the abstraction of thematic analysis pertaining to the second theme.

33

individuals, comprising males and females, with participants coming from urban areas and semi-rural areas.

THEME 2:
PERCEPTIONS & INDICATORS OF PSA

FIGURE 2: CO-OCCURRENCES BAR CHART FOR THEME 2



Retrospectively, in spearheading the health communication campaign, it is obvious that the selection of media is crucial to determine maximum reach. A study by Fauziah et. al. (2012) noted that the current usage of new media has significantly complemented and facilitated the acquisition of new information, as well as its quality. To this end, media is a powerful tool to raise the audience’s conscience and awareness, which could assist in information dissemination to further increase discourses among the public at large.

THEME 2: PERCEPTIONS & INDICATORS OF PSA

Media Consumption

The pattern of media consumption among the participants saw a significant inclination towards the Internet or digital communication platforms. This pattern could be seen balanced throughout all four FGD participants. Across all focus groups, the participants seemed to agree that the COVID-19 information shared on the Internet or social media was the fastest and most current. It is a fact that the information on the Internet, such as on social media, as well as on communication platforms, such as WhatsApp and Telegram, was fast and readily accessible at their fingertips.

The FGD indicated the importance of understanding media consumption patterns among Malaysians. In terms of media selection, it is vital to understand the reason underpinning their act of media consumption in their everyday lives, particularly when it comes to the dissemination of information (and PSAs) by various government bodies. As Malaysians were confined in their homes during the MCO, statistics reported an increase in TV viewership, and TV does come into contact with these participants on a daily basis. However, that does not mean their Internet or social media usage has taken a back seat. This is

in parallel with the UGT, as explained by Johnson (1997) that factors such as content, ease of use, and exposure in the media may regulate users in their media consumption.

TV has been noted as an important media platform during the first phase of the MCO. However, as the phases changed and with more information made available on other media and platforms, TV lost some of its prominence. However, some participants agreed that TV was still relevant, especially in informing the masses and the less tech-savvy people, or people with certain disabilities. Participants were also engaging with TV in a non-traditional sense, that is, online, and with multiple media at the same time.

The use of SMS as a means of reaching out to the masses brought mixed reactions. The co-occurrences in Chart 3 indicate that the negative reaction seemed to be higher than the positive reaction. However, when probed during the discussion, participants' reasons for having positive or negative views on the use of SMS for PSAs or information pertaining to COVID-19 depended on the participants' access to the Internet as well as on the nature of their community.

THEME 3: EFFECTIVENESS OF PSA AS COMMUNICATION PLATFORM

A total of 127 quotations were recorded in the abstraction of the thematic analysis pertaining to Theme 3. In determining the effectiveness of PSA as a communication platform that led to the formation of Theme 3, four (4) sub-themes were employed as pre-determined sub-themes, which were: 1) Affiliation; 2) Diversion; 3) Expression; and 4) Withdrawal, based on the UGT.

The first sub-theme, Affiliation, generated no quotations and codes. However, the second sub-theme, Diversion, generated three codes – 1) Emotional release; 2) Relaxation; and 3) Stimulation, with three, two and five quotations, respectively. The third sub-theme, Expression, generated six quotations but no codes generated. The fourth sub-theme – Withdrawal – generated the most codes which

included: 1) Activities (with two sub-codes – primary and secondary); 2) Traditional TV (45 quotations); 3) Limited information (three quotations); 4) Confirmation tool (two quotations); 5) Annoyance (three quotations); 6) TV on other media (three quotations); 7) PSA approaches (45 quotations); and 8) Activities (0 quotations). Sub-themes 2 and 7 – traditional TV and PSA approaches – yielded the most quotations, with a total of 45 quotations each.

Total of

127

quotations were recorded in the abstraction of the thematic analysis pertaining to Theme 3.

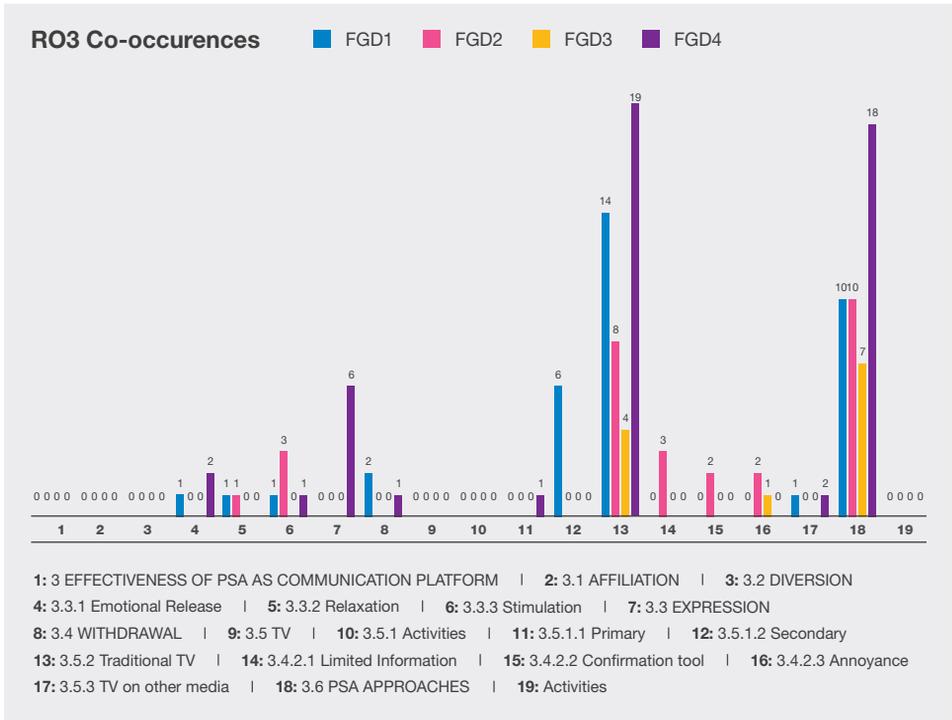
THEME 3: EFFECTIVENESS OF PSA AS COMMUNICATION PLATFORM

TABLE 4: CO-OCCURRENCES TABLE FOR THEME 3

THEME 3: EFFECTIVENESS OF PSA AS COMMUNICATION PLATFORM	FREQUENCY	TOTAL
<u>SUB-THEME: AFFILIATION</u>	0	
<u>SUB-THEME: DIVERSION</u>	2	
<i>Codes</i>		
Emotional Release	3	
Relaxation	2	
Stimulation	5	
<u>SUB-THEME: EXPRESSION</u>	6	
<u>SUB-THEME: WITHDRAWAL</u>	3	
<i>Codes</i>	5	
Activities		
Primary	1	127
Secondary	6	
Traditional TV	45	
Limited information	3	
Confirmation tool	2	
Annoyance	3	
TV on other media	3	
PSA approaches	45	
Activities	0	

THEME 3: EFFECTIVENESS OF PSA AS COMMUNICATION PLATFORM

FIGURE 3: CO-OCCURRENCES BAR CHART FOR THEME 3



Expression

The findings show that Expression is a part of the elements that contribute to the formation of Theme 3 – the effectiveness of PSAs as communication platform. Media preference and its content gave the informants the ability to connect and express their feelings about the MCO and the pandemic in general, either positively or negatively. The exposure to effective content that provided

emotional storylines about COVID-19 survivors, sharing from the family members of the deceased, or even frontliners’ stories were considered by the informants as an outlet for them to express their feelings on the MCO and the pandemic in general.

In addition, Expression as prescribed by the UGT denotes the informants’ social capacity and how they present themselves online or offline as a result of the exposure to various PSAs.

THEME 3: EFFECTIVENESS OF PSA AS COMMUNICATION PLATFORM

This is where social utility serves as a support system in allowing them to expressively pronounce their experience with the content of the PSAs. Social connectivity also means that it may not necessarily revolve around online presence, but also around real-life interaction, even during the MCO. The act of social learning through various types of exposure to the PSAs also relates very closely to social connectivity and cognitive development (Instrumental and Beware Surveillance). In addition, a study by Ferguson and Perse (2000) echoed the same finding, that the salient motive for surfing the Internet and social media is to find entertainment and information.

Traditional Television (TV)

Statistically, there was no significant difference between the hours spent online and watching TV. Statista (2021) reported that the time spent watching TV increased between 22 and 28 March 2020 and this contributed to the MCO imposed by the government. While on average, Malaysians spent around five hours and 17 minutes, the number peaked at seven hours and 24 minutes compared to nine hours and 17 minutes spent on the Internet. The informants admitted that Traditional TV took precedence in ensuring authenticity of information during

the pandemic. Although television is mostly used as a 'secondary screen' or a tool for background noise, the concept of watching TV is still relevant even with the proliferation of online streaming and the wide availability of numerous devices.

This makes traditional TV significant during COVID-19 and the strategy to air the PSAs via TV is commendable as it reduces uncertainties among the audiences on the question of trustworthiness of the content. Ferguson and Perse (2000) stated that although there are significant changes in media use due to the rise in the usage of the Internet and social media, TV has continually demonstrated its ability to adapt to the new technology by symbiotically offering the same content across various platforms.

Nevertheless, the informants also agreed that the content shown on traditional TV correlated with the importance of the context that they lived in. It was opined that personalities and key opinion leaders highlighted on traditional TV could be a good strategy to enhance audiences' confidence. The PSAs could take note of this by selecting appropriate persons to send out the awareness message, either to the general population or to specific target audiences.

THEME 3: EFFECTIVENESS OF PSA AS COMMUNICATION PLATFORM

PSA Approaches

In the case of PSA approaches during the pandemic, informants stated that not every PSA message is a one-size-fits-all approach. Effective PSAs can leave a lasting impact if they are geared towards the intended audience with the right approaches. When discussing the types of PSAs that they expect to watch more of, informants suggested that creative elements, aside from the content itself, are very important in PSAs. The use of animated features, visuals and infographics have been found to be some of the many effective features highlighted in the PSAs' content that the informants were able to recall.

In relation to this, real-life experience sharing also catches more of the informants' attention. Storylines of COVID-19 survivors, frontliners, or the victims' family members seem to carry a 'hook' element in PSAs and thus engage more audiences. The combination of education and 'dramatic' elements narrated in the PSAs also helps to reinforce the COVID-19-related information among the public, thus assisting them in understanding the issue better. In addition, the duration of the PSA is crucial to reinforce messages to the targeted audiences. Short videos like TikTok content are more engaging compared to lengthy, draggy visuals.

RECOMMENDATIONS

The recommendations as a result of this research are as follows:

- i. Content and context – There must be a strong correlation between the content created for the PSA and the context that the intended audiences is familiar with. This is important as familiarity will essentially breed holistic understanding of the issues highlighted in the PSAs. This calls for the content creator to involve relevant stakeholders, such as the National Film Development Corporation Malaysia (FINAS), *Jabatan Penerangan Malaysia* (JAPEN), Ministry of Health Malaysia (MOH), *Majlis Keselamatan Negara* (MKN), Ministries' Corporate Communication Departments, the community, key opinion leaders and NGOs, as consultants to ensure relevancy and social connectivity.
- ii. Media selection and preferences – It is crucial to understand the reasons underpinning the consumers' media selection and consumption, particularly when it comes to the dissemination of information, which in this case are the PSAs by various government bodies.

RECOMMENDATIONS

After living for more than two years with COVID-19, Malaysians have familiarised themselves with digital media, particularly social media. Digital and social media have become an integrated part of their lives in obtaining entertainment and information, and in everyday communication. Although TV remains as a trusted platform, its prominence as the sole information source has diminished. It has become part of a bigger media network in the lives of media consumers.

Given the fact that TV viewing experiences have changed with the advent of the Internet and social media, the content creators must also be aware of the dynamic shifts of the PSA from one medium to another while remaining in the act of watching the TV. The concept of 'anything, anywhere, anytime' has long replaced the demand of making people commune at one specific time to attain information from the TV. Thus, there must be a concerted effort by content creators to ensure strategic placements of PSAs across multiple platforms, be it digital and social, electronic or print. This is important to ensure that the ripple effects of the PSAs serve their purpose – to create understanding – which then assists in the modification of public information seeking behaviours.

- iii. Creative approaches – Generally, the participants gave positive feedback on the creative side of the PSAs. However, after two years of the pandemic and as COVID-19 moved into the endemic stage, these participants also felt that the creative approach of the PSAs should take a creative leap. There was no denying that the participants were attracted to compelling visuals and audio. However, when these features are paired with visceral real-life experiences, emotion-evoking narratives and drama, they are much more effective at grabbing the audience's attention. This aids in the effective transfer of information from the PSAs to the audience, which is likely to be more impactful and to yield higher chances of behavioural change.
- iv. Future research – Moving forward, future research on the effectiveness of PSAs during the COVID-19 pandemic should consider employing quantitative methodology in order to significantly determine the correlation between PSAs and public sentiments. The thematic findings derived from this study should serve as research instruments for the development of the questionnaire for the said study. Furthermore, with mixed-methodology, MCMC will be in a strong position to advise the government and relevant agencies on the best practices to deploy effective messages via PSAs.

CONCLUSION

This study has been able to identify the crucial elements concerning the motivation and factors underlying media preferences among consumers, and the intended outcome with regard to the PSAs disseminated on various media platforms to Malaysians. Through latent and manifest analyses, the results conclusively illustrate the need for relevant agencies to ensure that the content and context of the PSAs meet the audiences' demographic to ensure not only knowledge attainment, but also as intended education concerning COVID-19-related information. The public sentiment analysis conducted with four FGDs representing urban and semi-rural areas, native peoples, Sabah, Sarawak, and specially abled communities has been able to capture subjective information on the PSAs used by the government agencies. The notable expressions by the informants on issues pertaining to information seeking behaviours, perceptions on PSAs, and perceived effectiveness of PSAs were recorded based on the formation of opinions, emotional attachment, and attitudes on the discussed topic, as well as stakeholders' involvement.

The PSAs approach in particular saw interesting outcomes whereby the informants highlighted that there must be correlations between the

types of media and the specific target audiences. Although the inclusiveness of posting strategies on social media can be beneficial, the stakeholders involved must realise the significance of other available channels as well. TV, for instance, has adapted to evolve from the conventional watching of programmes at designated times to watching programmes at almost anytime, anywhere. This jives well with the UGT, whereby philosophically, people today seek and choose any type of media that provides gratification to them. This means that the selection of media channels must be done carefully to ensure maximum exposure. While social media has been touted as being fast and easy, it may not necessarily translate into the primary media when airing the PSAs. Instead, it may effectively serve as secondary media to fortify messages transmitted via TV.

Different audiences require different approaches. In the case of the native people, for example, although the rest of the three FGDs did not see the significance of radio and SMS, the *Orang Asli* communities specifically mentioned that PSAs from Asyik FM played crucial roles in providing important information during the first and second MCO phases. In addition, SMSes by the NSC have been very effective in providing updates to the

CONCLUSION

Orang Asli communities that have problems with Internet connectivity. This finding is worth highlighting as the government has made the constructive decision of producing PSAs in ways other than through visual communication.

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INVESTIGATING THE IMPACT OF SOCIAL NETWORKS ON WOMEN WORKING FROM HOME (WFH) IN ALLEVIATING PSYCHOLOGICAL DISTRESS

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ABSTRACT

In Malaysia, women constitute 38.9 percent of the total workforce. They play a fundamental role in contributing to the financial and economic strength of the country and their families. However, when the world was hit by COVID-19, which forced them to work from home, they faced many challenges in performing their different roles all at once. Within their homes they are expected to multitask – being a wife, mother and employee – without any clear distinction in terms of time and space in performing household and professional responsibilities. This situation has led them to experience psychological distress. To address the issue, this study was conducted to investigate how social networks are employed by women working from home in alleviating psychological distress. The research was undertaken using a mixed-method approach, via physical survey questionnaires and virtual online semi-structured interviews. It was found that women who work from home face a lot of challenges, especially in juggling between different responsibilities. In addition, women in the rural areas seemed to experience mild to extremely severe levels of depression, anxiety and stress, higher than their counterparts in urban areas who were able to manage these psychological elements better. Based on the findings, it is recommended that a centralised support system and fair Working From Home policy should be established to help our working women achieve a good and healthy state of mind.

Women constitute
38.9%
of the total workforce.



Keywords: COVID-19, Women Working From Home (WFH), Psychological Distress

INTRODUCTION

The coronavirus (COVID-19) pandemic presents unprecedented and unique challenges. People all over the globe are navigating uncharted waters with this virus, making it important to find new ways and methods to work and interact effectively while also taking care of one's mental health and well-being. Many are Working From Home (WFH) full-time for the first time and they are isolated from colleagues, friends, and other family members. Schools are closed for quite a long time and parents, especially working mothers, must adapt to these changes quickly. However, not many working mothers are able to cope with this sudden change. This 'new norm' has greatly impacted these working women. The uncertainty leads to added anxiety, stress, and strain – physically, mentally, socially, and financially.

In Malaysia, the amount of women in the labour force during the second quarter of 2020 was 38.9 percent. This was almost 40 percent of the total labour force in the country (Department of Statistics, 2020). While women are becoming an essential part of the workforce, they continue to hold multiple responsibilities which are associated with their roles as wives, mothers, and caretakers of others. Judging from these multiple roles assumed by women, it can be

anticipated that they are vulnerable to psychological distress and depression (Umi Adzlin Silim et al., 2011).

During the pandemic, some of these working from home mothers have resorted to social networks to express the challenges they face in having to work and care for the children all at the same time. Since they have to be at home and limit their physical contact, social networks provide much-needed solace for them in channelling their feelings and concerns. Since internet use became widespread globally in the early 1990s, social support has been pursued via the online space, where individuals are connected to one another beyond temporal, spatial, and geographical barriers. The social support from others via online platforms has been considered one of the major stress coping strategies (So Young Bae et al., 2020).

Problem Statement

One of the challenges faced by women WFH is spending the entire working day at home with spouses, children, or aging parents. Working in a house full of people means more distractions and disruptions. Also, many of these women feel they are less productive, which leads to stress. Working from home mothers have limited access to

INTRODUCTION

cope with their psychological distress during a pandemic compared to those working at the office, where they have their colleagues to share their concerns with. The lack of support in one's environment impacts stress levels in women WFH. Females working from home reported higher levels of work exhaustion compared to their colleagues who remained at the office (So Young Bae et al., 2020).

In a recent survey done in Malaysia by Vimala Balakrishnan et al. (2020), it was found that 37 percent of the women (664) surveyed experienced emotional distress during the movement control order (MCO), while 33 percent (592) experienced depression and 24 percent (430) experienced stress during the pandemic, particularly when the MCO was in place. This finding indicates that an intervention in the form of online social support needs to be formed to offer psychological

help to these working women. Since affected women might have limited access to physical social support due to the MCO, it is interesting to investigate how these social networks can facilitate mothers to help them cope with their mental health and well-being.

To the researchers' knowledge, there is no or limited online social support on social networks that is professionally set up and monitored to help these mothers to seek help regarding their mental health and well-being. Thus, this study was conducted to understand the impact of social networks in assisting women WFH to cope with psychological distress and provide suggestions on how the social networks can be further leveraged to develop these women's resilience in facing future health threats.

37%

of the women surveyed experienced emotional distress during the MCO.

33%

experienced depression during the pandemic.

24%

experienced stress during the pandemic.

INTRODUCTION

**Research Objectives**

Studies have shown that, in general, women who work from home do face challenges in juggling various personal and professional responsibilities simultaneously. More often than not, social media is their means to share their grief, difficulties and distress with friends and colleagues, especially during the COVID-19 pandemic where face-to-face communication was almost non-existent. Hence, this research was carried out to understand the impact of social networks in assisting women working from home (WFH) to cope with psychological distress. The study addressed the following research objectives:

- 1** To identify the level of psychological distress faced by women WFH.
- 2** To investigate the extent to which social networks help women WFH to cope with psychological distress.
- 3** To investigate the women WFH's perception on the effectiveness of social networks in providing support to them in coping with psychological distress.
- 4** To provide suggestions on how the internet (including social media) can be further leveraged to provide support to women WFH in coping with psychological distress and make them more resilient.

LITERATURE REVIEW

The use of social networks among working mothers

The Working Mother Research Institute (USA), in 2016, reported that 92 percent of working mothers use social media compared to 84 percent of working fathers. This shows that a high number of working mothers use and have access to social media in their daily life. According to the survey, most working mothers spend their time on Facebook, YouTube, Pinterest, and Instagram. One of the main reasons why they use social media is to share and get information, as well as to connect with individuals who share the same interests.

92%

of working mothers use social media.

84%

of working fathers use social media.

In Malaysia, there are several studies looking into the use of social networks. However, to date, not many studies have looked or are looking into the beneficial use of social networks among working mothers and how they use social networks to get the social support needed to help them cope with stressful situations during the pandemic. Thus, an investigation on this issue should be carried out, which makes the present study very relevant and timely.

The online communities and social support for working mothers

According to Preece (2004), an online community is defined as “a group of people, who come together for a purpose, online, and who are governed by norms and policies and supported by software”. Generally, two major activities take place in an online community. They are: 1) posting one’s opinions or knowledge; and 2) browsing information or opinions posted by other members. Online communities have not only served an essential role in promoting businesses, but have also become a space to enjoy social leisure, particularly for mothers to overcome social isolation and exchange social support based on a strong sense of companionship (Bae et al., 2020). According to the researchers, online communities function as “open collectives of dispersed individuals with members who are not necessarily known or identifiable and who share common interests” (Bae et al., 2020, p.2).

LITERATURE REVIEW

Social support can be found in any online community. Social support theory postulates that an increase in social support will result in an increase in well-being irrespective of the existing level of support (Ruffulo, 1989).

A study done by Duggan et al. (2015) indicated that 75 percent of parents use social media. They turn to social media for parenting-related information and social support. The social support that is available from these online communities could enable these parents to minimise their daily

stress, reduce depressive feelings and experience positive energy. However, research of this nature is very limited in Malaysia. The nearest was a study done by Siti Rafiah & Sakinah Salleh in 2013 which explored issues and coping strategies in the single parenting process in Malaysia among Malay women. Research that investigated online social support for working mothers in coping with psychological distress, especially during the pandemic, is even more scarce.

Two major activities take place in an online community:

1 Posting one's opinions or knowledge.

2 Browsing information or opinions posted by other members.



LITERATURE REVIEW

The mental health and well-being of women

In their study among married working women in Malaysia, Umi Adzlin Silim et al. (2011) found that:

22.8%

of married working women are psychologically distressed.

16%

have severe psychological distress or probable depressive disorders.

5%

have clinical depression which was under-diagnosed and not treated.

Apart from that, the study found that 82 percent of those diagnosed as having depressive disorders had neither been diagnosed nor had contact with mental health services before. This is indeed an alarming issue because if they do not manage to seek help from an appropriate service centre, an online platform should be developed to assist them. Considering that this study was done a decade ago, the percentage could be much higher now since the number of women who are in the labour force is also increasing year on year. Immediate actions need to be taken to address the mental health issues among these working women as they are also contributing to the nation's economy, their children's well-being, and to society.

In a recent survey carried out by Vimala Balakrishnan et al. (2020), they found that Malaysian women are having trouble coping during the pandemic. Some participants in the survey even contemplated suicide as they felt very depressed. While financial assistance has been laid out by the government to affected individuals and households during the MCO, it is imperative that social support should also be provided to this group of citizens. Apart from the mental health centres that are already available physically, online avenues should be developed, as when a pandemic strikes, physical contact is prohibited. Hence, online social support may benefit these working mothers in getting the help they need.

LITERATURE REVIEW

In Malaysia, a few agencies have taken several initiatives to address the psychological issues of its citizens during the pandemic (Nurashikin, 2021). Firstly, the mental health and psychosocial support services under the Ministry of Health offer a tele-psychosocial support hotline. There are other similar hotlines set up by other agencies too, such as *Perkhidmatan Atas Talian Percuma Bagi B40, Talian Bantuan Psikologi dan Kaunseling* Malaysian Relief Agency (MRA) and so on. The Ministry of Women, Family and Community Development Malaysia (KPWKM) has also introduced its tele-counselling service, called *Talian Kasih*, to provide counselling services by registered counsellors under the Board of Counsellors (Mardiyya, 2021). In total, KPWKM received a total of 2,108 clients for this service alone. The Ministry also suggested that a strategic collaboration, technological advancement, and sustainable advocacy programme should be taken up as a way forward.

In addition, the National Security Council in the Prime Minister's Department proposed a concept called 'Comprehensive Security' that discusses six strategies to cope with the pandemic (NSCPM, 2021). They are: security mind setting, societal mind setting, community resilience, volunteerism, use of technology and effective communication. These strategies contain the initiatives that aim to build community resilience due to the impact of the security situation, which includes pandemics. They emphasise strategic communication, comprehensive mind setting, community interaction, outreach communication, support systems through technology and comprehensive communications as integral parts of National Security management.

LITERATURE REVIEW

However, while many excellent services and initiatives are being set up and offered to the needy, especially tele-counselling, unfortunately, these services are all functioning in isolation, and they could be repetitive too. Sometimes, when too many services are being offered to a specific target audience, it will be difficult for individuals to identify and select the help they need.

Therefore, the researchers believe that a centralised national initiative with effective collaboration among different agencies should be established to assist women in dealing with psychological distress. Recently, the Ministry of Health (MoH) has introduced a national plan called '*Pelan Strategik Kesihatan Mental Kebangsaan 2020-2025*' or National Strategic Plan for Mental Health 2020-2025 (NSPMH 2020-2025). It is aimed at minimising the gaps in the MoH's efforts in delivering mental health services to the citizen.

While the plan focuses more on government agencies, the role of private companies as employers should be included and highlighted too. For example, the International Islamic University Malaysia (IIUM) has instituted the IIUM Policy on Mental Health for its staff and students which aims, among others, to foster equal opportunity for all, eliminating all forms of unlawful discrimination and encouraging good attitudes towards people, which will eventually improve the quality of life (Zaidi, 2021).

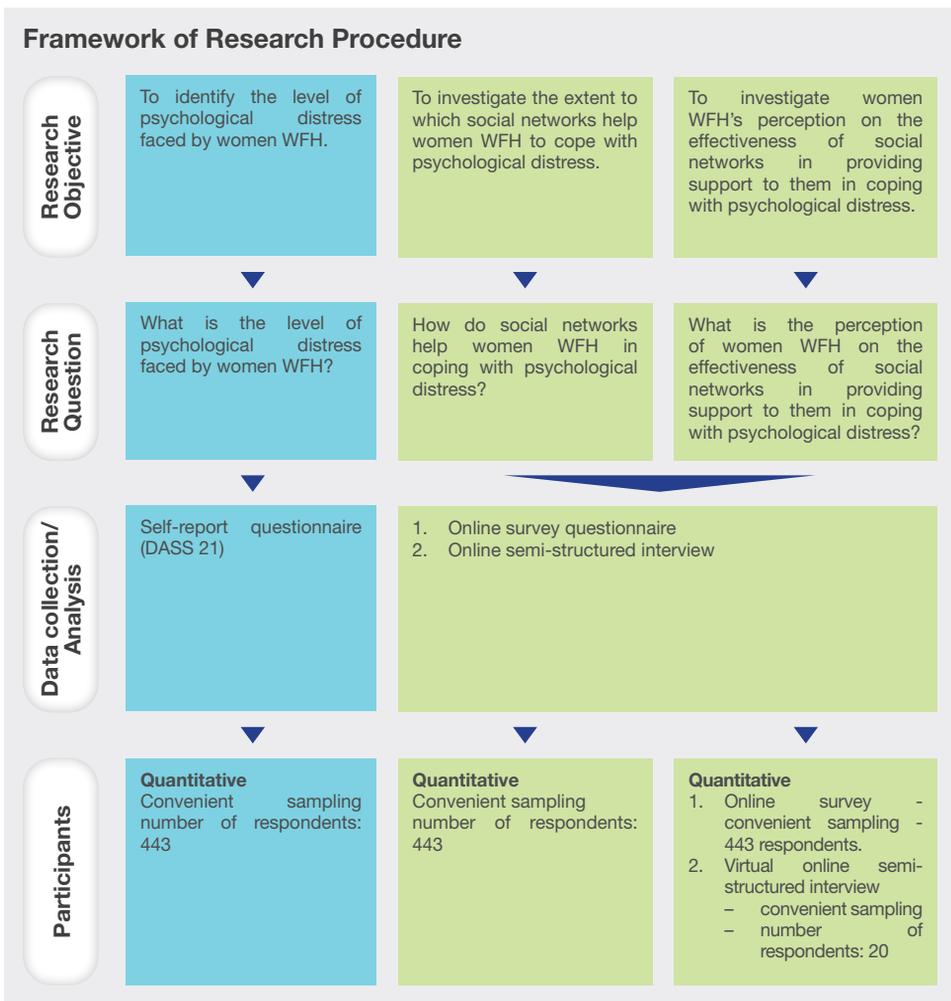
Moreover, in the effort to collaborate and synergise with various stakeholders, it is noted that the NSPMH 2020-2025 lacks an integration of religion spirituality and mental health services (i.e. interventions). Past research has shown that religio-spiritual integrated psychological treatments have resulted in greater psychological and spiritual improvements compared with no treatment controls and standard non-religio-spiritual psychotherapy (Captari et al., 2018; Koenig et al., 2012; Abd Khaiyom et al., 2019).

METHODOLOGY

Overall Research Design

This study employed a mixed-method approach as illustrated in the framework of the research procedure in Figure 1.1 below.

FIGURE 1.1 THE OVERALL RESEARCH DESIGN AND PROCEDURES FOR THIS STUDY



FINDINGS AND ANALYSIS



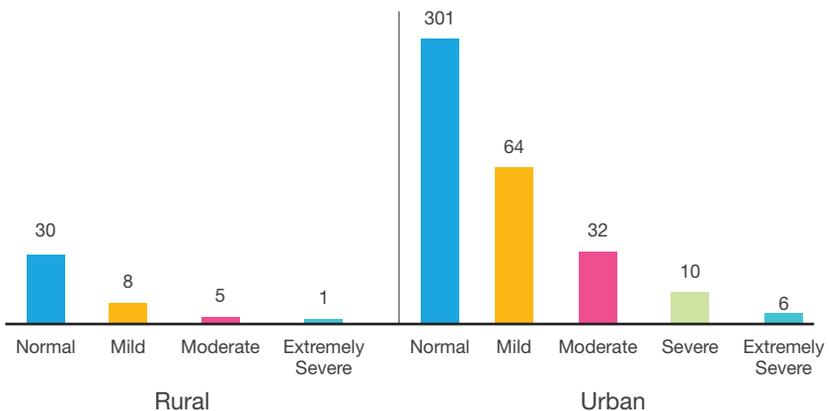
Research Objective 1: To identify the level of psychological distress faced by women WFH

Depression, Anxiety, and Stress Scale 21-item (DASS-21) was used to examine the mental health status of the participants during the data collection from the perspectives of psychological distress. The level of psychological distress examined involved the level of depression, anxiety, and stress symptoms of the participants. Further information on the findings of DASS-21 can be viewed in Figure 1.2, Figure 1.3, and Figure 1.4.

FIGURE 1.2 LEVEL OF DEPRESSION

DEPRESSION - Mental Health Status

	Rural	Urban
Normal	68.18%	72.88%
Mild	18.18%	15.50%
Moderate	11.36%	7.75%
Severe		2.42%
Extremely Severe	2.27%	1.45%
Grand Total	100.00%	100.00%

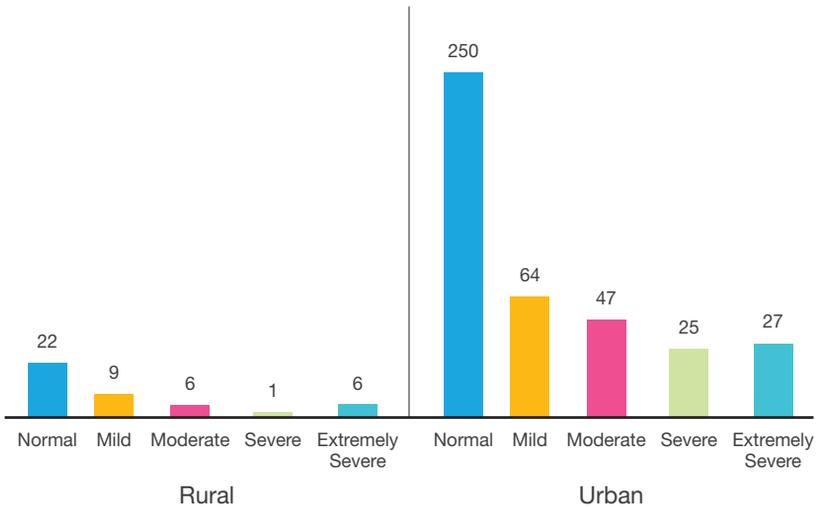


FINDINGS AND ANALYSIS

FIGURE 1.3 LEVEL OF ANXIETY

ANXIETY - Mental Health Status

	Rural	Urban
Normal	50.00%	60.53%
Mild	20.45%	15.50%
Moderate	13.64%	11.38%
Severe	2.27%	6.05%
Extremely Severe	13.64%	6.54%
Grand Total	100.00%	100.00%

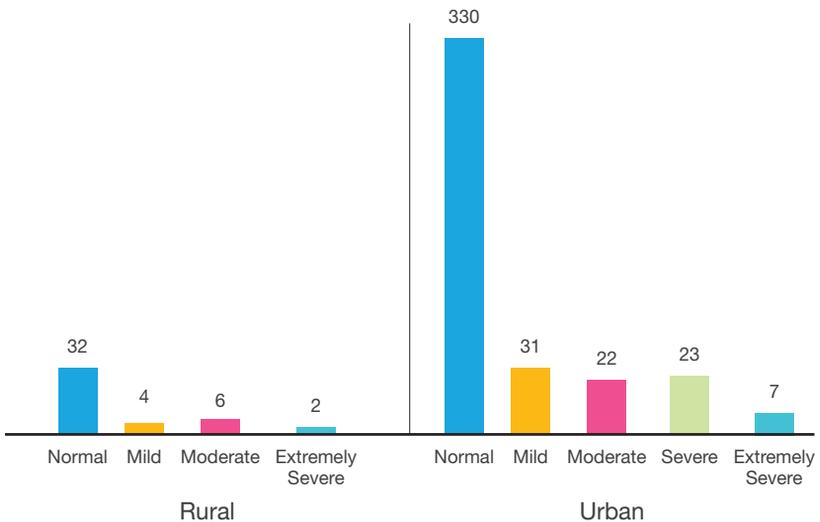


FINDINGS AND ANALYSIS

FIGURE 1.4: LEVEL OF STRESS

STRESS - MENTAL HEALTH STATUS

	Rural	Urban
Normal	72.73%	79.90%
Mild	9.09%	7.51%
Moderate	13.64%	5.33%
Severe		5.57%
Extremely Severe	4.55%	1.69%
Grand Total	100.00%	100.00%



FINDINGS AND ANALYSIS

457 participants (Urban n=413; Rural n=44) participated in the survey. Referring to Figures 1.2, 1.3, and 1.4, the majority of the participants (i.e. > 50 percent) rated themselves as having normal levels of depressive, anxiety, and stress symptoms. The normal level here may indicate that the participants have non-significant clinical issues pertaining to their mental health. The patterns are similar for participants who live in urban or rural areas.

Figure 1.2 illustrates that about 72.88 percent of the participants in the urban areas and 68.18 percent of the participants in the rural areas experienced normal levels of depressive symptoms. Meanwhile, for levels from mild to extremely severe, those in the rural areas 31.81 percent recorded higher levels as compared to those in the urban areas (27.12 percent). This shows that those in the urban areas were able to handle depression better than those in the rural areas.

Generally, higher prevalence rates could be seen in the levels of anxiety for both urban and rural respondents (see Figure 1.3). However, for levels from mild to extremely severe, those in the rural areas (50 percent) recorded higher levels as compared to those in the urban areas (39.47 percent). This shows that those in the rural areas were having more anxiety problems than those in the urban areas.

If the origin of anxiety is internal (i.e. persistent perceptions of COVID-19 as a threatening situation), stress is a response to an external event (i.e. COVID-19 itself). Based on Figure 1.4, about 20.1 percent of the participants in the urban areas and 27.28 percent of the participants in the rural areas experienced mild to extremely severe levels of stress. Again, this shows that women in the rural areas are facing more stressful issues as compared to their urban counterparts.

Based on the literature and clinical observations, the findings indicate that people who are experiencing severe and extremely severe levels of depression, anxiety, and/or stress may be struggling with clinical mental health problems (e.g. Acute Stress Disorder, Adjustment Disorder, Major Depressive Disorder, Persistent Depressive Disorder, Panic Disorder, Generalised Anxiety Disorder). However, comprehensive clinical assessments need to be done to confirm the assumption since DASS-21 is only a screening tool. Nevertheless, taking into consideration the duration of COVID-19 and the lockdowns that Malaysians are living with, and the number of positive cases and deaths that could trigger traumatic experiences, the above assumptions may be correct.

FINDINGS AND ANALYSIS

The findings for this part are:

- The majority of women from both urban and rural areas indicated having normal levels of depression, anxiety and stress.
- However, for levels from mild to the extremely severe, women in the rural areas seemed to experience a higher level of depression (Urban: 27.12 percent; Rural: 31.81 percent), anxiety (Urban: 39.47 percent; Rural: 50 percent) and stress (Urban: 20.1 percent; Rural: 27.28 percent), while those in the urban areas were able to manage these psychological elements better. However, due to the limited sample size of those from the rural areas, this finding cannot be generalised.
- Women from both urban and rural areas experienced anxiety more than depression and stress. Based on the literature on mental health status and COVID-19, many people developed anxiety symptoms due to their apprehension about the future. The uncertain, unpredictable, and uncontrollable situations of COVID-19 maintained the symptoms.

FINDINGS AND ANALYSIS



Research Objective 2: To investigate the extent to which social networks help women WFH to cope with psychological distress

The following figures show the purpose of using social networks among working women.

FIGURE 1.5 PURPOSE(S) OF USING SOCIAL NETWORKS



FINDINGS AND ANALYSIS

TABLE 1.1: PURPOSE(S) OF USING SOCIAL NETWORKS

THEMES	URBAN	RURAL	QUOTES
1. Work/work-related matters	170	11	181
2. Updates on current issues/trends/news	141	20	161
3. Socialising/keeping in touch	128	16	144
4. For nothing/to occupy free time/entertainment	56	9	65
5. De-stressing/resting/ taking a break from WFH	49	2	51
6. Seeking knowledge/info (and sharing)	40	6	46
7. Children's online education	24	5	29
8. Income generation/online business	14	1	15
9. For inspiration/keeping happy	9	2	11
10. Online shopping	9	0	9
11. Reduce risk of COVID-19 infection	1	0	1

Figure 1.5 shows that there are 11 main purposes of using social networks among women WFH. Moreover, Table 1.1 illustrates the comparison of the use of social media among working women from urban and rural areas.

From Table 1.1 above, it can be seen that most of the women in urban areas used social networks mainly for work or work-related matters; however, most women in rural areas preferred using them to get updates on current issues/trends/news. The second most preferred activity on social networks for women in urban areas is getting updates on current issues/trends/news, while women in rural areas used them to socialise with relatives, friends, and colleagues. The third most frequent

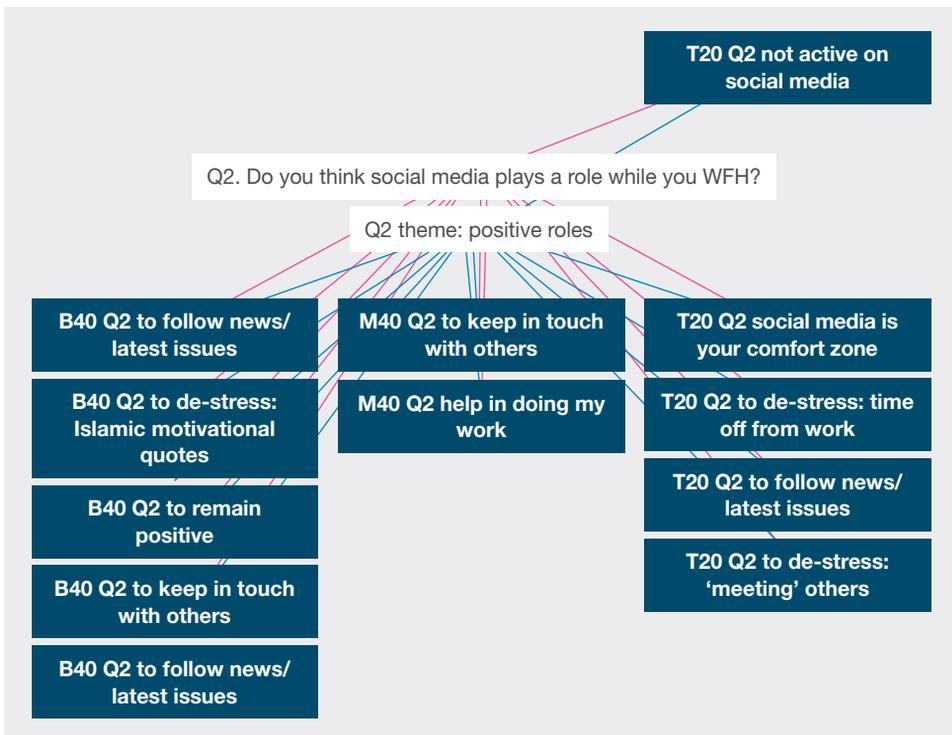
FINDINGS AND ANALYSIS

activity on social networks by women in urban areas is socialising and for those in rural areas, for work or work-related matters. The next most frequent activity on social networks for both groups of women is for entertainment purposes.

De-stressing/resting/taking a break from work-from-home is the fifth most frequent activity for urban women, while women in rural areas prefer to seek knowledge or information and share it with their communities.

The findings above are further corroborated by the data from the semi-structured interview, which indicated that all the respondents, irrespective of income brackets, agreed that social media played a positive role while they were working from home, as shown in Figure 1.6 below. One key reason mentioned in their feedback is the crucial role of social media in allowing them to ‘keep in touch with others’.

FIGURE 1.6 ROLES OF SOCIAL MEDIA DURING WFH



FINDINGS AND ANALYSIS

It could be deduced from this data that, in general, women who are working from home do make positive use of social networks, particularly to complete job-related matters, seek new information, socialise, and entertain themselves. This is supported by the high level of normal cases of depression, anxiety, and stress among women both in urban and rural areas, as reflected in the results from DASS 21. WhatsApp is the most common type of social media used by women WFH and the majority of them spent 3-5 hours per day on social networks.



Research Objective 3: To investigate womens Working From Home's (WFH) perception on the effectiveness of social networks in providing support to them in coping with psychological distress

An analysis of the survey questions indicated that the top three main challenges faced by women WFH are 'juggling different responsibilities', 'workload and long working hours', and 'lack of resources to get work done'. This is illustrated in Table 1.2 below where it can be seen that 115 quotes were recorded under 'juggling different responsibilities', of which 102 came from respondents in urban areas while 13 came from those in rural areas. Meanwhile, 42 quotes were detected for 'workload and long working hours', with 35 from urban and seven from rural respondents. As for 'lack of resources to get work done', 40 quotes were found, of which 38 came from urban areas and two came from rural areas.

FINDINGS AND ANALYSIS

TABLE 1.2: CHALLENGES DURING WFH

CHALLENGES	NUMBER OF QUOTES		
	URBAN	RURAL	QUOTES
Adapting to new norm – stressful	4	0	4
Boring routine	3	0	3
Children’s online learning – stressful	17	0	17
Lack of interaction	17	3	20
Family matters/handling children	18	3	21
Unconducive working environment	9	0	9
Internet connection	23	4	27
Juggling different responsibilities (work/family)	102	13	115
Lack of energy, sleep, rest and meals	3	2	5
Lack of social support	6	1	7
Long hours of being indoors	1	0	1
Lack of focus on work due to family	27	3	30
Low self-esteem, not confident	1	0	1
Need for more gadgets/updated IT skills	5	0	5
Limited activity & dormant life	2	1	3
Time management – too many things to handle	28	0	28
Difficult to remain positive/ disciplined	3	0	3
Lack of resources to get work done	38	2	40
Work-related (teaching challenges)	26	2	28
Workload & long working hours	35	7	42
	368	41	409

FINDINGS AND ANALYSIS

As for their feelings while WFH, only 79 quotes (out of 259 quotes) showed positive emotions such as ‘happy/ ok/ positive’ and ‘more relaxed after some time’, while the majority of them indicated negative feelings. The top three most negative emotions recorded were ‘stress/ challenging / overwhelming’ with a total of 61 quotes; ‘unhappy/ distracted/ anxiety/ demotivated’ with 35 quotes; and ‘tired/ lethargic’ with 31 quotes. The data is presented in Table 1.3.

TABLE 1.3 FEELINGS DURING WORKING FROM HOME (WFH)

FEELINGS	NUMBER OF QUOTES		
	URBAN	RURAL	QUOTES
Happy/okay/positive (+ve)	68	5	73
More relaxed after some time (+ve)	6	0	6
Agitated/annoyed or angry	4	1	5
Bored	9	2	11
Guilty	3	0	3
Lonely	4	0	4
Mixed feelings	27	3	30
Stress/challenging/overwhelming	53	8	61
Tired/lethargic	29	2	31
Unhappy/distracted/anxiety/ demotivated	31	4	35
	234	25	259

However, when respondents were queried during the interview sessions on their perception on WFH after almost two years, most of them provided positive inputs irrespective of their income brackets. Some of the positive themes generated were ‘more time for herself [oneself]’, ‘more flexible’, ‘more productive’, ‘more relaxing’ and ‘work-life balance’. Furthermore, it was noted that B40 and T20 shared one common theme, which was ‘more time with family’. Nevertheless, the data also showed some negative perceptions such as ‘backlog/ more work at once’, ‘not easy to get approval [for Working From Home]’, ‘less focus’ and ‘others still biased to the idea [biasness towards Working From Home]’.

FINDINGS AND ANALYSIS

In terms of the effectiveness of social media in providing support to women in handling emotional distress, data from the qualitative part of the survey indicated that a majority of the respondents provided positive feedback, with 364 total quotes. The top three main reasons for its effectiveness were ‘release from stress’ (82 quotes), ‘connected with others’ (68 quotes) and ‘social media is informative’ (57 quotes). Meanwhile, the data also showed the fundamental reasons for the ineffectiveness of social media in providing the much-needed support, which were ‘social media is toxic’, ‘too much info can create anxiety/uneasiness’ and ‘virtual bonding is difficult to form’. The detailed data is presented in Tables 1.4 and 1.5.

TABLE 1.4: REASONS FOR EFFECTIVENESS

YES	NUMBER OF QUOTES		
	URBAN	RURAL	QUOTES
If you choose wisely/right content	33	2	35
If you know how to handle yourself/emotions	10	3	13
It helps in doing my work	7	2	9
It’s a sharing platform	27	3	30
It’s convenient/necessity	4	0	4
It’s informative/full of knowledge	49	8	57
Connected with others	60	8	68
Finding solutions	6	1	7
Gain income	1	0	1
Get moral/emotional support	17	1	18
Learn from others	11	0	11
Release stress/relaxing	76	6	82
Remain positively motivated	23	2	25
Shop online	4	0	4
	328	36	364

FINDINGS AND ANALYSIS

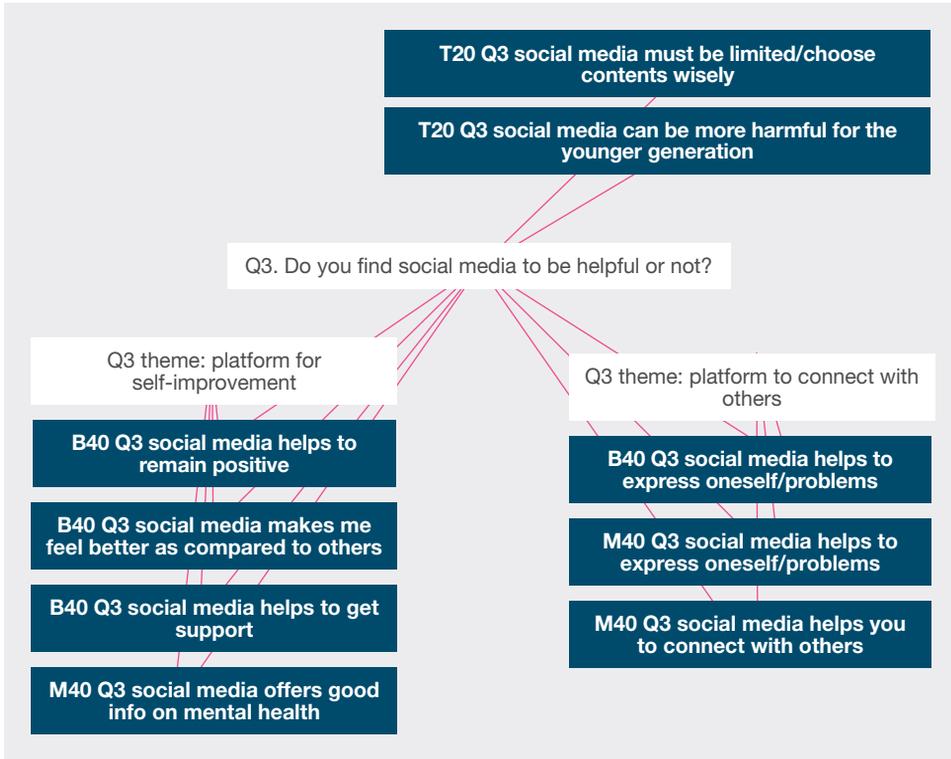
TABLE 1.5: REASONS FOR NON-EFFECTIVENESS

NO	NUMBER OF QUOTES		
	URBAN	RURAL	QUOTES
Distraction from work	4	0	4
Started comparing with others	4	1	5
Support too general, not individualised	3	0	3
Never-ending workload	6	1	7
Not a healthy way of healing oneself	4	1	5
Social media is toxic	12	1	13
Too much info can create anxiety/uneasiness	8	1	9
Too much pressure	6	1	7
Virtual bonding is hard to form	9	0	9
No (no reason provided)	8	3	11
Other means are better	6	0	6
	70	9	79

The data above is further corroborated by the input provided via the interview on whether social media is helpful for mental health. Generally, all the respondents provided positive feedback which could be categorised into two entities, which were: 1. Social media as a platform for self-improvement, and 2. Social media as a platform for communication. Nevertheless, a few respondents from T20 also highlighted the dangers of social media to the younger generation particularly and stressed that one must be wise and cautious in selecting suitable content. Further data on the findings can be found in Figure 1.7.

FINDINGS AND ANALYSIS

FIGURE 1.7: SOCIAL MEDIA IS HELPFUL FOR MENTAL HEALTH



Among the key findings for this Research Objective are the following:

- The biggest challenge faced by women WFH was juggling different responsibilities, followed by heavy workloads and long working hours.
- The majority of the respondents indicated having negative feelings while working from home, such as feeling agitated, annoyed, bored, stressful, etc.
- Those who experienced positive feelings working from home related that to having more time with the family, more time for oneself and more work-life balance.

FINDINGS AND ANALYSIS

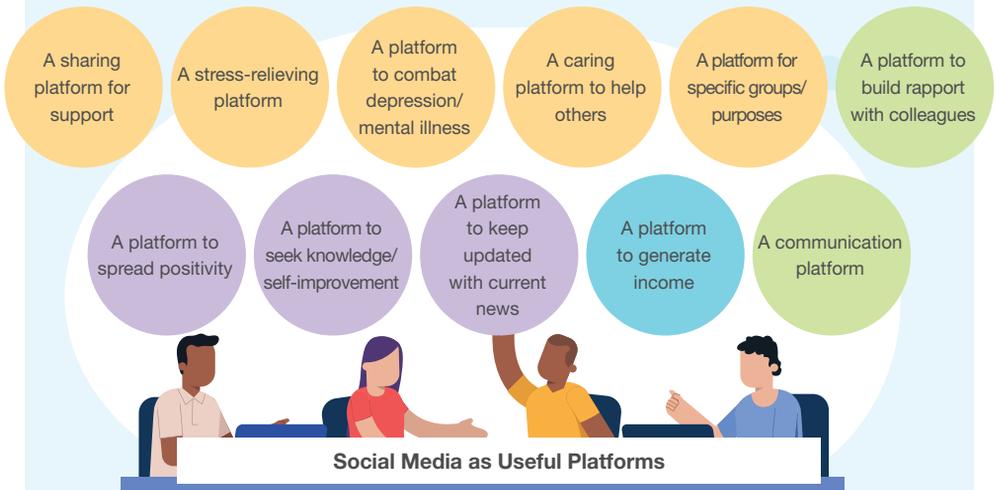
- In terms of the effectiveness of social media in providing support to women in handling emotional distress, the majority of the respondents provided positive feedback, with the top three main reasons being 'release from stress', 'connected with others' and 'social media is informative'.
- Social media is deemed helpful in addressing mental health issues based on its two main roles, i.e. as a platform for self-improvement and as a platform for communication.



Research Objective 4: To provide suggestions on how the internet (including social media) can be further leveraged to provide support to women Working From Home (WFH) in coping with psychological distress and make them more resilient.

The overall feedback is shown in Figure 1.8 below.

FIGURE 1.8: USES OF SOCIAL MEDIA



FINDINGS AND ANALYSIS

From the diagram above, it could be noted that the roles of the internet (including social networks) could be divided into four (4) main categories which are: 1. A caring platform to help others; 2. A platform to seek knowledge / self-improvement; 3. A communication platform; and 4. A platform to generate income.

Social media as a caring platform denotes that it is developed for specific groups of people, i.e. people who are facing some life challenges due to psychological distress and for specific, rather than general, purposes. It enables the participants to handle their depression or mental illness by receiving and providing much-needed support which eventually will help them to relieve their stress. Besides that, social media enables people to seek knowledge and attain self-improvement by keeping themselves updated with current news and benefiting from positivity that is being broadcast to the masses. Furthermore, social media or the internet is a good platform to enhance communication, especially in building rapport with colleagues. Finally, the respondents also suggested that social media / the internet could be a suitable platform to generate income as financial difficulty due to the lockdowns is also a source of psychological distress.

Some important cautionary remarks to social media users. These are:

- a. Information should be filtered
- b. Learn from others but don't compare
- c. Avoid toxic content - read good information only
- d. Limit the time on social media - be disciplined
- e. Control yourself or your emotions
- f. Don't simply share things you read.

In terms of their preference for support, three (3) main themes were derived which were: 1. Preference for face-to-face support; 2. Preference for online support; and 3. Preference for support through different methods.

Among the reasons given by the respondents for their preference for face-to-face support were that it allows for better communication and interaction due to a lack of barriers between the speakers; that mental health issues could be discussed openly but discreetly as they are not recorded (as would an online meeting be); and that it provides a more conducive environment for communication as going out to meet new people would allow one to gain new perspectives in life. As for the preference for online support, respondents indicated that it was preferred as it protects the identity and privacy of the speakers.

FINDINGS AND ANALYSIS

On the respondents' awareness of social support for mental health issues, it could be deduced that most of them have limited knowledge. Although they have never used any of the services, the most common social support cited by them were Befrienders, *Talian Kasih*, *Talian Nur*, and Telenita. Regarding the suitability of WFH as an option for the working environment in the future, most of the interviewees agreed to this while a few of them suggested that the government and employers should offer other options such as alternating between WFH and working from office (WFO). Among the reasons for their support of WFH were that it benefits their families, it is more productive, it leads to a healthier body and mind, and it leads to a more comfortable environment which is less stressful.

Some of the key findings of this research are that:

- The internet (including social networks) could be further leveraged in providing support to women WFH in four (4) different ways:
 - a. A caring platform to help others
 - b. A platform to seek knowledge/self-improvement
 - c. A communication platform
 - d. A platform to generate income.
- In terms of the women's preference in regard to the nature of the support, three main themes were derived which were: 1. Preference for face-to-face support; 2. Preference for online support; and 3. Preference for support through different methods.
- In regard to their awareness of existing social support for mental health issues, it could be deduced that most of them have limited knowledge.
- Most of the interviewees agreed to the idea of WFH as a suitable option for the working environment in the post-pandemic era, while a few of them suggested that the government and employers should offer other options such as alternating between WFH and WFO.

RECOMMENDATIONS

Based on the review of literature and the key findings of this study, in order to develop women's resilience in facing future health threats, this study would like to put forth the following recommendations.

1. A National Mental Health support platform should be established in accordance with the National Strategic Plan for Mental Health 2020-2025 (NSPMH) which may embody the following criteria:
 - a. One single platform which is holistic in nature, integrating and synergising the involvement of various stakeholders such as relevant Ministries, agencies, NGOs, and employers.
 - The role of employers both in the public and private sectors must be heightened to ensure the success of this collaborative initiative. Merely "equipping workers with appropriate knowledge, attitude and skills on mental wellbeing and establishing good work-life balance skills" (NSPMH 2020-2025, p. 43) may not be sufficient. Employers need to have their own internal policy on staff mental health to safeguard the well-being of the employees.
 - The collaborative effort also needs to integrate components of religion/spirituality by bringing in religious leaders of various faiths. Integrating religious coping techniques with evidence-based mental health interventions should be emphasised. However, it is equally crucial that these religious leaders should have received training on the subject matter to enlighten them on how important their roles are in this initiative.
2. Besides that, in determining work-life balance in the post-pandemic era, changes in terms of work policy are also fundamental, such as flexible or hybrid working conditions. This corresponds to the amendments that shall be made to the Employment Act on flexible schedules and a shorter work week for working women (The Star, 29 November 2021). It is also the responsibility of employers to respect the boundaries of working hours.

CONCLUSION

In general, it could be concluded from this study that women who are working from home do face a lot of challenges, especially in juggling between different responsibilities, i.e. as mothers, wives, employees, caretakers, etc. Besides that, they have to handle heavy workloads and long working hours. This situation has led to the majority of them harbouring negative feelings such as agitation, annoyance, boredom, stress, etc.

Women in rural areas seemed to experience a higher level of depression, anxiety, and stress, ranging from mild to extremely severe, while those in urban areas were able to manage these psychological elements better. Women from both urban and rural areas experienced anxiety more than depression and stress.

In this regard, the internet (including social networks and social media) has huge potential which could be leveraged to provide effective and sustainable support to women in urban and rural areas of Malaysia to alleviate psychological distress while working from home. The top three (3) main reasons for the effectiveness of social media in providing support to women are that it could be a stress releaser, a communication platform and an information provider. Moreover, it is recommended that the nature of support given should embed these three (3) highly suggested elements: a caring platform to help others, a platform to seek knowledge and a platform for positive communication.

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PSYCHOLOGICAL FLEXIBILITY AND DIGITAL LITERACY IN THE NEW COVID-19 NORMAL

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ABSTRACT

The COVID-19 pandemic has impacted individuals in many ways. Individuals encounter mental health issues at home and the workplace. Social isolation can breed psychological distress, which can severely impact the individuals' lives and, if not treated, can bring about worrying repercussions. This study proposes that psychological flexibility be introduced to buffer psychological and emotional distress in these trying times, especially during social isolation. With psychological flexibility, individuals will not be adversely affected by social media. They would be able to enhance their knowledge on digital literacy and develop a strong sense of digital citizenship. Hence, this study researched the construction of a measure to examine Malaysians' psychological flexibility and digital literacy and also determined if there was a significant relationship between Malaysians' psychological flexibility and digital literacy. This study implemented a mixed-method research design with both quantitative and qualitative approaches. The findings of this study indicated that our proposed Malaysian Psychological Flexibility and Digital Literacy Measure (MPFDLM) can measure our respondents' psychological flexibility and digital literacy. The findings also recorded that psychological flexibility and digital literacy are significantly and highly correlated with one another. This implies that individuals with high psychological flexibility tend to have high digital literacy and conversely, individuals with low psychological flexibility tend to have low digital literacy.



Keywords: COVID-19, Psychological Flexibility, Digital Literacy

INTRODUCTION

When COVID-19 was declared a pandemic, social isolation became a necessary measure to combat the spread of the virus. Although it helped reduce the chances of the virus spreading, social isolation has also greatly affected social capital. As a concept, social capital refers to the social relations or connections that an individual might possess and the subsequent collective benefits from the said connections. Hence, such connections can be viewed as an individual's assets, which also act as enablers of goals. However, such connections require upkeep and maintenance, and they depend on frequent communication to avoid reciprocity that may decline as time passes (Coleman, 1990).

INTRODUCTION

The pandemic also bore witness to the impact of a relatively new social practice, known as ‘doomscrolling’. By definition, the term refers to “the tendency to continue to surf or scroll through bad news” (Merriam-Webster, 2020, “About Doomscrolling”, para.1). Current research suggests that frequent social media exposure during the pandemic is associated with high odds of anxiety (Gao, Zheng, Jia, Chen, Mao, Chen, Wang, Fu and Dai, 2020). This suggestion is further supported by previous studies identifying links between poor mental health and exposure to news of negative or traumatic events (Holman, Garfin and Silver, 2014).

When assessing the concept of citizenship, one can draw on Westheimer and Kahne’s (2004) three (3) conceptions of the good citizen: personally responsible citizen, participatory citizen, and justice-oriented citizen. However, in this modern era, with the presence of the virtual or online environment, regular citizenship has evolved into digital

citizenship, which requires a much more multi-layered understanding of its definition. On the other hand, digital literacy can be understood as “skills, strategies and stances that enable the representation and understanding of ideas using a range of modalities enabled by digital tools” (O’Brien & Scharber, 2008, pp. 66-67). Buchholz, DeHart and Moorman (2020) suggest that digital citizenship makes digital literacy critical as participation or engagement is a necessary and essential component and advocate that more than just technical skills are needed in this demanding digital world. During this pandemic, social isolation and dependence on social media are heightened, and the possibility of mental health being impacted by these phenomena is real.



INTRODUCTION

Problem Statement

According to the United Nations' "Policy Brief: COVID-19 and the Need for Action on Mental Health" (2020) report, mental health is declared one (1) of the most untended domains of health. It was said that there had been little investment in mental health, specifically in community-based services, and this situation is cause for alarm, especially in a COVID-19 pandemic situation. In this pandemic situation, individuals are more inclined to demonstrate heightened anxiety, stress, fear of becoming infected, compulsive checking and confirmation due to the menacing threat of being infected with COVID-19 (Taylor, Landry, Paluszek, Fergus, McKay & Asmundson, 2020). In such a situation, crises would impact people's lives adversely. On the one hand, individuals who had been able to cope are now perhaps less able to manage due to the many stressors engendered by the pandemic. This signals a decline in mental health for those individuals. On the other hand, for those who had previously suffered from poor mental health, their mental health could now be aggravated due to the pandemic.

The United Nations report continues to stress that further evidence obtained from various national surveys conducted depict that there is now widespread psychological distress.

Before the onset of COVID-19, most communities worldwide experienced limited and constrained access to affordable and effective mental health care (United Nations' "Policy Brief: COVID-19 and the Need for Action on Mental Health", 2020). With the ongoing threat of COVID-19, mental health services have been disrupted and people in long-stay mental care facilities fear being infected with the virus. Face-to-face care has decreased with the increase of barriers preventing physical interaction between patient and caregiver. Presently there is an increase in online services, but not all patients undergoing mental health treatment can access these online services. This situation has created a need to ensure other modalities of care provision are made available to the public, especially since social distancing is still being actively imposed. People also need to be informed through awareness of the mental health risks they face due to this pandemic and the severe repercussions they will face if these risks are left untreated.

INTRODUCTION

**Research Objectives**

1

To construct a measure to examine Malaysians' psychological flexibility and digital literacy.

2

To determine if there is a significant relationship between Malaysians' psychological flexibility and digital literacy.

LITERATURE REVIEW

To better fathom these emotional and psychological plights ailing individuals, this study proposes that psychological flexibility be introduced, encouraged, and used as a means to identify and be offered as a remedy to individuals suffering from debilitating mental health. Recent neuroscience research has indirectly paved the way for a better understanding of the biological basis of emotions (Barrett, 2017), facilitating numerous studies on emotions, the ubiquitous quality of emotions, and the stimuli and stressors that induce emotions (Trampe, Quoidbach & Taquet, 2015). Based on these studies, it is distressing to note that emotions may not always be positively regulated, which could hinder us from procuring optimal mental health. As it is, mental health awareness is an important

matter in Malaysia and globally. There could be severe repercussions and maladies if mental health problems are left unchecked, especially during this pandemic. An article in *The Malay Mail* dated 19 November 2020 stated that the Malaysian Health Ministry mentioned that 37,009 calls were placed to helplines during this COVID-19 pandemic, with more than half of those calls requesting emotional and psychological assistance.

37,009

calls were placed to helplines during this COVID-19 pandemic.

LITERATURE REVIEW

Another report in The Malaysian Reserve dated 29 January 2021 reported escalating incidents of Malaysians suffering deleterious mental health challenges due to the second Movement Control Order (MCO). This information depicts the emotional and psychological strain Malaysians have come under, especially during this pandemic. Hence, it is pivotal to study how Malaysians can regulate their emotional and psychological challenges, especially in these demanding times. We are anchoring this study on the premise that psychological flexibility is associated with digital literacy.

Ben-Itzhak, Bluvstein and Maor (2020) have noted that prevailing assessment measures of psychological flexibility measure aspects that are not directly related to psychological flexibility and partially measure psychological flexibility, thus not measuring the construct completely. Hence, this research aims to develop a valid and reliable measure to measure psychological flexibility in the Malaysian context. It also seeks to conduct more research on the 'acceptance' and 'self' aspects in the Acceptance and Commitment Therapy (ACT) and confirm how these can feature effectively in the new proposed Malaysian Psychological Flexibility Measure (MPFM).

Psychological flexibility is integral in the ACT foundation. The ACT is defined by Hayes, Levin, Plumb-Villardaga, Villatte and Pistorello (2013) as "an overarching model of key intervention and change processes..." (p. 2). One (1) of the six (6) core elements that form the ACT is acceptance. Hayes et al. (2013) view acceptance by itself and together with other ACT elements as being able to augment "persistence and willingness to engage in distressing tasks" (p. 10). On the one hand, acceptance is not a passive resignation for the individual to fate or chance or tolerance of an event. On the other hand, self refers to an awareness of the individual self emerging (Hayes et al., 2013). This awareness is crucial as the same cognitive processes employed in being aware of oneself would also enable us to understand others' perspectives and be concerned. This awareness also allows positive social functioning. Self permits a "secure psychological space for facing painful emotions or thoughts" (Hayes et al., 2012, p.13). Being aware of the self now is engendered by mindfulness. Hence, these two (2) aspects have been selected to be further researched as they are seen as instrumental in constructing the new measure of psychological flexibility for Malaysians.

LITERATURE REVIEW

Individuals need to know how crucial it is to be empowered to modulate their emotions via psychological flexibility and not be overwhelmed by certain emotions which could debilitate their thoughts and behaviour. Also, individuals need to know how to harness psychological flexibility to enhance their experiences in daily life. Psychological flexibility is associated with higher tendencies to practise good values. Individuals can navigate their life paths towards achieving control and mastery of their lives.

Hence, we propose that there must be an approach to promote and protect mental health specifically from pandemic-related afflictions which can impair mental health. We propose that digital literacy premised upon psychological flexibility be promoted positively as a construct which is pivotal for positive mental health. We also propose that a psychological flexibility measure that is especially specific to measuring the psychological flexibility of Malaysians be developed.

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This study adopted a mixed-method approach with a combination of quantitative and qualitative methods. This study has been conducted in two (2) phases: Phase One (1) for Item Development and Phase Two (2) for Scale Development. We began our research study with the qualitative approach. The usage of scales is to measure behaviours, perceptions, and emotions. The advancement of science and technology brings about new research and this in turn generates the need for new scales (Boateng, Neilands, Frongillo, Melgar-Quiñonez & Young, 2018). Hence, our aim is to develop a Malaysian Psychological Flexibility Measure specifically for this COVID-19 situation as we are of the opinion that prevailing measures of psychological flexibility do not specifically relate to the Malaysian context. The existing models may be non-representative in measuring the psychological distress Malaysians go through.

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Phase One (1) – Item Development

The following work has been undertaken during Phase One (1):

1. Conceptual Operationalisation of Psychological Flexibility and Digital Literacy

In conceptualising the Psychological Flexibility (PF) construct and the Digital Literacy (DL) construct, we adhered to the fact that psychological flexibility is constructed based on ACT's six (6) components, which are acceptance, defusion, self, the now, values and committed action (Hayes et al., 2013). We propose to develop a new measure of PF that can explore the impact of digital literacy on psychological flexibility based on the Malaysian experience.

2. Review of Literature

A comprehensive review of the existing literature on psychological flexibility and digital literacy was undertaken. The review focused on studies that have employed psychological flexibility as a construct to alleviate mental health.

3. Scale Development and Critique of Existing Measures

For this step, we have reviewed the following existing psychological

flexibility measures and other measures that we perceived to be relevant to the construction of the new measure:

- i. The Psychological Flexibility Questionnaire (PFQ) as developed by Ben-Itzhak, Bluvstein and Maor (2020);
- ii. The Mindfulness Attention Awareness Scale (MAAS) as developed by Brown and Ryan (2003);
- iii. The Acceptance and Action Questionnaire as developed by Hayes et al. (2006) and Bond et al. (2011);
- iv. The Short Health Anxiety Inventory (SHA-I) as developed by Salvoskis, Rimes, Warwick and Clark (2002);
- v. The Obsessive Compulsive Inventory-Revised (OCI-R) as developed by Foa et al. (2002);
- vi. The Xenophobia Scale (XS) as developed by van Zalk, Kerr, van Zalk and Tattin (2013).
- vii. The New Media Literacy Scale (NMLS) as developed by Koc and Barut (2016).

4. Development of Items and Related Dimensions

For this step, we have developed and identified the potential dimensions and items of the MPFDLM. The earlier conducted literature review

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would present possible dimensions that can be included in this new measure. This development also needs to consider that there is no existing measure on this to date.

Proposed Factor Structure and Content Validity

Content validity can be defined as the degree to which each item on the measure is fairly representative of the construct the measure intends to measure. At this point, each item in the measure was assessed for content representativeness and content relevance before measuring the construct. Factor structure can be defined as the correlational relationship existing between a number of variables thought to be measuring a specific construct.

Reliability, Convergent and Discriminant Validity

Convergent and discriminant validity are two (2) important aspects of construct validity. The convergent validity was checked on how closely the newly developed measure is related to other variables and measures with the same construct of psychological flexibility. It was confirmed that the new measure does correlate with related variables and does not correlate with unrelated variables. In the case of discriminant validity, it was confirmed

that the psychological flexibility construct measures that should not be theoretically related to each other are not correlated to each other. Statistically, discriminant validity coefficients should be markedly smaller than convergent validity coefficients. We have tested for the reliability of the proposed measure. As depicted in Table 2 (Section 5), the internal consistency reliabilities as indicated by the Cronbach's α for both subscales are excellent, with 0.93 for psychological flexibility and 0.90 for digital literacy.

Phase Two (2) – Scale Development

For Phase Two (2), a survey has been conducted to test the feasibility of the items in the proposed new measure.

The data collection began with a pilot study conducted on 20 November 2021. However, following a meeting with MCMC officers on 26 November 2021, the questionnaire was modified. The revised questionnaire was then uploaded onto Google Drive and the link was shared with the respondents of the study on 26 November 2021. The data collection exercise concluded on 30 December 2021, and 258 respondents responded to the questionnaire. There were 149 female respondents and 109 male respondents. Most of the respondents (53.1 percent) were from the 30-39 age range and the oldest respondent was in the 60 and above

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age range (0.4 percent). The research exercise started in late November 2021 after the approval from JEPeM, USM (16 November 2021) was obtained.

Findings and Analysis

The data analysis exercise was conducted from 31 December 2021 to 20 January 2022. The exercise was undertaken using the IBM SPSS 27 in order to analyse the quantitative data obtained from the questionnaire.

Exploratory factor analysis (EFA) was run to determine the psychometric properties of the MPFDLM. The EFA included the following procedures as recommended by Pett et al. (2003):

- i. The Kaiser-Mayer-Olkin (KMO) measure of sample adequacy was run for this sample to determine if the sample was appropriate for factor analysis;
- ii. The Kaiser criterion was used to determine the number of factors. This method suggests that factors with an eigenvalue > 1.0 should be considered; and
- iii. Factor loadings were obtained using the Oblimin rotation method. There are two major types of rotation methods in factor analysis – oblique or orthogonal. Oblimin is an oblique rotation method which assumes that the factors would be correlated to one another, whereas an orthogonal

method assumes that the factors are not correlated. Based on the identified factors, the items should preferably load greater than 0.40 on the appropriate factor and less than 0.40 on other factors.

Correlation analysis was used to examine the relationship between the dimensions or factors of the MPFDLM. Correlation in statistics is a technique which indicates how two variables are related or associated with each other.

Reliability Analysis

The reliability analysis depicts the extent to which our items in the MPFDLM are related to each other, and we can ascertain the extent to which the items in our questionnaire are related to each other. Also, through this analysis, we are able to exclude item/s which are not related. One example of a reliability analysis model is the Cronbach's alpha.

The means and standard deviations of the two subscales and the Cronbach's α coefficients can be found in Table 1 below. Mean in statistics refers to the average. Standard deviation is a measure of variability in a set of scores and indicates whether the scores are clustered around or spread out. Standard deviation refers to how much all scores in a set vary on average from the mean score.

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The internal consistency reliabilities as indicated by the Cronbach's α for both subscales are excellent.

TABLE 1: MEANS, STANDARD DEVIATIONS AND CRONBACH'S α FOR THE SUBSCALES

Item	Mean	SD	Cronbach's α
Psychological Flexibility	4.04	0.59	0.93
Digital Literacy	4.24	0.55	0.90

Correlational Analyses

Psychological Flexibility and Digital Literacy significantly correlate with each other, $r(256)=0.83, p<.0001$.

The means and standard deviations of the 19 MPFDLM items can be found in Table 2 below.

TABLE 2: MEANS AND STANDARD DEVIATIONS OF MPFDLM ITEMS

No	Item	Mean	SD
5.	I can easily use various e-payment methods to make online payments amidst the changes because of the COVID-19 pandemic	4.41	.75
6.	When I receive negative digital content, I am aware that I am able to also find positive digital content	4.22	.77
7.	In demanding situations, I am able to source for information from different types of digital media	4.31	.69
8.	I am prepared for changes in digital media	4.32	.71
9.	I can change my views based on my understanding of the political, economic and social aspects of media content	4.10	.70

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No	Item	Mean	SD
10.	I can easily use non-conventional ways to interpret social media messages from across different environments	3.87	.80
11.	I can determine the most appropriate digital media to complete an assignment using a totally different approach	4.17	.67
12.	When I experience online challenges and problems, I can evaluate numerous solutions that are able to overcome the issues	4.03	.71
13.	When necessary, I am able to make important decisions to change based on the authenticity of media content	4.01	.72
14.	I am an open person as compared to my friends in terms of being able to evaluate information on social media objectively	4.09	.76
15.	I am someone who can analyse, interpret and compare information from various social media platforms	4.09	.71
16.	I feel it is important to increase my knowledge of media ratings, threats and ramifications of media content from people I interact with	4.35	.69
17.	I can evaluate media content shared by others across various platforms because to me there are many perspectives to reality	4.16	.74
18.	I am able to use various hardware, software and operating tools to produce content reflecting that reality has many different aspects	4.03	.77
19.	When there are disagreements about digital media content, I am able to use my digital literacy to find various solutions	4.00	.79

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No	Item	Mean	SD
20.	I find it easy to contribute to a variety of media content although digital media content is diverse	3.88	.78
21.	I can collaborate with various digital users who may have different interpretations of media concepts	3.94	.83
22.	I am able to interact with diverse media users to use various ways to achieve a common goal	4.14	.76
23.	I am open and considerate when creating media content which reflects people's varied and unique lifestyles	4.16	.74

Factor Analysis

Factor analysis is conducted to determine patterns emerging from a set of variables. There are two groups of factor analysis; one is Exploratory Factor Analysis (EFA) and the other is Confirmatory Factor Analysis (CFA). Exploratory Factor Analysis is run to obtain patterns of correlations in data. EFA is usually implemented in research comprising the construction of measurement scales (as in our study).

Before Exploratory Factor Analysis (EFA) was run on the MPFDLM items, correlational analyses were run among all the identified 20 items to ascertain if the items were suitable for EFA. Based on the analyses, all the items were found to be correlated with another item with a magnitude of at least 0.30, with the exception of one (1) item: "I find using the MySejahtera hotspot tracker a challenge". Hence, the one (1) item was removed, and subsequent analyses were done based on the remaining 19 items.

The following EFA supported the psychometric properties found in the proposed MPFDLM:

- i. The Kaiser-Meyer-Olkin measure was 0.95, which indicated that the sampling was adequate for factor analysis;

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- ii. The Kaiser criterion (eigenvalue > 1.0 , an eigenvalue is a measure which measures the variance explained by a factor) indicated that there were two (2) factors;
- iii. The factor loadings of the items from the factor analyses followed a generally consistent pattern with our conceptualisation of two (2) subscales: Psychological Flexibility and Digital Literacy. Although several items were inconsistent with the model, the majority of the items were consistent; and
- iv. The factor pattern (this comprises factor loadings of the variables) and factor structure (this comprises the correlations between the variables and the factors) coefficients based on exploratory factor analyses of the MPFDLM can be found in Table 3 below. Based on the table below, item 4 has been removed and the remaining items are as follows:

TABLE 3: FACTOR PATTERN AND FACTOR STRUCTURE COEFFICIENTS BASED ON EXPLORATORY FACTOR ANALYSES OF THE MPFDLM

No	Item	Factor 1: Psychological Flexibility		Factor 2: Digital Literacy	
		Pattern	Structure	Pattern	Structure
5.	I can easily use various e-payment methods to make online payments amidst the changes because of the COVID-19 pandemic	-.13	.44	.84	.75
6.	When I receive negative digital content, I am aware that I am able to also find positive digital content	.05	.58	.78	.82
7.	In demanding situations, I am able to source for information from different types of digital media	.03	.57	.79	.81

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No	Item	Factor 1: Psychological Flexibility		Factor 2: Digital Literacy	
		Pattern	Structure	Pattern	Structure
8.	I am prepared for changes in digital media	.14	.62	.71	.80
9.	I can change my views based on my understanding of the political, economic and social aspects of media content	.26	.63	.56	.73
10.	I can easily use non-conventional ways to interpret social media messages from across different environments	.31	.50	.28	.49
11.	I can determine the most appropriate digital media to complete an assignment using a totally different approach	.48	.72	.36	.68
12.	When I experience online challenges and problems, I can evaluate numerous solutions that are able to overcome the issues	.53	.71	.25	.61
13.	When necessary, I am able to make important decisions to change based on the authenticity of media content	.41	.68	.40	.68

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No	Item	Factor 1: Psychological Flexibility		Factor 2: Digital Literacy	
		Pattern	Structure	Pattern	Structure
14.	I am an open person as compared to my friends in terms of being able to evaluate information on social media objectively	.51	.68	.25	.59
15.	I am someone who can analyse, interpret and compare information from various social media platforms	.73	.79	.09	.58
16.	I feel it is important to increase my knowledge of media ratings, threats and ramifications of media content from people I interact with	.40	.70	.45	.72
17.	I can evaluate media content shared by others across various platforms because to me there are many perspectives to reality	.62	.80	.27	.69
18.	I am able to use various hardware, software and operating tools to produce content reflecting that reality has many different aspects	.80	.81	.01	.55

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No	Item	Factor 1: Psychological Flexibility		Factor 2: Digital Literacy	
		Pattern	Structure	Pattern	Structure
19.	When there are disagreements about digital media content, I am able to use my digital literacy to find various solutions	.81	.80	-.01	.54
20.	I find it easy to contribute to a variety of media content although digital media content is diverse	.91	.85	-.10	.52
21.	I can collaborate with various digital users who may have different interpretations of media concepts	.93	.84	-.14	.49
22.	I am able to interact with diverse media users to use various ways to achieve a common goal	.89	.82	-.10	.50
23.	I am open and considerate when creating media content which reflects people's varied and unique lifestyles	.69	.79	.16	.62

There is a significant relationship between Malaysians' psychological flexibility and digital literacy. This is proven through the Correlational Analyses, which indicated that Psychological Flexibility and Digital Literacy are significantly correlated with each other, $r(256)=0.83$, $p<.0001$.

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The EFA was conducted using principal components analysis with the Oblimin oblique rotation method as the factors were expected to be related. Following Pett et al.'s (2003) guidelines, various criteria were used to determine the number of factors: the Kaiser criterion, the screen test, the interpretability of factors, the amount of variance explained, and a prior criterion based on the hypothesised MPFDLM model.

As described above, the EFA resulted in two (2) factors: an 11-item Psychological Flexibility (PF) subscale and an 8-item Digital Literacy (DL) subscale. Reliability analyses indicated that these two factors had high internal consistency. Hence, the EFA results provided support that the Malaysian Psychological Flexibility and Digital Literacy Measure (MPFDLM) can measure psychological flexibility and digital literacy.

The factor pattern and factor structure coefficients from the EFA are presented in Table 3. Items 12, 14, 15, 17, 18, 19, 20, 21, 22 and 23 loaded on Factor One and was labelled Psychological Flexibility. For example, item 12, “When I experience online challenges and problems, I can evaluate numerous solutions that are able to overcome the issues”, illustrates psychological flexibility in terms of being able to characterise the self as flexible, and item 14, “I am an open person as compared to my friends in terms of being able to evaluate information on social media objectively”, illustrates psychological flexibility in terms of self-characterisation as open and innovative (Ben-Itzhak, Bluvstein & Maor, 2014). Items 5, 6, 7, 8, and 9 loaded on Factor Two and was labelled Digital Literacy. For example, item 5, “I can easily use various e-payment methods to make online payments amidst the changes because of the COVID-19 pandemic”, illustrates the functional consumption (Koc & Barut, 2016) aspect of digital literacy. Items 10, 11, 13 and 16 seem to load on both factors. We assigned item 10 to Factor One as it represented Psychological Flexibility in terms of being able to characterise the self as flexible. We assigned items 11, 13 and 16 to Factor Two as they fit conceptually with the critical consumption (Koc & Barut, 2016) aspect of Digital Literacy.

- v. The reliability analyses of the eleven (11) items on the Psychological Flexibility subscale and eight (8) items on the Digital Literacy subscale indicated that both subscales had high internal consistency scores.

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The two (2) factors, PF and DL, were significantly and highly correlated with one another. In other words, individuals with high PF also tend to have high DL, or conversely, individuals with low PF tend to have low DL. This link between PF and DL has the following implications:

- i. Psychological flexibility can impact the digital literacy of individuals; and
- ii. It is pivotal that we emphasise the significance of cultivating psychological flexibility to enhance our digital literacy.

RECOMMENDATIONS

This study can be conducted on larger populations to include individuals from all walks of life to achieve more generalisability. For instance, the study on psychological flexibility and digital literacy could be conducted on school students. It is also imperative that school students both at the primary and secondary levels be exposed to psychological flexibility in a digital literacy context. This could be an effective consideration for future research, especially with a view to developing intervention strategies among school students who may be more susceptible to negative digital content. Exposure to psychological flexibility can be structured into an educational experience for these students. A layperson's perspective of this can be interpreted via understanding that psychological flexibility (in the sense of being in touch with the present and accepting the situation to find solutions to setbacks) is related to digital literacy and that psychological flexibility can circumvent the debilitating effects of negative media content. Having psychological flexibility enables one to be flexible and open to changes.

Although the empirical evidence from the study indicated that gender did not affect the respondents' psychological flexibility or digital literacy, there is nevertheless an urgent need for relevant stakeholders to be aware that psychological flexibility and digital literacy are pivotal in managing negative psychological impact in a digital context. Moreover, future research can also explore the possibility of psychological flexibility and digital literacy as reducers of depression among Malaysians.

RECOMMENDATIONS

Based on the MPFDLM items, an individual exemplifies psychological flexibility and digital literacy in these situations when:

1. The individual knows how to use 'Google' to search for tutorials on different social media platforms upon encountering technical issues.
(When I experience online challenges and problems, I can evaluate numerous solutions that are able to overcome the issues - Item 22)
2. The individual receives notification of a recent development via one social media platform, s/he would not jump to conclusions regarding the notification. Instead, s/he would check and verify the credibility and authenticity of the development through an independent news website or non-digital media source.
(I am someone who can analyse, interpret and compare information from various social media platforms - Item 15)
3. The individual wishes to share updates with friends, s/he is able to use different social media platforms to upload photos or videos.
(I find it easy to contribute to a variety of media content although digital media content is diverse - Item 20)
4. The individual is a member of an online gaming community, s/he is able to communicate online with others in order to complete an in-game task.
(I am able to interact with diverse media users to use various ways to achieve a common goal - Item 22)

CONCLUSION

This study has examined the relationship between psychological flexibility and digital literacy among Distance Education students at a local university in Malaysia. This study has shown that the Malaysian Psychological Flexibility and Digital Literacy Measure can measure psychological flexibility and digital literacy. Also, there is a significant relationship between psychological flexibility and digital literacy. Psychological flexibility and digital literacy are linked and with psychological flexibility, individuals are better equipped to manage navigating negative digital content.

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LESSONS LEARNED FOR INFORMATION SECURITY RISKS AMONG SMES FROM THE AFTERMATH OF COVID-19

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ABSTRACT

Small and Medium Enterprises (SMEs) have been badly affected by COVID-19. When most business activities are conducted via online platforms, enterprises' data is exposed to Information Security Risk (ISR) susceptibility. The Work from Home (WFH) norm compels most companies to avoid fully adhering to their information security controls, thus jeopardising the confidentiality and integrity of organisations' information. Obviously, to sustain and stay competitive in the post-COVID period, ISR, particularly cybersecurity, must be addressed and mitigated efficiently. Therefore, this study provides empirical evidence of the main challenges faced by the SMEs, their level of preparedness in terms of information security management (process), human capital capabilities (people) and technology enhancement (technology), and their impact on SMEs' business agility. Based on 12 semi-structured interviews of SMEs' decision-makers in Malaysia, mainly from Services and Manufacturing, the findings show that the level of preparedness of the SMEs can be categorised into two (2), namely Stage 1: Unaware and Stage 2: Fragmented Micro. The SMEs under Stage 2 recognise digitalisation has a potential risk, but they have limited insights into its cyber risk management practices. Despite the lack of a formal policy, the enterprises have a practice in place but prefer to handle incidents on a case-by-case basis. Challenges to adequately implement sound Information Security Practices include lack of management buy-in on the need to establish a formal policy on Information Security (InfoSec) as a preventive measure to minimise InfoSec risk, financial constraints and lack of knowledge on the best software or solution that best suits the needs of the SMEs, as well as lack of awareness, knowledge and ability to assess the possible threats to information security. To survive, SMEs need to develop strategies to optimise their 'Dynamic Capabilities' by formulating InfoSec policies that can be designed and customised to support the business processes and the characteristics of their operations in this challenging era.



Keywords: Information Security, Cybercrime, Small and Medium Enterprises, COVID-19, Dynamic Capabilities

INTRODUCTION

COVID-19 has changed the way business is conducted. When most business activities are conducted via online platforms, organisations' data is exposed to Information Security Risk (ISR) susceptibility. The Work From Home (WFH) norm compels most companies to evade their information security controls, thus jeopardising the confidentiality and integrity of organisations' information. In Malaysia, a total of 838 incidents of cybersecurity were reported to CyberSecurity Malaysia during the Movement Control Order (MCO) from 18 March to 7 April (Keng, 2020). Globally, PwC's Global Economic Crime and Fraud Survey 2020 reported that for the past 24 months, the highest number of fraud cases faced by businesses was cybercrime, and the number is expected to grow in 2021 (PwC, 2020). The COVID-19 pandemic has hugely impacted multinational corporations and the economy. Many companies had to shut down, and many employees became unemployed. In Malaysia, the effects of the pandemic have led to an increase in unemployment from five (5) percent in April to 5.3 percent in May 2020, with a total of 826,100 unemployed Malaysians (DOSM, 2020). In addition, 25 percent of SMEs in Malaysia face the possibility of closure. Entrepreneur Development and Cooperatives Minister Wan Junaidi Tuanku Jaafar stated that 32,000 SMEs were forced to

close due to the COVID-19 pandemic (Jaafar, 2020). Companies affected are mostly those heavily dependent on the 'old or traditional' way of doing business, with the physical presence of workers/customers. When most business activities are conducted via online platforms, organisations' data is exposed to Information Security Risk (ISR) susceptibility.

Obviously, to sustain and stay competitive in the post-COVID period, ISR, particularly cybersecurity, must be addressed and mitigated efficiently. While other types of fraud are declining, as reflected by effective risk management processes, substantial growth in the number of reported cybercrime cases signals lapses in Information Security Management in an organisation. Based on a survey by the Institute of Internal Auditors (IIA), corporate governance actors recognise cybersecurity risk as the top 2021 risk their companies face. However, they admitted that their level of personal knowledge on cybersecurity is the lowest among other types of risk (IIA, 2020). Besides that, as a preventive measure, SMEs might invest in technology enhancement that could effectively mitigate the ISR. Digital technologies, such as communication networks (5G), big data analytics, artificial intelligence (AI), and blockchain technologies, are used to deal with the

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effects of COVID-19 (Papadopoulos, Baltas, & Elisavet, 2020). Observing the growing vulnerability of InfoSec threats to SMEs' sustainability, the ability to quickly mobilise the right combination of resource (individual capabilities), process (Information Security Risk Management), and technology could minimise the impact of information security threats on business excellence.

5.3%

increase in unemployment from 5 percent in April.

25%

of Malaysian SMEs face the possibility of closure.

Problem Statement

The upward trend of cybersecurity threats entails an organisation to strengthen its defence to secure information integrity, confidentiality, and availability, especially in the WFH environment. Substantial growth in the number of reported cybercrime cases signals lapses in the organisation's Information Security Management (ISM). The main hindrance to effective ISM is misalignment between InfoSec and the business' overall strategic

goals, which results in vague responsibility and accountability for InfoSec and minimum effort and resources dedicated to mitigate ISR in an organisation (Alghamdi, Win, & Vlahu-gjorgievska, 2020). Georgiadou, Mouzakitis, & Askounis (2021) found that most employees who have been instructed to WFH have not received any security guidelines from their employer. This signals insufficient readiness from an information security management process viewpoint which exposes an organisation to information security risk. The readiness of SMEs in terms of their ISM process will be a value-added advantage that could enhance their sustainable performance.

The second limitation of SMEs is that they lack the capabilities in terms of resources and competencies with regard to information security (IIA, 2020). Georgiadou et al. (2021) highlighted the urgent need to study people's readiness, especially in terms of behaviour, attitude, awareness, and compliance with information security. This human factor is crucial, especially in the remote office setting. High security awareness among employees helps to protect businesses from information security threats.

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The third challenge is investigating the use of digital technologies in SMEs post-COVID-19. SMEs usually lack the resources to fully adopt technology to prevent information security breaches, especially when all business has been conducted online. A study of Sri Lankan businesses indicated that SMEs had insufficient guidance to implement the technologies and were often resistant to the new changes to their operations (Pasindu Tirantha, 2019). Technology such as blockchain technology has been proven to bring benefits to the company which include efficiency, increased transparency and accountability and reducing transaction and monitoring cost (Toufaily, Zalan, & Ben, 2021). The level of SMEs' readiness in terms of technology enhancement to mitigate information security risk is yet to be explored and will be explored in this study. Businesses that are currently surviving the pandemic outbreak are likely to survive in the near future. Their capabilities to change in terms of ISM (process), human capital capability and technology may be crucial factors in creating business excellence. This warrants such a project to be conducted to provide a roadmap towards excellent business performance. Hence, to achieve the purpose of the research, this study highlighted three (3) objectives to be fulfilled:



Research Objectives

- 1** To understand the challenges faced by the SMEs in adapting to the remote office environment, specifically in terms of process (information security management), people (human capital capabilities) and technology enhancement.
- 2** To investigate the level of SMEs' preparedness in terms of process (information security management), people (human capital capabilities) and technology enhancement in managing information security risk.
- 3** To investigate the impact of information security threats on SMEs' business agility.

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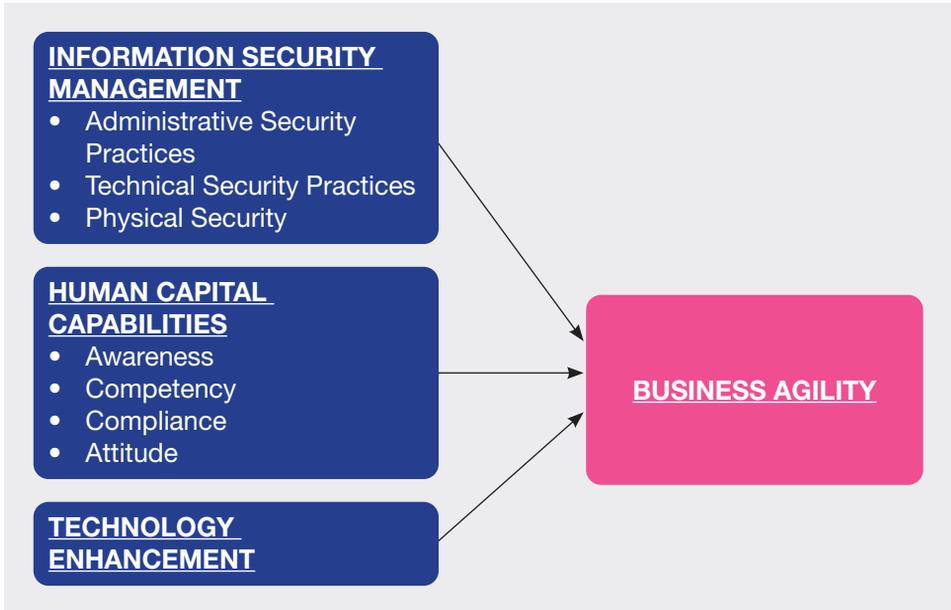
Theoretical Framing - Dynamic Capabilities (DC) Theory

Teece, Pisano, and Shuen (1997) stated that organisations could use the Dynamic Capabilities framework to achieve competitive advantages in a rapidly changing technological environment. The authors highlighted that the dynamic capabilities framework analyses the sources and methods of wealth creation captured by the organisation to thrive in the said environment. Most importantly, the study highlights the importance of mobilising “internal technology, organisational, and management process” to create a competitive advantage. By definition, DC represent an “organisation’s ability to integrate, build, and coordinate internal and external competencies to combat a rapidly changing environment” (Teece et al., 1997). In other words, DC represent the ability to assess threats and turn them into opportunities to create a competitive advantage. Clearly, to survive and create a competitive advantage, the ability to exploit an existing opportunity, create opportunity and foresee emerging threats is crucial (Hussain Shah, Ahmad, Maynard, & Naseer, 2019).

Observing SMEs’ vulnerabilities to cybercrimes, there is an urgent need to examine the current challenges SMEs face in managing cybersecurity threats, which evolve rapidly. In the context of this study, we utilised DC to investigate the main challenges faced by SMEs in mobilising their information security management (process), human capital capabilities (people) and technology to create competitive advantage during and post-pandemic. Specifically, the area of investigation for Information Security Management will be divided into three factors: administrative security (ASP), technical security (TSP), and physical and environmental security (PES) following suggested practices by previous studies (Baker & Wallace, 2007; Zaini et al., 2020). The area for human capital capabilities investigations will cover awareness, compliance, competencies, and internal expertise concerning InfoSec, a response to a call by Georgiadou et al. (2021). Finally, challenges faced by SMEs in terms of technology used to mitigate cybercrime are also explored to confirm findings of previous studies (Bank, 2021; Bernama, 2021; Toufaily et al., 2021). Figure 1 summarises the research framework for the study.

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FIGURE 1: THEORETICAL FRAMING - DYNAMIC CAPABILITIES (DC) THEORY

**COVID-19 Pandemic and Digitalisation of SMEs**

After MCO 1.0, it was found that nearly 70 percent of SMEs reported experiencing a 50 percent drop in their business (Azril Annuar, 2020). As one of the main contributors to Malaysian Gross Domestic Product (GDP), SMEs were among those badly affected (i.e. closure and loss of employment) (Jaafar, 2020). The World Bank Report entitled “Weathering the Surge: Malaysia Economic Monitor (June 2021)” reported that SMEs in Malaysia had been badly impacted by the pandemic, causing a huge gap in productivity as compared to their global peers (World Bank, 2021). This urged the Malaysian Government to introduce a series of initiatives to encourage SMEs. One of the initiatives was SMEs’ digitalisation, encouraging SMEs to turn to e-commerce and other online platforms for their business. Many of these SMEs have taken part in these initiatives. The COVID-19 pandemic has pushed SMEs to advance into the new business models catalysed by internet technologies for e-commerce and other online platforms. Most of the SMEs have adopted remote office environments. In fact, it was reported that

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Malaysian small businesses made greater use of digital technologies in response to the COVID-19 pandemic, with 40 percent increasing their focus on online sales over the past 12 months, according to a new survey by professional accounting organisation CPA Australia (The Edge Markets, 2021). Transitions from offline to online economic activities indicate that SMEs must participate in the digital economy to survive and succeed in the post-COVID-19 world. COVID-19 has ushered SMEs into the digitalisation era. However, SMEs have to face many challenges in doing so.

70%

of SMEs reported experiencing a 50 percent drop in their business (Azril Annuar, 2020).

40%

have increased their focus on online sales over the past 12 months, according to a new survey by professional accounting organisation CPA Australia (The Edge Markets, 2021).

Digitalisation and Cybersecurity Challenges

One of the most prevalent challenges is the high dependency on internet-enabled business models; companies are more vulnerable to a wider array of cyber-attacks and events that disrupt business. For example, when the MCO 1.0 started in March 2020, 269,533 phishing attempts against Malaysian SMEs were reported in the first half of the year, a 56 percent year-on-year increase. Within the same period, 238,780 crypto-mining attempts were reportedly made against SMEs (Kaspersky Security Network, 2020). Therefore, developing a comprehensive cyber defence system is crucial to protect and enable digital businesses in the post-COVID-19 era. On a similar note, the Accenture 9th Annual Cost of Cybercrime Study 2020 reported that the impact on organisations, industries and society from these cyber-attacks is significant (Bissell et al., 2020). In tandem with the growing amount of security breaches, overall cybercrime expenses for businesses have increased to a record peak of USD13.0 million in 2020, from USD11.7 million in 2018, marking an increase of 12 percent. From the reported cases, most were found to be perpetrated for financial and economic gains. In this view, cybersecurity incidents may have very negative effects on numerous levels (individual,

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institutional, organisational, corporate, and national), causing direct financial damage at all levels. Based on the statement above, it is obvious that intrusions and data theft were among the highest reported cases and had a high impact on organisations' finances and reputations, particularly on SMEs (Sandya & Rajaendram, 2021). The potential negative effects on finances and reputations could be the major factors preventing SMEs from fully embarking on digitalisation (World Bank, 2021). In Malaysia, a study on the level of digital readiness among SMEs in the manufacturing sector shows that "Information Security (InfoSec)" is the main concern (Tham & Yaakub, 2021).

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56%

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12%

Cybersecurity to Enhance Agility and Sustainable Business Performance

From the technical perspective, this study strongly implies that the main root of cybersecurity incidents is often the poor management of information systems within the organisation and the lack of strong encryption mechanisms in place for protecting critical data belonging to the organisation. In this view, a lower cybersecurity risk can be ensured by having effective and advanced controls that can detect cyber threats within the organisation. According to Spremić and Šimunic (2018), security controls should be applied to detect and/or prevent unwanted events (unauthorised use, inaccurate data, ineffective processes, wrong algorithms, or faulty system inputs, etc.) or problems from the external environment (external attacks, faulty data transmission, natural disasters, etc.). Within that setting, the integration of cybersecurity into the given context will secure business data, hence creating trust in stakeholders, customers, and partners. Implementing InfoSec management, i.e. administrative, technical, and physical practices, to mitigate cyber threats has proven to enhance agility and sustainable business performance (Zaini, Masrek, & Abdullah Sani, 2020).

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Information Security Management (ISM)

ISM is often a combination of processes, policies, governance activities and specific security measures which work together to enable an organisation to manage information risks effectively (ISO.org, 2013). The purpose of InfoSec is to protect and preserve the confidentiality, integrity, and availability of information. It may also involve protecting and preserving the authenticity and reliability of the information and ensuring entities can be held accountable (ISO 27000). ISO 31000 defines risk as the “effect of uncertainty on objectives”. Therefore, Information Security Risk (ISR) is defined by ISO 31000 (Praxiom Research Group Limited, 2014) as “potential security threats that could exploit vulnerabilities in an information asset or group of assets and therefore cause harm to an organisation”. InfoSec is an important aspect that needs to be collectively understood by the members of the organisation, especially those in charge of risk management (Alghamdi, Win, & Vlahugjorgievska, 2020), especially in the COVID-19 period. During this time, most business activities were conducted on online platforms, thus exposing company data and information to the InfoSec threat (Keng, 2020). InfoSec risk areas include business continuity and disaster recovery, cyber risks and

cyber threats, data leakage, data loss prevention, InfoSec transformation, and compliance monitoring.

The effective implementation of ISM in administrative, technical, physical, and environmental security practices proved to enhance the organisation’s agility, thus indirectly enhancing its sustainable performance (Zaini et al., 2020).

Human Capital Capabilities and Cybersecurity

Human capital plays an important role in modern organisations, especially in the era of the digital economy. Human capital consists of the knowledge, skills and values that can be used to obtain a competitive advantage. Several scholarly studies have proven that human capital plays an important role in achieving good business performance in SMEs. In order to survive during the pandemic and post-pandemic, there is a growing need for cybersecurity experts, as SMEs will be the main target of cyber threats due to lack of readiness (Sandya & Rajaendram, 2021). Tjahjadi, Soewarno, Nadyaningrum, and Aminy (2020) concluded that human capital readiness has a direct and positive effect on business performance. Tjahjadi et al. (2020) defined Human Capital Readiness (HCR) as the respondents’ perception of the

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competency and readiness of the employees to carry out the business processes as part of the success of the strategy execution. Implementing the business process remotely from home also necessitates higher human capital capabilities to avoid exposure to InfoSec risk, particularly cybersecurity. Georgiadou et al. (2021) highlighted the urgent need to study people's readiness, especially in terms of behaviour, attitude, awareness, and compliance with InfoSec. Besides readiness, human capital awareness was found to have a significant impact on threat management performance (Thangavelu, Krishnaswamy, & Sharma, 2021). Most importantly, to keep pace with growing cyber threats, an organisation needs to have an internal expert who possesses core InfoSec skills, including project/process management skills and risk management skills (Haqaf & Koyuncu, 2018).

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Technology Enhancement and Cybersecurity

Technology enhancement was found to be an effective countermeasure to minimise InfoSec risk, particularly cybersecurity threats (Zeng et al., 2020), and aid in elevating productivity and business agility (Hendayani & Febrianta, 2020; Zaini et al., 2020; Tham & Yaakub, 2021). It was also determined to be the main factor influencing Malaysian SMEs' digitalisation readiness (Tham & Yaakub, 2021). Most importantly, technology such as blockchain helps to assure the existence, integrity, and authenticity of the information for better decision-making (Erri Pradeep, Yiu, Zou, & Amor, 2021). Nevertheless, the adoption of high technology enhancement (i.e. blockchain) among entrepreneurs, especially SMEs, is low due to several obstacles, such as immature technology, security, complexity, and the costs of the technology itself (Toufaily, Zalan, & Ben, 2021). The cost could be the major obstacle leading SMEs to invest in other operational options for business continuity instead of technology (Bank, 2021; Bernama, 2021). The organisation's ability to mobilise the right combination of

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process, people, and technology helps to mitigate cybercrimes (PwC, 2020), thus creating competitive advantages in the pandemic era. Enhancement of technology induces a significant gap between SMEs and big companies, either in productivity or business agility (OECD, 2021).

Sample Selection

The samples used in this study are from various industries consisting of local operators of SME organisations in Malaysia. The samples were selected to represent each sector, mainly Services and Manufacturing. The respondents comprised 12 representatives of their organisations, either businesses owners or decision-makers. The data set is from 12 semi-structured interviews with these respondents. The size of the SMEs—micro, small, and medium—is based on the definition of Malaysian SMEs (SME Corp. Malaysia, 2021). The sample is summarised in Table 1.

TABLE 1: SAMPLE SUMMARY

ID	SECTOR	ORGANISATION	ROLE	SECTOR	SIZE
MICRET1	Services	Wholesale and retail trade	Business owner	Private	Micro
MICSEV1	Services	Business services	Decision-maker	Private	Micro
MICMFOOD1	Manufacturing	Food	Business owner	Private	Micro
SMLRET1	Services	Wholesale & retail trade	Business owner	Private	Small
SMLSER1	Services	Business services	Business owner	Private	Small
SMLIT1	Services	Information and communication	Decision-maker	Private	Small
SMLMAN1	Manufacturing	Basic metal and fabricated metal products	Business owner	Private	Small
SMLMAN2	Manufacturing	Non-metallic mineral products	Business owner	Private	Small

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ID	SECTOR	ORGANISATION	ROLE	SECTOR	SIZE
MEDSFOOD1	Services	Food and beverage	Business owner	Private	Medium
MEDRET1	Services	Wholesale & retail trade	Business owner	Private	Medium
MEDSEV1	Services	Business services	Decision-maker	Private	Medium
MEDMFOOD1	Manufacturing	Food and beverage	Decision-maker	Private	Medium
	Category	Employees (Services)	Employees (Manufacturing)		
	Micro	Less than 5	Less than 5		
	Small	5 to 30	5 to 75		
	Medium	30 to 75	75 to 200		

Data Collection and Analysis

Data collection was conducted during the COVID-19 pandemic, which was from 1 September 2021 to 30 November 2021, by employing the online interview method. Online invitations were sent to representatives from each SME informing them about the aim of this study and inviting their participation in the research. An online interview was conducted via Google Meet. This platform was used since face-to-face meetings were not encouraged to ensure social distancing and minimise the risk of COVID-19 infection. Each interview session was recorded with the respondent's consent and agreement. The statements captured in interview sessions were then transcribed and transferred to ATLAS.ti for analysis based on codes. The deductive coding process was done in ATLAS.ti code manager based on the area of investigation identified by the Dynamic Capabilities Framework.

SUMMARY OF FINDINGS

Firstly, in terms of 'Process', specifically Information Security Practices, SMEs lack preparedness in terms of Administrative Security Practices (ASP), as evidenced by the non-existence of a formal policy on Information Security. SMEs' current practices of dealing with 'cyber threat incidents' on a case-by-case basis may result in the slow recovery of operations and significant financial loss. SMEs admitted that they did not impose any requirement for their staff to comply with any laws and regulations regarding information security due to their nature of business. In the WFH setting, there were no proper guidelines on preventive measures, thus exposing company information assets to cyber threats. On top of that, the current level of Technical Security Practices (TSP) in SMEs was insufficient to protect them from cyber threats. This was evidenced by their over-reliance on the Cloud provider to back up the enterprises' information assets. The alternative backup procedure was practised inconsistently by SMEs. In the WFH setting, SMEs faced Access Control and Password difficulties, especially when the staff used their own device. In terms of Physical and Environment Practices (PES), practices were adequate to safeguard SMEs from unauthorised access to information assets (i.e. computers) containing confidential data. However, in the WFH setting, SMEs

admitted facing problems in terms of Access Control and Password, thus suggesting an increase in vulnerability to cybersecurity threats.

Secondly, in terms of 'People', specifically Human Capital Capability, SMEs have a basic awareness of information security threats, and most SMEs depend on key personnel who possess an IT background as the centre of reference for employees when dealing with any IT issue, including information security. Most IT caretakers admitted that they have basic knowledge of IT-related matters. Most of the time, they will try to solve the issues related to information security by themselves, either by referring to YouTube or friends. The SMEs have also taken some precautionary measures to prevent any cybersecurity threat by circulating information to employees periodically through email, WhatsApp, or face-to-face meetings. However, the practices were not documented and formalised for future reference. In terms of employees' competence in managing information security threats, all SMEs have at least basic knowledge of information security. However, most of them are not competent since they do not have any IT background or proper training regarding the subject matter. Currently, most SMEs under review admitted that they are highly dependent on one person in charge (PIC), who oversees

SUMMARY OF FINDINGS

admin-related matters. Most of them do not have a designated 'IT Executive' to manage IT-related matters, except for three respondents. This is due to a lack of financial resources to employ an IT expert. However, if the top management has an IT background, the SMEs will take proactive measures to ensure that the company is safe from any cyber threat and employees are competent in dealing with information security threats.

The main challenge in ensuring awareness competencies is the inability to get management buy-in on the need to create awareness at all levels of the organisation. In the WFH setting, there was no clear guideline on the 'do's and don'ts' in information security matters; thus, this limits staff awareness of the need to take precautions to protect enterprises' information against cybercrime. Furthermore, major challenges faced by SMEs under review in terms of competency are keeping the staff updated on evolving risks of cybercrime and finding a way to manage them competently. There is also a lack of knowledge on the available training provided, specifically on cybercrime. In the WFH setting, SMEs faced difficulty in conducting face-to-face training due to COVID-19 SOPs. Finally, a key challenge in terms of internal expertise among SMEs is the over-reliance on one key

personnel, which could highly expose SMEs to 'key-person dependency risk'.

Thirdly, in terms of 'Technology', most SMEs under review are using the standard Microsoft Windows Defender and opined that the current control is sufficient to protect them from information security threats. Most threats come in the form of malicious emails. Although there were incidents, there was no significant financial implication and major business disruption requiring the urgent acquisition of enhanced technology. Most SMEs prefer to outsource internal applications to an Application Services Provider (ASP) because it frees up resources and allows organisations to focus on their core competencies. It also reduces costs for many organisations that do not have the in-house expertise or the funding to support in-house information systems. Most SMEs use software and media platforms readily available on the market. They do not invest in making their own systems as they are not capable of doing so. The enhancement of technology will be subject to the future expansion of the business. Most SMEs opined that investment in more advanced technology would be made once fully integrated systems are implemented in-house. Some of the reasons cited against investing in technology enhancement to mitigate

SUMMARY OF FINDINGS

information security threats were: i) lack of management buy-in as there is no urgent need to invest in technology enhancement; ii) financial constraints; iii) lack of knowledge on the best technology and supplier that can best meet the needs of SMEs; iv) facing trouble in getting financial support or assistance to invest in technology enhancement; and v) lack of human capabilities to embrace technological change and the need to evolve.

Overall, most SMEs interviewed admitted that the information security threat did not lead to disruption in both operational agility and customer agility. Most SMEs had invested in online platforms before COVID-19, which contributed to business agility during the pandemic in the WFH setting. Most SMEs under review did not have a fully integrated system and did not fully digitalise, thus foreseeing a low information security threat. Therefore, they opined that their current level of technology was adequate to safeguard the enterprises from information security threats. However, evidence suggests that SMEs' use of digitalisation enabled high productivity during the COVID-19 pandemic. Several companies put effort into digitalising their business processes by hiring third parties since they were aware of the benefit of digitalising the processes. This served as a competitive advantage for the companies in the pandemic era.

In reference to the five maturity levels of cybersecurity by the World Economic Forum (2014), the findings show that the level of maturity of the SMEs can be categorised into two, namely Stage 1: Unaware and Stage 2: Fragmented Micro. The SMEs under Stage 2 recognise digitalisation has a potential risk, but they have limited insights into its cyber risk management practices. Despite the non-existence of a formal policy, the enterprises have a practice in place but prefer to handle incidents on a case-by-case basis. The challenges to adequately implement sound Information Security Practices include: (i) lack of management buy-in on the need to establish a formal policy on InfoSec as a preventive measure to minimise InfoSec risk; (ii) financial constraints; (iii) lack of knowledge on the best software that best suits the needs of the SMEs; as well as (iv) lack of knowledge and ability to assess the possible threats to information security.

RECOMMENDATIONS

In order to survive, there is an urgent need for SMEs to develop strategies to optimise their ‘Dynamic Capabilities’, specifically ‘process (Information Security Practices), people (human capital capability), and technology’, to effectively manage Information Security Risk, which could lead to a competitive advantage. It is recommended that SMEs leverage digitalisation while starting an initiative to establish sound information security practices to protect their information assets. To strengthen Information Security Practices, it is recommended that SMEs initiate the formulation of an InfoSec policy. It could be cost-effective if the SMEs understand the needs of their InfoSec management practices within their own contexts and characteristics. However, it is also obvious that SMEs are not generally aware of the available standards that may assist them in mitigating cybersecurity risks in their businesses. In this case, a formulation of InfoSec Policy based on ISO/IEC 27001:2013 standards would be applicable, or SMEs can refer to “Information Security Guidelines for Small and Medium Enterprises”. Alternatively, CyberSecurity Malaysia (CSM) has established a ‘Knowledge Bank’ as a reference to guide users on the principles and guidelines related to Information Security Practices. SMEs can refer to “Information Security Guidelines for Small and

Medium Enterprises” issued by CyberSecurity Malaysia to get started on implementing Information Security Practices in their organisations.

In managing people (human capital capability in terms of awareness, compliance, competency, and internal expertise), SMEs should also establish proper Information Security Governance to have clear authority and responsibility in managing information security. Establishing a formal policy on information security could help SMEs delegate the duties of information security to one person to avoid over-reliance on key personnel. By having a clear policy, the person in charge may not necessarily be an IT expert. In implementing a successful InfoSec Policy, the tone at the top is crucial to inculcate awareness on and compliance with Information Security. SMEs’ top management, particularly the owners, should exercise due care and due diligence in protecting their information assets. SMEs should also emphasise Security Education, Training & Awareness (SETA) to increase staff competencies and awareness. It is suggested that SMEs participate in free online training/webinar/awareness sessions that are widely available. Upskilling and Reskilling are vital for SMEs to survive in the digital business ecosystems. If financial constraints are not an issue, SMEs could send their designated

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staff for the training conducted by CyberSecurity Malaysia or any training provider. If financial constraints are an issue, there is a wide range of free educational resources available online for self-reference. Additionally, SMEs should conduct a threat assessment programme or simulated attack to practise and normalise such situations. The assessment results could be used for further investment in information security resources (human and technology).

The commitment of management and assistance from related authorities, such as SME Corp, MDEC and CyberSecurity Malaysia, is crucial in ensuring SMEs incorporate InfoSec management practices as many SMEs do not realise its importance. With many SMEs unaware of the flexibility in formulating InfoSec practices, it is vital that related authorities facilitate programmes that can increase their awareness of adopting security standards. In order to increase SMEs' competencies in managing information security, it is suggested that consulting agencies partner with CyberSecurity Malaysia and Human Resource Development Corporation (HRDCorp) to further promote designated training programmes for information security that are affordable. Future support should also focus on ensuring SMEs are well equipped with security measures in the WFH (or remote)

setting to protect the confidentiality, reliability, and availability of information given that their current security practices are weak, exposing the company to a high risk of cybercrime. Specifically, CyberSecurity Malaysia could provide a specific guideline on best practices for the WFH setting and how to avoid cybersecurity crimes. For further outreach, SME Corp can collaborate with CSM Malaysia to create awareness on the information security risks when working from home. Third-party service providers (i.e. telecommunications companies, financial services companies, or consulting companies) should include cybersecurity features in their packages. Initiatives should also include information security promotion through events, such as SME Day, SME conventions, and SME exhibitions. These can be a good platforms for top experienced business owners to share their knowledge and best practices on InfoSec to raise awareness on the importance of information security to SMEs.

CONCLUSION

In a nutshell, to sustain and stay competitive in the post-COVID period, information security risk, particularly cybersecurity, must be addressed and mitigated efficiently. To survive, SMEs need to develop strategies to optimise their 'Dynamic Capabilities', specifically 'process (Information Security Practices), people (human capital capability), and technology', to create a competitive advantage. Since the SMEs' main obstacles to implementing sound information security practices are a lack of management buy-in and financial constraints, they must have the ability to integrate, build and coordinate internal and external competencies to combat rapidly evolving information security threats. Clearly, to survive and create a competitive advantage, the ability to exploit an existing opportunity, create opportunity and foresee emerging threats is crucial.

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MAPPING AND TRACKING OF MALAYSIA'S NATIONAL DIGITAL POLICIES AND PLANS VIS-À-VIS THE ASEAN DIGITAL MASTERPLAN 2025

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ABSTRACT

The ASEAN Digital Masterplan 2025 (ADM 2025) that was launched in January 2021 envisions ASEAN as a leading digital community and economic bloc that is powered by secure and transformative digital services, technologies and ecosystems. This would see the ASEAN region making giant strides towards becoming both a digital economy and a digital society in the next five years. As an ASEAN member state, Malaysia is committed to ensuring the fulfilment of the vision. The first step towards this is to ascertain the current state that we are in now with regard to the desired outcomes of the ADM 2025. There are already a handful of national digital development policies and plans developed in past years that overlap in their purpose of promoting the digital economy and digital society. However, it is not quite clear how they correspond/map to regional development initiatives and plans, due to the lack of concrete indicators of the development and implementation of these policies and plans vis-à-vis regional priorities and goals. This research therefore aims to address this deficiency by coming up with a matrix that can connect the national to regional digital development policies and plans. To do this, an exhaustive yet systematic search for the existing various national digital policies and plans will be first conducted, together with their respective owners, monitoring metrics and timeframes, and outputs and deliverables. Cross-case analysis will then be performed to extract the required information above. Constant comparison analysis will be used to categorise the desired outcomes of the various Malaysian digital policies and plans based on the themes that emerge. Subsequently, a matrix to map the various digital plans and metrics against the eight desired outcomes and respective enabling actions of the ADM 2025 will be incrementally and iteratively developed. Focus group interviews will then be held to evaluate the matrix. Using the matrix, the gaps between the national and regional priorities and goals with respect to the digital development policies and plans will be identified and recommendations and actions to narrow the gaps will be subsequently proposed. The presence of the matrix will therefore contribute significantly to the identification and reduction of these gaps that leverage the existing efforts and actions defined by the policies and plans, to avoid redundancy or reinventing the wheel.



Keywords: Digital Policy, Digital Plan, ASEAN Masterplan, Policies Mapping, Policies Tracking, Digital Economy

INTRODUCTION

The first ASEAN Digital Ministers' Meeting held in January 2021 agreed to adopt the Putrajaya Declaration with the ASEAN Digital Masterplan 2025 (ADM 2025) at its core. The ADM 2025 is viewed as the continuation of the ASEAN ICT Masterplan 2020 (AIM 2020), with the vision of ASEAN as a leading digital community and economic bloc that is powered by secure and transformative digital services, technologies and ecosystems. It comprises eight (8) desired outcomes (DOs) as follows:

DO1: Actions of the ADM 2025 prioritised to speed ASEAN's recovery from COVID-19.

DO2: Increase in the quality and coverage of fixed and mobile broadband infrastructure.

DO3: The delivery of trusted digital services and the prevention of consumer harm.

DO4: A sustainable competitive market for the supply of digital services.

DO5: Increase in the quality and use of e-government services.

DO6: Digital services to connect businesses and facilitate cross-border trade.

DO7: Increased capability for businesses and people to participate in the digital economy.

DO8: A digitally inclusive society in ASEAN.

Being one of the ASEAN Member States, Malaysia has pledged its full commitment towards ensuring the successful realisation of the DOs. Since the ADM 2025 is not entirely new, but rather a continuation of the previous masterplan(s), and that the Malaysian government has been actively promoting digitalisation, digital inclusion and digital economy for many years, there exist a handful of relevant policies and plans at the national level. These include Malaysia's Digital Roadmap, Malaysia Digital Economy Blueprint, Malaysia's National eCommerce Strategic Roadmap, National Industry 4WRD Policy and the recent *Jalanan Digital Negara* (JENDELA) action plan. It is believed that these policies and plans somehow must have

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been mapped to the DOs listed in the ADM 2025. JENDELA, for example, should be able to match well with DO2 and DO8 since it will be the platform to expand and improve Malaysia's digital connectivity by accelerating the country's digital connectivity through widespread deployment of mobile, fibre and fixed wireless access, and paving the way to 5G, under the 12th Malaysia Plan (2021–2025).

Looking at the current state of digital development initiatives in Malaysia, with the government actively promoting a digital society and digital economy over the past decade through various digital development policies and plans, it is believed that much has been achieved in this respect. The question is “To what extent does the implementation of these initiatives correspond to the DOs of the ADM 2025 and other regional priorities and goals?”.

Currently, there is no means to ascertain this as no such mechanism exists. We hypothesise that this can be achieved using a matrix that can be used to map Malaysia's digital plans and metrics against the DOs and respective enabling actions of the ADM 2025. Therefore, in this research,

the matrix will be designed, developed and evaluated. It will include the missing concrete indicators of the development and implementation of Malaysia's digital policies and plans vis-à-vis regional priorities and goals. The creation of the matrix is important to determine the extent to which Malaysia has already achieved (or is on its way to achieving) the DOs with its existing policies and plans, and to provide a comprehensive overview of all national digital development policies and plans, before yet another policy and/or plan is developed. This way, the new policy and/or plan, if any, can be designed to complement rather than reinvent or duplicate existing ones.

The lack of concrete indicators of the development and implementation of Malaysia's digital policies and plans vis-à-vis regional priorities and goals has resulted in a disconnect between National Digital Development Policies and Plans vis-à-vis regional development initiatives and plans. There is thus a need to clarify and understand the differences and similarities between Malaysia's National Digital Policies and Plans vis-a-vis the ASEAN Digital Masterplan 2025.

INTRODUCTION



Research Objectives

This project is a closed type of project. The three (3) objectives of the project were readily given, and are listed below:

- 1** Identify and classify the various national digital policies and plans, their respective owners, monitoring metrics and timeframes, and outputs and deliverables.
- 2** Create a matrix mapping Malaysia's digital plans and metrics against the desired outcomes and enabling actions of the ASEAN Digital Masterplan 2025.
- 3** Identify possible gaps and propose actions to narrow the gaps.

LITERATURE REVIEW

The 21st century is currently being shaped by three (3) distinct global challenges: the near-total urbanisation of the world's population; the integration of diverse digital information technologies into a digital economy, within the Fourth Industrial Revolution (IR4.0) environment; and to top it all, the COVID-19 pandemic that has had a major impact on the health, social interaction and economic growth of nations around the world. One way for nations to deal with challenges such as the divergence of urbanisation, technologies that are growing at a faster pace and the pandemic that is affecting economies of the world, is through digital transformation strategies in the form of 'digital master plans' that have become inevitable (Townsend & Lorimer, 2015).

These digital master plans are attempts to mobilise stakeholders in nations around visions, goals, roadmaps and frameworks to adapt to the external digital, technological and economic pressures within the local social environment. Holistic digital master plans have been suggested by strategic scholars, bearing in mind the Brundtland Report (1987) as the most successful approach, which incorporates

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three (3) main components that form a successful master plan, namely roadmaps, frameworks and guidelines; clear vision and goals; and a well-thought-out measurement and monitoring approach that follows through the initiatives that incorporate the plans.

Various nations have created their own digital master plans for specific digital development projects. Canada, for instance, developed a successful 'digital smart city master plan' as a guide that assists municipalities, provinces and solution providers in developing Digital Smart City Master Plans for communities across Canada. This guide is intended to help improve the overall quality of life of the people with the use of data and connected technologies integrated throughout the built environment, to provide opportunities for economic development and enhance urban services, resource conservation and cost effectiveness (Canadian Urban Institute, 2018).

In Germany, the digital master plan is the Digital Strategy 2025 (De.Digital), among others, intended to assist start-ups and encouraging cooperation between young companies and established companies, creating a regulatory framework for more investment and innovation,

encouraging smart networks in key commercial infrastructure areas of the German economy and strengthening data security and developing informational autonomy (Germany Federal Ministry for Economic Affairs & Energy, 2016). The United Kingdom's (UK) Digital Strategy is a digital master plan intended to make Britain "a world-leading digital economy that works for everyone" (Minister of State for Digital & Culture, Caroline Dinenage, 2021). The digital strategy is yet to be published but, among others, its goals intend to ensure the benefits of digitalisation: to have the necessary infrastructure, to ensure regulations are agile and benign, and that the citizens have the necessary skills that they need in the digital age and the workers too have the necessary skills to survive in the digital economy.

Closer to our shores, the first ASEAN Digital Ministers' Meeting (1st ADGMIN) which took place from 20 - 22 January 2021 saw the launch of the ASEAN Digital Masterplan 2025 (ADM 2025). Malaysia was given the privilege of coordinating the development of the ADM 2025 for ASEAN, with the five-year plan listing the desired outcomes as follows:

- Actions of the ADM 2025 prioritised to speed ASEAN's recovery from COVID-19;

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- Increase in the quality and coverage of fixed and mobile broadband infrastructure;
- The delivery of trusted digital services and prevention of consumer harm;
- A sustainable competitive market for the supply of digital services;
- Increase in the quality and use of e-government services;
- Digital services to connect businesses and facilitate cross-border trade;
- Increased capacity of businesses and people to participate in the digital economy; and
- A digitally inclusive society in ASEAN.

Thus, the development of the ADM 2025 envisions ASEAN as a leading digital community and economic block, powered by secure and transformative digital services, technologies and ecosystems. In order for the desired outcomes to be achieved, it is important that the current policies, roadmaps and frameworks that are developed in the respective ASEAN Member States are studied in detail, proper enabling actions are undertaken, and suitable metrics developed and mapped with the available desired outcomes (DO1-DO8).

For Malaysia, various policies, roadmaps and frameworks have been created to grow and strengthen digital services, to increase productivity and economic growth and to enable digital inclusion. Among these are *Jalanan Digital Negara* (JENDELA), which intends to provide quality access to digital connectivity for all (MCMC, 2020); the National Industry4Wrd Policy that provides a concerted and comprehensive transformation agenda for the manufacturing sector and its related services in order to achieve a certain level of GDP growth in the nation's economy (MITI, 2019); National e-Commerce Strategic Roadmap, created to accelerate seller adoption of e-commerce, increase adoption of e-procurement by businesses, lift non-tariff barriers, make strategic investments and promote national brands to boost cross-border e-commerce (MDEC, 2019); Public Sector Cloud First Policy to have a connected government, a digital, data-driven government and connected citizens (MAMPU, 2020); the National AI Framework and the National AI Roadmap, respectively, to drive the country's AI ecosystem (MDEC, MOSTI, 2020); and the Malaysia Digital Economy Blueprint (MyDIGITAL) (EPU, 2021) that outlines plans to accelerate Malaysia's progress as a technologically advanced economy and as a competitive force in this new digital era.

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With all these policies, roadmaps, frameworks and guidelines, Malaysia, as one of the ASEAN Member States, would do well to meet the ADM 2025's desired outcomes if there exists a mechanism to measure these national initiatives against the regional initiatives and plans. The lack of concrete indicators on the development and implementation of these existing digital policies has indicated a disconnect or gap between national digital initiatives, plans and policies vis-à-vis regional initiatives, plans and policies. There is a need to classify, clarify and track these initiatives through the enabling actions undertaken and then map these with the ADM 2025 Framework.

METHODOLOGY

Figure 1 shows the research design. It begins with the compilation of relevant national digital development policies to be included in the research, which is performed through an exhaustive desktop study/literature survey. The collected policies are then deliberated on, where only most relevant policies will be included and analysed further. The basis for inclusion is as below:

- i. It is complete, i.e. not under development
- ii. It is accessible, i.e. openly available

- iii. It is either a policy, framework or blueprint, e.g. an application is not included
- iv. Its contents can be mapped to at least one of the ADM 2025's DOs.

The list of short-listed policies is shared and discussed with the project champion during progress meetings for consent.

Each selected policy is then analysed further to extract as much of the required information that is available using the cross-case analysis technique. Cross-case analysis allows policies bearing similar content to be grouped together, avoiding redundancy in information extraction and allowing us to start seeing the connections or overlaps between the selected policies. New information is only added if not previously found. The process is repeated for each selected policy.

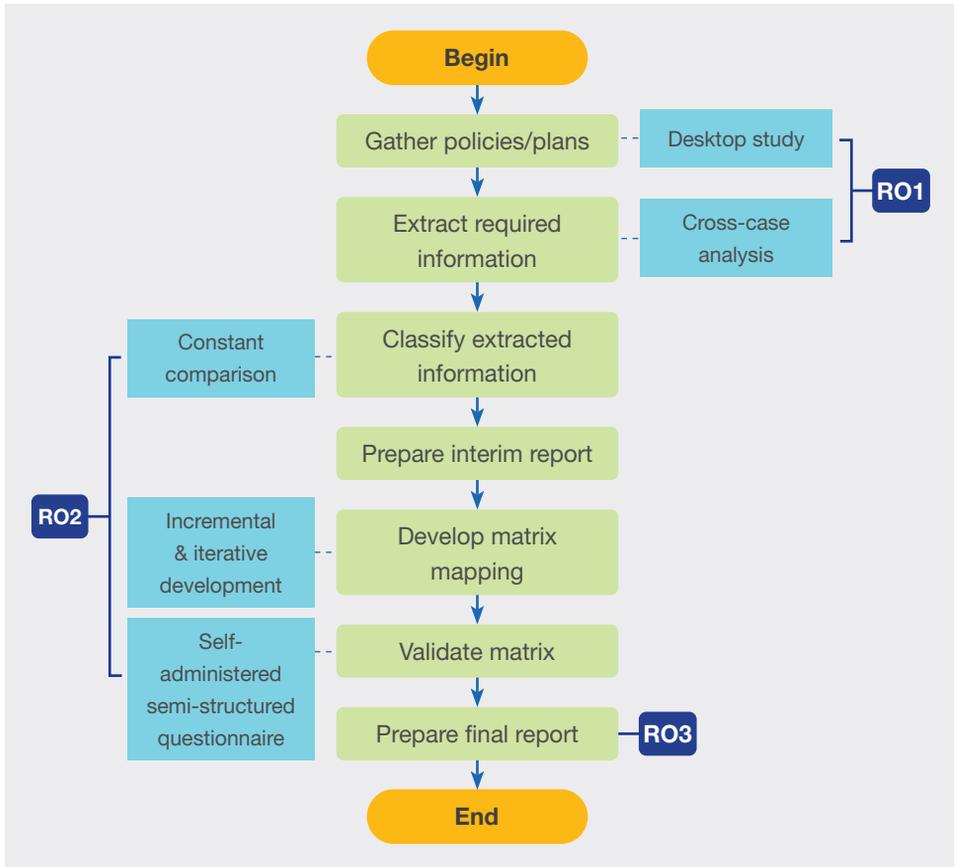
The extracted content of the policies is then classified using the constant comparison analysis technique. The extracted content from the policies is compared and emerging themes are identified. Policies with similar content are grouped together. Since one policy may have content belonging to a number of different themes, the classification is made based on the main content of the policy.

METHODOLOGY

The next step would be to map the extracted content from the policies against the eight desired outcomes of the ADM 2025. For this, the scope of each DO and its respective enabling actions are studied in detail. From the study, the important elements of each DO are extracted. These elements would become the basis for mapping each DO to each of the selected national policies. The list of 20 short-listed national policies becomes the vertical elements of the matrix while the ADM 2025 DOs become the horizontal elements. The mapping is done using the incremental and iterative development method in order to come up with the matrix. Each policy's content is incrementally and iteratively compared against the identified elements of each DO. Finally, the matrix is validated through a self-administered semi-structured questionnaire where selected experts in relevant areas evaluate and comment on the matrix based on the guide given.

METHODOLOGY

FIGURE 1: RESEARCH METHODOLOGY



FINDINGS AND ANALYSIS

From the analysis performed on the 20 selected policies, it is evident that there are overlaps in terms of the content between some of them because they are broadly defined. The overlaps are resolved through the cross-case analysis where similar content is categorised together into unique groups. Further analysis is done to reduce the number of groups by combining similar groups using constant comparison analysis, which yielded 10 themes (categories), as shown in Table 1. Table 2 shows the coverage of the selected national policies with respect to the identified themes.

TABLE 1: THE THEMES THAT EMERGED FROM CONSTANT COMPARISON ANALYSIS

NO	NEW THEME	OLD THEME	DESCRIPTION	CATEGORIES
1	A	A	COVID-19 Recovery	COVID-19 recovery
2	B	B	Digital Infrastructure	Digital infrastructure
		F	4-IR Technologies & Emerging Technologies	
3	C	Q	Cybersecurity	E-Commerce (gig economy, etc.)
		C	E-Commerce & Markets/ Economic Recovery Phase	
4	D	D	Society Well-being	Societal well-being
		O	Digital Health	
5	E	P	Digital Education	Capacity building (digital skills)
		E	HR Upskilling & Reskilling (Government, Business and Citizens)	
6	F	G	Digital Economic and Trade Regulatory & Laws	Governance, regulatory and laws
		N	Governance Implementation Policies	
7	G	H	Green Technology & Sustainability	Sustainability/ Sustainable development
		L	Smart Cities	
8	H	I	Science, Technology & Innovations	Innovation
		J	Intellectual Property	
9	I	K	Digital Productivity	Digital productivity
10	J	M	Digital Adoption	Digital adoption

FINDINGS AND ANALYSIS

TABLE 2: THE SELECTED NATIONAL POLICIES AND THEIR RESPECTIVE COVERAGE IN TERMS OF THE IDENTIFIED THEMES (REVISED)

NO	POLICY NAME	COVERAGE
NP1	Malaysia Digital Economy (MyDIGITAL) Blueprint: 2021-2025	A, B, C, D, E, F, J
NP2	<i>Pelan Jalinan Digital Negara</i> (JENDELA)	B, D, J
NP3	National 4IR Policy (EPU)	A, B, C, D
NP4	Industry 4WRD (National Policy on Industry 4.0) (MITI)	B, C, F
NP5	National Policy on Science, Technology & Innovation (2013-2020) (<i>Akademi Sains Malaysia</i>)	B, G, H
NP6	<i>Dasar Sains, Teknologi & Inovasi Negara</i> (MOSTI)	F, G, H
NP7	Green Technology Master Plan Malaysia (2017-2030) (Ministry of Energy, Green Technology & Water)	G, H
NP8	10-10 MySTIE Framework (<i>Akademi Sains Malaysia</i>)	B, C, D, E
NP9	Intellectual Property Policy (MOSTI)	H
NP10	National Biotech Policy (MOSTI)	H
NP11	Bursa Malaysia Sustainable Policy (Bursa Malaysia) 2020	C, G
NP12	Malaysia Education Policy Review, Abridged Report 2013	D
NP13	Future Talent Malaysia (HRDF)	E
NP14	National E-Commerce Roadmap 2.0	C
NP15	Shared Prosperity Vision 2030	D
NP16	Malaysia Digital Productivity Blueprint 2016-2020	K
NP17	Malaysia Smart City Framework 2019-2025	G
NP18	National Data Sharing Policy (NDSP)-(KKMM)	J
NP19	National Cyber Security Policy (Framework)	B
NP20	Strategic Framework of the Medical Programme	D

FINDINGS AND ANALYSIS

NATIONAL POLICY/PLAN/ROADMAP/FRAMWORK	ADM 2025 DESIRED OUTCOME/COMPLEMENTING ATTRIBUTES							
	DO1	DO2	DO3	DO4	DO5	DO6	DO7	DO8
NP8	x	x	x	x	x	/	x	x
NP9	x	x	/	x	x	/	/	x
NP10	/	x	/	x	x	x	/	x
NP11	/	/	x	/	x	x	/	x
NP12	x	x	x	x	/	x	x	/
NP13	/	x	x	x	x	x	/	/
NP14	x	/	x	/	x	/	/	x
NP15	x	x	x	x	/	/	/	/
NP16	x	x	x	x	x	/	x	x
NP17	x	x	x	x	x	/	/	x
NP18	x	x	/	x	x	x	x	/
NP19	x	x	x	x	x	/	x	x
NP20	/	/	x	x	x	x	/	/

As can be seen from the table, the extent of mapping varies between each selected policy and each ADM 2025's DO. Overall, it can be seen that in combination, all of the policies address all of the DOs, which indicates congruence between the two. Horizontally, it can be seen that NP1 (Malaysia Digital Economy (MyDIGITAL) Blueprint) and NP3 (E-Commerce & Markets/Economic Recovery Phase) have the most extensive mapping to the DOs with NP1 mapping to all of the DOs. NP3 maps to all DOs except DO2 (Increase in the quality and coverage of fixed and mobile broadband infrastructure). Vertically, it can also be seen that DO7 (Increased capability for businesses and people to participate in the digital economy) has been mostly addressed by the selected national policies, which means that the majority of the selected national policies cover this outcome of the ADM 2025, an indication of our emphasis on digital economy. The mapping matrix accomplished the second objective of this research.

The last research objective is to identify the gaps and to recommend actions to narrow the gaps. These will be presented and elaborated in the next section.

RECOMMENDATIONS

The study on Mapping and Tracking of Malaysia's National Digital Policies and Plans vis-à-vis the ASEAN Digital Masterplan 2025 has been underpinned by the various national policies (similarly with the other ASEAN Member States) that have been formulated in the hope of fully maximising benefits from the digital economy. The study has shown that there are gaps in both the National Policies formulated in Malaysia as well as the ASEAN Digital Masterplan 2025 (ADM 2025). In analysing the gaps between the ADM 2025's desired outcomes and the selected national policies, it has been found that there are two types of the gaps, namely Type I and Type II.

Type I are gaps found in the National Digital Policies, while Type II are gaps found in the ADM 2025, as indicated in Table 4 and Table 5, respectively. Based on these gaps, we would like to make recommendations for Type I and Type II, respectively. The recommendations to narrow the gap for Type I: Gaps in the National Policies are as follows:

1 Recognition of Relevant Skills/Programmes across ASEAN

This gap, found in DO2, was particularly related to the integrated and end-to-end digital skills and certification programmes that are run across the ASEAN Member States and have not been formally recognised at the regional level in order to benefit ASEAN Member States. Thus, in order to narrow this gap, there is a need to establish a database of certifications on the mentioned skills that are recognised at the ASEAN level.

RECOMMENDATIONS

2 Establishment of Specific Digital-based Centres of Excellence

This gap, found in DO2 and DO8, acknowledged the gap in the establishment of the Centre of Excellence (COE) for ‘best practices for rural connectivity’ and a Centre of Excellence for ‘promoting digital inclusion’, respectively. In the former, Malaysia, being one of the more developed digital economies in ASEAN, has tackled many issues relating to rural connectivity, although it has not established a COE specifically for rural connectivity best practices. Similarly, for the latter, although much has been done with regard to inclusivity, no COE to promote digital inclusion has been established. Thus, to narrow these gaps for the former, it is recommended that the minimum requirements for the establishment of the COE for best practices for rural connectivity be defined, and to take note that requirements for rural connectivity will depend on the minimum requirements of good fit for the particular rural location. As for the latter, it is recommended that a COE at the national level for promoting digital inclusion be established as it is critical to ensure that no one sector, organisation, or group of the community is left out in the digitalisation initiatives of the country and the region.

RECOMMENDATIONS

However, it is interesting to note that the Shared Prosperity Vision 2030 suggests a Centre of Excellence (COE) for Societal Well-Being – which includes digital adoption but does not specifically mention ‘best practices for rural connectivity’ nor ‘promoting digital inclusion’.

The recommendations to narrow the gap for Type II: Gaps in the ASEAN Masterplan 2025 (ADM 2025) are as follows:

1 **Prioritising Pandemic Recovery**

This is a gap observed in DO1. Many aspects on prioritising ASEAN recovery from the COVID-19 pandemic were mentioned in the ADM 2025. However, there is no mention of the importance of the strategies to be undertaken in prioritising recovery from the COVID-19 pandemic among ASEAN Member States. Thus, to narrow the gap, there is a need for ASEAN look into the strategies and digital frameworks to determine how to prioritise pandemic recovery to address future pandemics (such as health, global warming and climate change) more positively and effectively across ASEAN Member States, based on lessons learnt.

2 **Promoting Improvement of Digital Laws and Regulations and Standards**

This is a gap found in DO2 and DO6. The former refers to laws and regulations to improve laws and regulations related to cabotage laws and policy, as well as related to improving digital infrastructure. There is thus a need to narrow the gap by improving appropriate existing digital laws and regulations of ASEAN Member States, such as the ethical use of IR4.0 technologies, and specific digital standards, such as roaming rates for ASEAN Member States.

RECOMMENDATIONS

3 Strengthening the Future Digital Economy in the Region

Strengthening the future regional digital economy of ASEAN is imperative and all the recommendations are important. However, the following three (3) gaps in DO4 and DO5 are of significant importance. Firstly, there is no mention in the ADM 2025 of the tax revenue framework available that would capture revenue from the digital economy and thus strengthen the future regional digital economy (DO4). Secondly, there is also no mention of data-driven policy and thirdly, no mention of data sharing, data management and data governance among ASEAN Member States (both gaps in DO5). Based on the former, in order to narrow these gaps, there is a need for ASEAN to suggest the development of a tax revenue framework that is practical and workable for the future digital economy to work effectively across ASEAN Member States. Based on the latter, there is a need for ASEAN to suggest the formulation of a Data-Driven Policy that enables digital cooperation and decisions made based on data and actionable insights among ASEAN Member States. There is also a need for ASEAN to include the development or syndication of available data sharing policies of ASEAN Member States to allow for more effective data sharing, management and governance among ASEAN Member States to strengthen the future of digital economy in the region.

4 Promoting Local Digital Champions

In a global digital economy that is moving rapidly, it is imperative that ASEAN should promote local digital champions to ensure that they carry out digital adoption through the vast range of local policies that have been formulated in the country and have the relevant skills and knowledge, such as ICT digital skills, digital e-commerce, digital marketing and digital entrepreneurship culture. There are gaps observed in DO7, where there is no mention of the importance, the need, and the way to grow local champions, as well as no mention of recognising local IPs that can be accepted and shared among ASEAN's local start-ups, SMEs and multinational companies. Thus, to narrow the gaps, it is recommended that ASEAN make developing local digital champions a region-wide initiative, and also recognise IP rights among ASEAN Member States.

RECOMMENDATIONS

5 Establishment of Governance and Implementation Structure for Digital Inclusion

Establishing an implementation structure for digital inclusion is critical. This gap is observed in DO8, where there is no mention of a governing and implementation steering council for digital inclusion, as well as an absence of focus funding. Thus, to narrow these gaps, ASEAN is to establish a Coordinating and Implementation structure such as the 'ASEAN Digital Council' that would, among others, implement a digital ID that would encourage digital inclusion, e.g. the use of a Digital ID across ASEAN. ASEAN should also recommend focus funding, for example, special projects/programmes for digital inclusion.

6 Establishment of a Sustainable Digital-Friendly Environment

A sustainable digital-friendly environment in the digital economy now and in the future is inevitable. This gap is observed in DO8, where there has been no mention of the importance of Environment, Society and Governance (ESG) considerations in organisations, companies, and investors among ASEAN Member States, as well as of the disposal of electronic waste. Thus, to narrow these gaps, ASEAN should acknowledge its importance either in the general sustainable development policy or sustainable financial policy to promote the importance of ESG in organisations, companies, and among investors in ASEAN Member States, as well as formulate a framework and guidelines on the disposal of electronic waste by ASEAN Member States.

RECOMMENDATIONS

7 Promoting Women's Empowerment in the Digital Space

Women's empowerment in the digital space, specifically women in technology, is critical to ensure inclusivity. This gap is observed in DO8, where women's empowerment in the digital space, or women in tech to be specific, is not mentioned. Thus, in order to narrow this gap, ASEAN is to put women's empowerment, especially women in tech, at the forefront of digital inclusivity initiatives through the many programmes either conducted by the governments or NGOs of ASEAN Member States.

8 Assessing Benefits of Digital Initiatives for ASEAN Member States

A generic gap that is observed is on assessing the benefits of initiatives for ASEAN Member States. The basic assumption is that ASEAN Member States (AMS) would appreciate clearly stated strategies on how Member States can assess and reap the benefits of the digital initiatives, e.g. how AMS can benefit from cross-border trade and cross-border education or health services. This generic gap does not fall within any of the DOs but is critical enough to be mentioned in the ADM 2025. Thus, in order to narrow this gap, a clear digital benefits and incentives (if any) framework is to be developed that would be enjoyed by ASEAN.

RECOMMENDATIONS

TABLE 4: TYPE I: GAPS IN THE SELECTED NATIONAL POLICIES

DESIRED OUTCOME	GAP	RECOMMENDATION TO NARROW THE GAP
DO1	No gap	-
DO2	1. Many reskilling / upskilling programmes (especially integrated and end-to-end service skills) mentioned in the national policies have not included the need for recognition at the regional level, which would benefit ASEAN Member States.	There is a need to establish a database of certifications on the mentioned skills that are recognised at the ASEAN level. There must be a mutual recognition scheme of certifications at the ASEAN level.
	2. The establishment of a Centre of Excellence for 'best practices for rural connectivity' has not been mentioned in any of the National Policies. They have tackled many issues on rural connectivity but have not mentioned a Centre of Excellence (COE).	<p>To define minimum requirements for a COE for 'best practices for rural connectivity', and to note that requirements for rural connectivity will depend on the minimum requirements of good fit for the particular rural location.</p> <p>It is interesting to note, however, that the Shared Prosperity Vision 2030 suggests a Centre of Excellence for Societal Well-Being – which includes inclusive digital adoption but not specifically 'best practices for rural connectivity'.</p>

RECOMMENDATIONS

DESIRED OUTCOME	GAP	RECOMMENDATION TO NARROW THE GAP
DO3	<p>1. Ensuring trusted, affordable and seamless services, content and application. This is not clearly stated in the national policies. It is only broadly included and stated as ‘inclusive’ and ‘inclusivity’.</p>	<p>There is a need to define terms related to trust, affordability, seamless services, content and application in the context of inclusivity, especially in areas where health, education, R&D and economy are concerned.</p>
	<p>2. Regional coordination and cooperation on incidence response team – but expected/required at the regional level in the ADM 2025.</p>	<p>The need to identify bodies/agencies to coordinate and cooperate on incidence response at regional level is inevitable in this current state of affairs with pandemics, global warming and climate change.</p>
DO4	<p>1. Competition laws only exist (cover) at the national level.</p>	<p>The need to refine and include Malaysia’s national competition laws to meet regional requirements. This can also be done by establishing regional cooperation arrangements on competition laws and policies.</p>
	<p>2. Monitoring of developments in regulations is only done at the national level.</p>	<p>To work on achieving greater harmonisation of the competition laws, and monitoring of developments in regulations should be performed at the regional level.</p>

RECOMMENDATIONS

DESIRED OUTCOME	GAP	RECOMMENDATION TO NARROW THE GAP
DO5	<ol style="list-style-type: none"> <li>1. The national policies are not clear on the need to make our (IT) systems interoperable between AMS to support ASEAN economic and social cohesion. <li>2. Cross-border health services - Malaysia is yet to have a holistic national health policy that includes all aspects of digitalisation (although there are specific policies on Health and our National Health System is well respected). 	<p>There is a need for ASEAN to suggest the formulation of a Data-Driven Policy that enables “cooperation and decisions made based on data and actionable insights” among ASEAN Member States.</p> <p>There is a need to formulate a holistic and comprehensive national health policy for the country that includes cross-border health services.</p>
DO6	No gap	-

RECOMMENDATIONS

DESIRED OUTCOME	GAP	RECOMMENDATION TO NARROW THE GAP
DO7	1. Barriers to using tools and apps across ASEAN.	There is a need to formulate a regulatory framework to overcome barriers to enable the use of tools and apps across ASEAN Member States.
	2. To support standard ICT professional qualifications across ASEAN.	To have a database of ICT professional certifications recognised at the ASEAN level that could benefit Member States.
DO8	1. Absence of Centre of Excellence (COE) for 'promoting digital inclusion'.	The need to establish a COE at national level for 'promoting digital inclusion' is critical to ensure that no one sector, organisation, or group of the community is left out in the digitalisation transformation initiatives of the country and the region.

RECOMMENDATIONS

TABLE 5: TYPE II: GAPS IN THE ADM 2025

DESIRED OUTCOME	GAP	RECOMMENDATION TO NARROW THE GAP
DO1	1. Many aspects on prioritising ASEAN recovery from the the COVID-19 pandemic are mentioned. However, there is no mention of the importance of cooperation among ASEAN Member States and how to conduct this best based on lessons learnt.	There is a need for ASEAN to look into the formulation of a digital cooperative framework to address and mitigate future pandemics (such as health, global warming and climate change) across ASEAN Member States based on lessons learnt.
DO2	1. Laws and regulations to improve cabotage law/policy.	There is a need for ASEAN to consider this being included in appropriate policies of ASEAN.
	2. Laws and regulations to improve digital infrastructure.	
DO3	No gap	-
DO4	1. Tax framework to capture revenue from digital economy.	There is a need for ASEAN to suggest the development of a tax revenue framework that is practical and workable for the digital economy across ASEAN Member States.

RECOMMENDATIONS

DESIRED OUTCOME	GAP	RECOMMENDATION TO NARROW THE GAP
DO5	1. Lack of a data-driven policy.	There is a need for ASEAN to suggest the formulation of a Data-Driven Policy that enables “cooperation and decisions made based on data and actionable insights” among ASEAN Member States.
	2. Lack of data sharing, data management and data governance among ASEAN Member States.	ASEAN to include the development or syndication of available data sharing policies of ASEAN Member States to allow for more effective data sharing, management and governance among ASEAN Member States.
DO6	1. The ethical use of IR4.0 technologies.	ASEAN to establish a legal framework on the use of IR4.0 technologies across AMS.
	2. Specific digital standards such as roaming rates.	ASEAN to work on establishing specific digital standards, such as roaming rates, for ASEAN Member States.

RECOMMENDATIONS

DESIRED OUTCOME	GAP	RECOMMENDATION TO NARROW THE GAP
DO7	1. There is no mention found of how to grow local digital champions. ASEAN should be encouraging AMS to develop local digital champions.	ASEAN to make developing local digital champions a region-wide initiative.
	2. There is no mention found of recognising IPs that can be shared among ASEAN members.	ASEAN to recognise IP rights among ASEAN Member States.
DO8	1. Lack of a Governing and Implementation structure for digital inclusion.	ASEAN to establish a coordinating and implementation structure such as the 'ASEAN Digital Council' that would, among others, implement a Digital ID that would encourage digital inclusion, e.g. the use of a digital ID across ASEAN.
	2. Absence of focused funding.	ASEAN to recommend focused funding for special projects/programmes on digital inclusion.
	3. No mention/stress found of the importance of environment, society and governance (ESG) in organisations/companies/investors among ASEAN Member States.	ASEAN to promote ESG among organisations/industries/companies/investors among ASEAN Member States.
	4. No mention found of women's empowerment in the digital space.	ASEAN to put women's empowerment at the forefront of digital inclusivity initiatives.

CONCLUSION

This research has performed detailed analysis on each desired outcome of the ADM 2025 and 20 selected national policies in order to map and identify gaps between them. The mapping is presented in the form of a matrix that can indicate their intersections. From the analysis, gaps between the two (2) are also identified and subsequently, the actions to narrow the gaps are also recommended. Apart from the recommendations presented above, one additional and general gap can be seen in terms of the implementation of the policies. We foresee that the implementation will involve various agencies and coordinating agencies, which need to be identified. There is also another gap in assessing the benefits – how can each AMS assess the benefits from all of the initiatives? This is far from being clearly stated, e.g. for cross-border trades, what are the benefits for higher income/lower income ASEAN countries?

The implications and impacts of this research can be numerous for regulatory and/or policy action. Based on the proposed matrix, which maps the existing national digital development policies and plans, we would be able to identify areas where policies/plans/frameworks are lacking or not being addressed. This would facilitate the development of new national digital development policies. Therefore, the outcome of this study would be able to provide the following implications and impacts:

- It would be able show the government which priority policies and/or policy actions should be implemented based on the rates of the metrics.
- The findings of the study would be able to show the possible positive and negative effects of the existing or proposed policies.
- The study would be able to indicate which policies, plans, roadmaps and frameworks have provided value to the desired outcomes.
- The study would be able to identify the benefits of the policy solutions provided.
- The study would be able to help define the contours of the problems related to the desired outcomes.
- The study would be able to help regulators and policymakers make more informed decisions.

CONCLUSION

The next recommended courses of action that should be significant in offering new insights into the subject area include providing new insights into the following areas:

- Conducting Regulatory Impact Analysis (RIA) on the policies, plans, and frameworks to get more significant insights to make more definite and impactful decisions, and
- Designing and developing specific policies, roadmaps or frameworks that had shown significant gaps.

This would give better insights into the right policies that should be implemented to drive digital economic growth and societal well-being. The general recommendation is to address the recommendations in stages based on needs and priorities. In order to do this, evaluation results can be a good starting point to prioritise the recommendations.

Finally, it is important to recap that the present outcome of this research is based on the 20 selected national policies fulfilling the stated criteria that include completeness. While this research was being undertaken, there were also other relevant national policies that were being formulated, which, when completed, may change the current state of the mapping presented in this report, and consequently, may affect the recommendations. The matrix/mapping developed in this research is also based on our national policies, which are compared with the ADM 2025. The outcome may be different from other ASEAN Member States based on the countries' priorities and may not be generalised to all ASEAN Member States. However, replication of the research to other ASEAN Member States is plausible. There is a need to be fully cognisant of the different levels of progress that are being made within each ASEAN Member State and the potentially divergent nationally driven agendas that may hamper the full realisation of the ADM 2025's DOs.

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SECURITY AND PRIVACY CHALLENGES OF BIG DATA ADOPTION: A CASE STUDY IN THE TELECOMMUNICATIONS INDUSTRY

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ABSTRACT

The telecommunications industry is the most appropriate industry to observe big data trends as this industry not only has the most capable infrastructure for big data collection, but also needs to utilise it extensively in the context of location services it provides to individuals. However, the adoption of big data in telecommunications services also raises important security and privacy challenges. This study focuses on investigating the security and privacy challenges for both data users and data subjects in telecommunications services and examines codes of practices and standards to address the privacy and security challenges. The proposed study is conducted using mixed-methodology, qualitative and quantitative methodology, where each phase is conducted concurrently and independently of each other. From the perspectives of data users, it could be concluded that data management, data privacy, data compliance, and regulatory orchestration challenges are the most pressing concerns in big data adoption. From the perspectives of the data subject, the findings indicate that only the error variable has a direct effect on big data adoption, which is partially mediated by perceived trust and perceived risk. Among the four variables of security and privacy concerns, the improper access variable has a significantly higher effect on perceived trust. Similarly, the collection variable has a significantly higher effect on perceived risk among the four variables. Finally, the findings show that telecommunications users' awareness of data privacy regulations greatly impacts big data adoption. The contributions of the proposed study are two-fold: (1) to help identify the perceived risk implications of the information collected, stored, shared, and managed in big data, and assess reasonable mitigation strategies in the context of data sharing for big data purposes; and (2) to serve as recommendations for the developers and decision-makers to design a secure and fully ethically compliant big data solution in the telecommunications industry.



Keywords: Big Data, Security, Privacy, Telecommunications

INTRODUCTION

Big data analytics has the capacity to extrapolate trends and patterns to predict the behaviour of a given population or even of individuals (Hardy, 2017).

The telecommunications industry is the leading industry in big data trends as the industry has the most capable infrastructure for big data (Chua et al., 2015). With the rollout of 5G technology, numerous emerging big data technologies have emerged as they are able to capitalise from the improved connectivity. The collection of geolocation data of telecommunications subscribers has opened up many opportunities in collecting continuous and real-time data (Wang et al., 2017) as the service provider is able to obtain geolocation data without internet services through the cellular network protocol once the subscriber turns on their mobile device. This capability may greatly benefit most areas of government services by enabling surveillance systems, cybersecurity, and public safety and defence.

Despite the potential advantages of big data, automated data collection by telecommunications service providers is not without scrutiny as it may pose privacy and security challenges. Privacy and security risks may vary depending on the purpose and types of collected data in the big data application, and the type of framework used in developing the application. Many big data applications in Malaysia are considered privacy-invasive because these applications adopt a centralised architecture, where all collected data is stored on a central server. Data breaches are the main threat in big data applications. Therefore, the telecommunications service application must adopt an open-source framework that allows system transparency for the public to test and suggest measures to correct vulnerabilities in the big data application. However, the lack of an open framework is to be expected as the requirement for the telecommunications service provider to protect personal information becomes complicated due to the uncertain reliability of data de-identification. The data user's best efforts in de-identifying personal identifiable information (PII) may not prevent the re-identifying of an individual because data could be combined with other sources (Narayanan, 2008).

Problem Statement

Pursuant to the Personal Data Protection Act, 2015 (PDPA), commercial entities are under an obligation to comply with certain obligations and rights afforded to persons providing information. These obligations and rights were further clarified

INTRODUCTION

under the Personal Data Protection Standard (2015). This standard encompasses security, retention, and data integrity standards, which apply to personal data that is processed electronically and non-electronically.

However, despite the introduction of the PDPA and its various subsidiary legislation, there have been incidents where unauthorised sharing of information of data subjects has occurred. Additionally, the level of awareness and understanding of consumers of their rights and protection

mechanisms is also unclear and whether there is a correlation between awareness and understanding and the take-up of various digital services. The telecommunications sector is an identified sector that the Personal Data Protection Commissioner has directed to set up a data user forum to develop its own codes of practice for adherence by data users. To date, the codes of practice for the telecommunications sector have yet to be finalised and registered with the Personal Data Protection Commissioner.



Research Objectives

- 1** To investigate the perspectives of telecommunications data users in addressing privacy and security issues. Perspectives sought shall include perceived risks and mitigation, industry and/or internal standards being applied, process and modes of redress for data subjects, and compliance requirements.
- 2** To investigate the perspectives of data subjects (telecommunications users and subscribers) on issues pertaining to privacy and security issues and the correlation with take-up and continued use of applications and services utilising data analytics.
- 3** To conduct a comparative review of codes of practices and standards being used by local and international telecommunications providers and recommend potential areas for improvement and/ or adoption.

LITERATURE REVIEW

Big Data Adoption Challenges in Telecommunications Services: Data Users' Perspectives

Privacy and security challenges in big data adoption have been discussed in many pieces of literature. However, apart from Chua (2015), there is a general lack of research that empirically investigates the security and privacy challenges for data subjects or subscribers and how they are related to big data adoption in telecommunications services. Figure 2.1 illustrates the classification of related security and privacy challenges of big data adoption found in the literature. The classification of the challenges is done from the context of the Technological, Organisational and Environmental (TOE) framework (Tornatzky et al., 1990). The mapping of studies in privacy and security challenges in big data adoption is shown in Figure 1.

In the technological context, most issues revolve around the need for strong security and privacy solutions to protect the high volume of data that is collected in a distributed manner. The issue of ineffective scalable privacy-preserving mechanisms (Cuzzocrea, 2014; Salleh, 2016) is also a big challenge, particularly during data mining and data analysis, where the data could easily be exploited by malicious data users. The organisational context can be referred to as 'organisational security practice and culture, security planning, and risk mitigation strategies' (Salleh, 2016). In the organisational context, addressing organisational culture (Hardy, 2017; Salleh, 2016) is very important to shape an organisation's security practices. The skills shortage (Malaka & Brown, 2015; Hardy & Maurushat, 2016; Salleh, 2016) is another organisational-related issue that needs to be solved. In the environmental context, the most widely cited issues are the lack of relevant laws and regulations (Leonardo, 2012; Fang et al., 2016; Ardagna, 2016). The responsibility for ensuring the mitigation of security and privacy risks relating to big data requires international collaboration across governments and international organisations.

LITERATURE REVIEW

FIGURE 1: MAPPING OF STUDIES IN PRIVACY AND SECURITY CHALLENGES IN BIG DATA ADOPTION

Context	Sub-Category	Leonardo (2012)	Cuzzocrea (2014)	Malaka (2015)	Chua (2015)	Aditya (2016)	Fang (2016)	Ardagna (2016)	Hardy (2017)	Salleh (2016)
Technical Context	Infrastructure Security			✓		✓	✓	✓		✓
			✓			✓	✓	✓		✓
Data Management	Secure data storage and transactions logs	✓		✓		✓	✓			
	Granular audits			✓	✓	✓	✓			✓
	Data provenance			✓	✓	✓	✓			✓
	Data usability							✓		
Data Privacy	Analytics accuracy			✓	✓			✓		
	Scalable and composable privacy preserving for data mining and analysis		✓			✓	✓			✓
	Mandatory encryption for data-centric security	✓				✓	✓		✓	
	Granular access control	✓	✓	✓	✓	✓	✓	✓	✓	
Integrity and reactive security	End-point input validation/filtering			✓		✓	✓			
	Real-time security monitoring					✓				✓
Organisational Context	Organisation Culture								✓	✓
	Skill Shortage			✓						✓
	Organisation compliance						✓		✓	
Environmental Context	Demographic inequality				✓		✓			
	Relevant law & regulation	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Outsourcing and use of 3 rd party tools			✓						✓
	Unethical interpretation				✓					✓

LITERATURE REVIEW

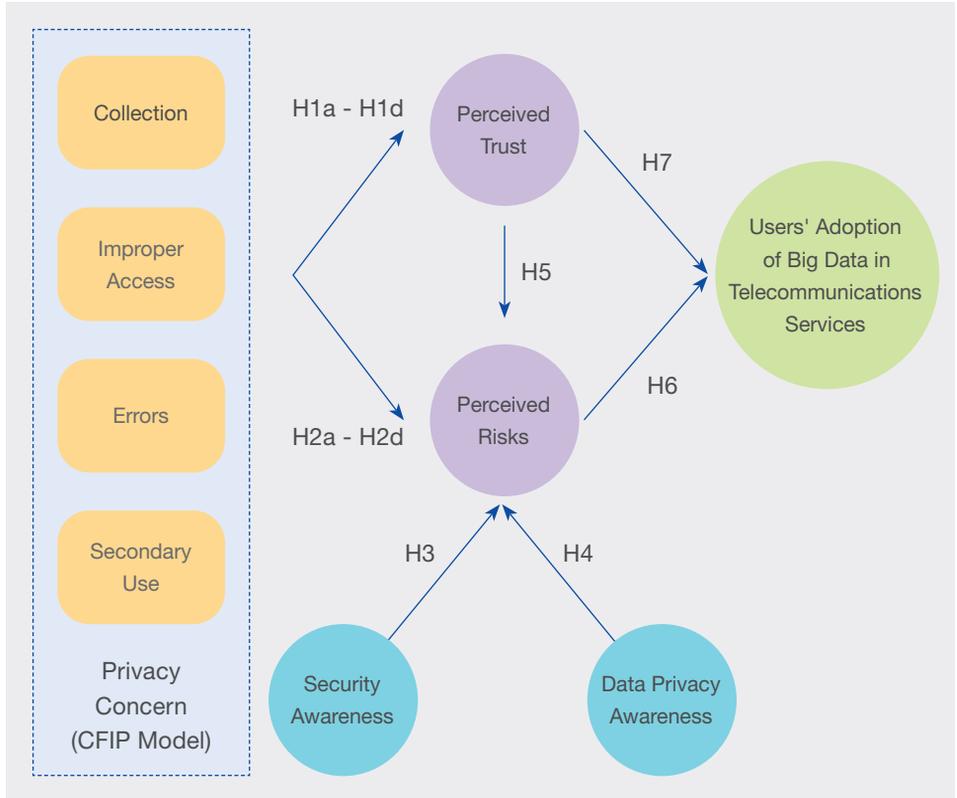
Big Data Adoption Challenges in Telecommunications Services: Data Subjects' Perspectives

Security and data privacy are crucial challenges in big data adoption among data subjects since they include personal and sensitive information about customers. Crawford and Schultz (2014) argue that the extensive use of existing data and analysis in big data will result in detailed individual profiles. The risk of data breaches grows as more data becomes available and stored in online databases and is increasingly shared with third parties. As a result, big data raises security and data privacy concerns about who has access to, stores, and uses customer data. Another security and data privacy concern in big data is regarding the accuracy of data. Telecommunications providers need to adequately design data collection methods and extra measures to reduce and avoid the risk of making incorrect decisions and misinterpretations resulting from inaccuracies in the data collection process.

Figure 2 presents the theoretical framework for this study. The operational definition of each construct in the proposed model is presented in Section 5.2. The important aspect of the proposed theoretical model is the assumption that there are two (2) pathways to the adoption of big data in telecommunications services, which is via perceived trust or perceived risks in the services. From the related work and previous studies, a list of variables is identified which suits the study on security and privacy risk for technology use. The variables are then examined, and the variables that fit the context of big data in telecommunications services are identified.

LITERATURE REVIEW

FIGURE 2: THEORETICAL FRAMEWORK FOR USERS' ADOPTION OF BIG DATA IN TELECOMMUNICATIONS SERVICES



The theoretical framework for data subjects' adoption of big data in the telecommunications industry is proposed based on the Concern for Information Privacy (CFIP) Model and Trust, Confidence, and Cooperation (TCC) Model. In addition, the variables security and privacy awareness are added into the proposed model. The CFIP model was first developed by Smith et al. (1996) to measure individuals' concerns regarding organisational practices. CFIP consists of four dimensions of information privacy concerns: collection, errors, secondary use, and unauthorised access to information. Users with a high level of privacy concerns will doubt the trustworthiness of the telecommunications service provider.

LITERATURE REVIEW

On the other hand, the TCC Model was introduced by Earle et al. (2012) and describes the dual concepts of social trust and confidence. Trust is an idea related to the self-confidence, hope, reliability, dependence, integrity, and capacity of an entity (Meyliana et al., 2019), while risk is an act of a person who produces a decision that gives hope and a detrimental effect (Peter & M. J. Ryan, 1976). Based on previous studies in risk management, the relation between trust and risk is stronger (Larson et al., 2018). It is also found that trust significantly affects perceived risk, and both factors further determine user behaviour (Zhou, 2011). Telecommunications service providers who have successfully developed traditional or online channels will have an edge in gaining user trust. Security awareness is a state where individuals are aware of and ideally committed to their security mission (Al-Daeef et al., 2017). In contrast, data privacy awareness reflects how clearly users understand how their data is handled and processed by used applications (Chrysakis et al., 2021). Lack of awareness and knowledge about security measures raises concerns and worries they will be exposed to security risks and breaches (Smit et al., 2014).

The hypotheses of this study are as follows:

Hypothesis 1(a-d): The effect of CFIP antecedents towards users' adoption would be mediated by Perceived Trust.

Hypothesis 2(a-d): The effect of CFIP antecedents towards users' adoption would be mediated by Perceived Risk.

Hypothesis 3: The effect of Security awareness towards users' adoption would be mediated by Perceived Risk.

Hypothesis 4: The effect of Data Privacy awareness towards users' adoption would be mediated by Perceived Risk.

Hypothesis 5: Perceived Trust would be significantly associated with Perceived Risk.

Hypothesis 6: Perceived Trust would significantly predict Users' adoption.

Hypothesis 7: Perceived Risk would significantly predict Users' adoption.

METHODOLOGY

The proposed study will be conducted using mixed-methodology, qualitative and quantitative methodology. The research study is designed based on the mapping of the research objective, research phase, and main research deliverables. Each phase will be conducted concurrently and independently of each other. The mapping is summarised in Table 1.

TABLE 1: RESEARCH DESIGN

RESEARCH PHASE	RESEARCH ACTIVITIES	RESEARCH OBJECTIVE	RESEARCH DELIVERABLE
Phase 1: Qualitative Study	<ul style="list-style-type: none"> • Literature review • Interview instrument design • Data collection (Focus Group) • Data reduction • Data display • Conclusion drawing 	Objective 1	Deliverable 1 Big data adoption assessment for Data Users
Phase 2: Quantitative Study	<ul style="list-style-type: none"> • Survey instrument design • Content validation • Forward-backward translation • Pilot study • Perform data collection using proportional quota sampling • Construct validation • Descriptive analysis • Path analysis 	Objective 2	Deliverable 2 Big Data adoption assessment for Data Subjects

METHODOLOGY

RESEARCH PHASE	RESEARCH ACTIVITIES	RESEARCH OBJECTIVE	RESEARCH DELIVERABLE
Phase 3: Systematic Review	<ul style="list-style-type: none">• Region and telco providers identification• Data collection: Code of practice and privacy notice collection• Review principles and features determination• Feature extraction: Content• Features classification	Objective 3	Deliverable 3 Privacy Notice Assessment for local and international telecommunications providers

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Specific Research Question 1

Instrument Design and Data Collection

The focus group interview instrument has been designed according to the technological, organisational, and environmental (TOE) framework. A focus group protocol and interview questions have been developed based on the following sub-research questions:

RQ1a:

What are the perceived security and privacy risks and mitigation strategies by the telecommunications provider for big data adoption?

RQ1b:

What are the industry and/or internal standards being applied as mitigation strategies?

RQ1c:

What are the compliance requirements (external and internal) being applied in the organisation?

Before recruitment, field expert screening is done according to age (35-45 years old), gender, occupation (upper management and senior positions), and previous experience in cybersecurity and big data projects in Malaysia's four telecommunications operators. The recruitment process is done by sending an invitation to the representatives of the telecommunications providers using convenient sampling. Participant profiles are created based on the basic background questions before the interview is conducted. Ethics approval is obtained from the research ethics committee at Universiti Teknikal Malaysia Melaka. Although the chances are very small, there is a risk that someone could get access to the data being stored. The risk may include reputational harm, losing customers, fears of misuse of the information, and strong emotional relatedness to the organisational data.

All interviews are video-recorded and then transcribed verbatim and conducted in English. The data is analysed using NVIVO 1.6 software. The focus group session is conducted in two modes: a virtual interview and an email interview. The virtual interview is approximately one (1) hour and 30 minutes in length and is recorded for analysis purposes. The email interview is the follow-up question from the focus group session.

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To address RQ1, three (3) main analyses are performed on the focus group data, namely data reduction, data display, and conclusion drawing. In the data reduction phase, first cycle coding and pattern coding are conducted. The first cycle coding uses a mix of in vivo, process, and descriptive coding approaches. To ease the coding process, a deductive coding method is applied, whereby a 'start list' of codes was first developed based on the emerging themes and concepts from the literature review. In the pattern coding stage, the large number of coding in the start list was revised again into a smaller analytical unit to see whether it possessed structural unity. All first cycle codes were transferred into nodes in NVIVO 1.6 to generate the Pattern codes. Later, a group of prominent themes emerged from each of the sub-research questions to present and organise the data display. In the conclusion drawing phase, the relationship of the selected themes with the research questions is observed and interpreted.

RQ1a: What are the perceived security and privacy risks and mitigation strategies by the telecommunications provider for big data adoption?

14 themes were found to address sub-research question 1a. The themes are categorised under the context of technological challenge (4 themes), organisational challenge (2 themes), environmental challenge (3 themes), and mitigation strategies (5 themes). The explication for each theme is summarised in Table 2. The number in parentheses () indicates the number of references in the focus group data. From the findings, the Data Management theme is of highest concern, followed by Data Privacy, Data Compliance, and Data Governance, respectively.

In this study, the researchers have concurred that the three TOE challenges do influence big data adoption, and the findings show that there are distinctive challenges pertaining to the telecommunications industry in Malaysia. The salient themes shown in Table 2 have emerged from the collective opinions of the participants in the focus group interview. Among the 14 challenges identified, four concurred with the original TOE framework (Tornatzky et al., 1990). These differences can be explained due to the national and industry type influences towards the adoption (Baker, 2012).

FINDINGS AND ANALYSIS

TABLE 2: SUMMARY OF EMERGING THEMES

CONTEXT	THEME	DIMENSION	EXPLICATION
Technological Challenge	Integrity and Reactive Security (7)	Advanced security analytics (3)	Real-time threat detection tool with enhanced network-based security analytics and forensics.
		Reactive security (1)	A measure was taken based on detected threats from real-time monitoring.
		Security automation (3)	Security tools and technology that monitor, detect, troubleshoot, and remediate cyber threats without human intervention.
	Data Management (16)	Data over-collection (1)	Collection of users' data more than its original function while within the permission scope.
		High volume (3)	A large number and diverse sets of data from multiple sources.
		Data discrimination (1)	A bias occurs when predefined data types or data sources are intentionally or unintentionally treated differently from others.
		Data integration (2)	Process of bringing data from disparate sources together to provide users with a unified view.
		Data quality and usability (6)	The ability of data users to derive useful information from data.

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CONTEXT	THEME	DIMENSION	EXPLICATION
Technological Challenge	Data Privacy (14)	Data anonymisation (3)	Process of masking personally identifiable information with an irreversible value from datasets.
		Data encryption (2)	Process of encoding data from plaintext (unencrypted) to ciphertext (encrypted) to protect data confidentiality.
		Granular access control (8)	The practice of granting different levels of access to a particular resource to a particular user.
	Data Compliance (13)	Comp-Data collection (6)	The practice of ensuring the process of data collection is following legal requirements.
		Comp-Data injection (3)	The practice of ensuring the process of data injection is following legal requirements.
		Comp-Secondary use (4)	The practice of ensuring the use of personal information is following legal requirements and is within what has been authorised.

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CONTEXT	THEME	DIMENSION	EXPLICATION
Organisational Challenge	Data Governance (9)	Data stewardship (5)	Responsibility for assuring that the right data gets to the right processes/ parties in the proper format and is compliant with the regulations.
		Data transposition (2)	Process of restructuring values or shape of dataset.
	Subject Matter Expert (1)	Professionals who have advanced and specialised knowledge in the field.	
Environmental Challenge	Competition Intensity and Market Structure (1)	Competition intensity (1)	The degree of rivalry between providers within the telecommunications industry.
		Market structure (2)	The number of providers and their market share.
	Relevant Laws and Regulations (6)	Regulatory change (1)	Any regulatory changes at a national and regional level that substantially affect the industry.
		Regulatory orchestration (5)	A form of regulatory actors' engagement with industry players at different levels to address a target in the pursuit of public goals.

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CONTEXT	THEME	DIMENSION	EXPLICATION
Environmental Challenge	Technological Support (2)	Vendor support (1)	The availability and ability of vendors to fulfil the implementation and use of a given technology.
		Open Source (1)	Open and publicly available tools and software.
Mitigation Strategies	Advanced Security Tools		Real-time threat detection tool with enhanced network-based security analytics and forensics.
	Security Talent Development		The development of an employee's human capital as a resource for improving professional skills and quality in the security domain.
	Continuous Security Assessment	Security assessment	
Audit			Examination of the practices, procedures, technical controls, personnel, and other resources that are leveraged to manage companies' security risks and assure that they adhere to best practices.

FINDINGS AND ANALYSIS

CONTEXT	THEME	DIMENSION	EXPLICATION
Mitigation Strategies	Security Plan	Key performance indicator (KPI)	A set of quantifiable measures to evaluate organisational success in meeting the strategic goal.
		Strategic roadmap	A plan that defines the organisation's objectives, strategies, and pathways for the future.
	Security Culture Promotion	Awareness programme	Activities that are designed to influence employees' secure behaviour by promoting understanding of endpoint security.
		Awareness training	Activities that are designed to influence employees' secure behaviour by introducing knowledge, skills, and competence of endpoint security.
		Leadership support	The organisation attitudes and behaviours of the top management in providing support and required direction to employees.

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When we compare the emerging themes found in this study with the literature review, our findings differ slightly from the initial categorisation of security and privacy challenges found in the literature review of technological, organisational, and environmental (TOE) contexts. New themes have been added to reflect the analysis of the focus interview. Data Compliance categories have been added in the technological challenge, while Infrastructure Security themes have been removed from the category. Data Governance has emerged as a new theme in the organisational context; while under the environmental context, Competition Intensity and Market Structure themes have been included.

There are some themes from our initial study in the literature that have been removed from the final findings. Although big data requires organisation-wide adoption, the findings show that very few themes were extracted under organisational challenge. On the other hand, considering the uncertainty of the political landscape in Malaysia and the global COVID-19 pandemic situation, it is expected that geopolitical factors may have a significant effect on big data adoption in the telecommunications industry. Surprisingly, this study found that the telecommunications industry does not regard geopolitical factors as a challenge.

RQ1b: What are the industry and/or internal standards being applied for the mitigation strategies?

The mapping of the industry and/or internal standards being applied by the telecommunications providers is provided in Table 3.

TABLE 3: STANDARDS BEING APPLIED FOR THE MITIGATION STRATEGIES

RISK/ CONCERN	INDUSTRY AND/OR INTERNAL STANDARDS
Data Privacy	<ul style="list-style-type: none"> • Data protection impact assessments (DPIA) • ISO27701 – Privacy Information Management System (PIMS) • Personal Data Protection Act (PDPA) • General Data Protection Regulation (GDPR)

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RISK/ CONCERN	INDUSTRY AND/OR INTERNAL STANDARDS
Data Management	<ul style="list-style-type: none"> • Data protection impact assessments (DPIA) • ISO27701 – Privacy Information Management System (PIMS) • Personal Data Protection Act (PDPA) • ISO27001 – Information Security Management • Payment Card Industry Data Security Standard (PCI DSS)
Data Compliance	<ul style="list-style-type: none"> • Information Security Readiness Assessment • Cloud Security Alliance (CSA) practices • ISO27001 – Information Security Management • ISO27701 – Privacy Information Management System (PIMS) • Personal Data Protection Act (PDPA) • General Data Protection Regulation (GDPR) • Information Security Framework (ISF)
Advanced Security Technology	Critical Security (CIS) control

RQ1c: What are the compliance requirements (external and internal) applied in the organisation?

The compliance requirements applied in the telecommunications provider are presented in Table 4. The compliance requirements are classified according to internal and external requirements.

TABLE 4: COMPLIANCE REQUIREMENTS APPLIED IN THE ORGANISATION

TYPE	COMPLIANCE REQUIREMENT	DESCRIPTION
Internal	Data protection impact assessments (DPIA)	A process that is designed to identify and minimise risks associated with the processing of personal data.

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TYPE	COMPLIANCE REQUIREMENT	DESCRIPTION
Internal	Information Security Readiness Assessment	Assessment mechanism that enables organisations to determine their current cybersecurity capabilities, set individual goals for a target state, and establish a plan for improving and maintaining information security readiness.
	Critical Security (CIS) control	Recommended set of actions for cyber defence that provide specific and actionable ways to stop pervasive and dangerous attacks.
	Cloud Security Alliance (CSA) practices	Best practices for providing security assurance within cloud computing, and to provide education on the uses of cloud computing to help secure all other forms of computing.
	ISO27001 – Information Security Management	The framework that helps organisations establish, implement, operate, monitor, review, maintain, and continually improve an Information Security Management System.
	ISO27701 – Privacy Information Management System (PIMS)	Procedures and organisational structures that are designed to protect personal data from unauthorised access, processing, or use for purposes other than those originally given, as well as to ensure privacy data security.
	Payment Card Industry Data Security Standard (PCI DSS)	Set of security standards designed to ensure that ALL companies that accept, process, store, or transmit credit card information maintain a secure environment.
	Information Security Framework (ISF)	Documented processes that define policies and procedures around the implementation and ongoing management of information security controls.

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TYPE	COMPLIANCE REQUIREMENT	DESCRIPTION
Internal	IT Audit	IT audit determines whether IT controls protect corporate assets, ensure data integrity, and are aligned with the business' overall goals.
	Security Audit	Security audit measures an information system's security against an audit checklist of industry best practices, externally established standards, or federal regulations.
External	Personal Data Protection Act (PDPA)	The Act that regulates the processing of personal data in regard to commercial transactions.
	General Data Protection Regulation (GDPR)	The legal framework that sets guidelines for the collection and processing of personal information from individuals who live in the European Union (EU).

Specific Research Question 2

Instrument Design and Data Collection

This study used a structured questionnaire for data collection. The sources of the items, and operational definitions of the dependent variables, independent variables, and modifying variables are shown in Table 5.

TABLE 5: OPERATIONAL DEFINITIONS AND SOURCES OF ITEMS

VARIABLES	OPERATIONAL DEFINITION	SOURCES OF ITEMS
Collection (C)	Users' concern whether their personal information is overly collected by the telecommunications service provider.	Smith et al. (1996); Stewart & Segars (2002)

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VARIABLES	OPERATIONAL DEFINITION	SOURCES OF ITEMS
Improper Access (IA)	Users' concern about whether telecommunications providers fail to protect access to their personal information from unauthorised entities.	Smith et al. (1996); Stewart & Segars (2002)
Error (E)	Users' concern as to whether their personal information is appropriately protected from errors.	Smith et al. (1996); Stewart & Segars (2002)
Secondary Use (SU)	Users' concern about whether telecommunications providers use personal information for illegal or unauthorised purposes.	Smith et al. (1996); Stewart & Segars (2002)
Perceived Trust (PT)	Users' belief or confidence in telecommunications providers' trustworthiness.	Chiou (2004); Zhou (2011)
Perceived Risks (PR)	Users' expectation of losses associated with the release of personal information to the telecommunications service provider.	Pavlou & Gefen (2004); Zhou (2011)
Security Awareness (SA)	Level of knowledge and understanding regarding information security and the relevant protection mechanisms.	Alzubaidi (2021)
Privacy Awareness (PA)	Level of knowledge and understanding regarding the options for privacy available to them and the privacy practices of the telecommunications provider.	Yusoff (2011)
User Adoption (UA)	The acceptance, integration, and use of telecommunications services.	Zhou et al. (2010)

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There are a total of 46 items in the survey instrument. Content validity was carried out to verify the representation and relevance of the items in measuring the variables. The questionnaire is validated by six (6) experts with minimum experience of ten (10) years. The total number of items after revision is 38. The I-CVI and S-CVI/Ave meet satisfactory levels, indicating that the questionnaire scale has a satisfactory level of content validity. A pilot study was carried out by collecting data from 50 respondents to determine the reliability of the questionnaire. The questionnaire's reliability is tested using the Cronbach alpha value for each variable.

A total of 400 respondents were included in this study. In order to improve the quality of survey response, the criteria for selecting the participants for the quantitative study included: (1) familiarity with smartphones and (2) experience in the use of the MySejahtera application. This study utilised non-proportional quota sampling. The abovementioned target sample will be subdivided into unequal proportions of respondents to represent the age demographic segments in the study. The proportion of each quota of respondents is based on the percentage distribution of smartphone owners by age group in the Hand Phone User Survey conducted

by Malaysian Communications and Multimedia Commission (MCMC) in 2017.

Respondent Profile

A total of 400 respondents participated in this study. Six (6) demographic criteria are collected, namely age, gender, monthly income, education level, areas of living, and telecommunications provider. The gender distribution was found to be **male (n=148, 37 percent)** and **female (n=252, 63 percent)**. Respondents varied from below 20 to above 65 years of age. Many of the respondents were around **20-23 years (n=191, 47.8 percent)**, followed by respondents aged **35-49 years (n=102, 25.5 percent)**, respondents aged below **20 years (n=50, 12.5 percent)** and subsequently, respondents of **50-64 years old (n=48, 12 percent)**. The fewest respondents were at the age of **above 65 years (n=9, 2.3 percent)**.

400

respondents participated in this study. Six (6) demographic criteria are collected, namely age, gender, monthly income, education level, areas of living, and telecommunications provider.

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Most respondents have a monthly income of RM1,000-RM 4,850 (n=142, 35.5 percent), followed by a monthly income of RM4,851-RM10,971 (n=69, 17.3 percent) and respondents with an income of RM999 and below (n=35, 8.8 percent). The fewest respondents' income was RM10,971 and above (n=32, 8.0 percent). Most respondents originated from urban areas (n=252, 65.0 percent). The rest of the respondents are from rural areas (n=148, 37.0 percent). Most respondents use Celcom as their telecommunications service provider (n=123, 30.8 percent), followed by U Mobile (n=79, 19.8 percent), Maxis (n=60, 15.0 percent), Digi (n=52, 13.0 percent), Unifi Mobile (n=40, 10 percent), TuneTalk (n=19, 4.8 percent) and redOne (n=18, 4.5 percent). The least number of respondents were using other telecommunications service providers (n=9, 2.3 percent).

Descriptive Analysis

This section presents the findings of the descriptive analysis for each variable in this study. Eight (8) variables are used in this study namely, collection, improper access, errors, secondary use, perceived trust, perceived risks, security awareness, data privacy awareness and user adoption. The results reveal that the highest privacy concern among data

subjects is about Errors. Most of the data subjects are concerned as to whether their personal information is appropriately protected to minimise accidental and intentional errors by the telecommunications service provider.

Several comparisons have been done in this study, such as comparison of gender groups, age groups, monthly income, education level and areas of living. The results for the Mann-Whitney test, which is utilised to compare two independent gender groups in the study, show that there is no significant difference for all variables across the categories of gender, age, monthly income and areas of living. However, from all variables, collection, improper access, and security awareness show significant difference across the category of education level.

Inferential Analysis

This section presents the findings of the inferential analysis in this study. Exploratory Factor Analysis (EFA) is performed to explore the relationship between observed variables, and to group them according to their factor loading. In this study, direct oblimin rotation is used, as it is an oblique rotation method to allow correlation between factors. There are a total of 33 items in independent variables after

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EFA was carried out. Two (2) items were removed from the survey instrument. All items were grouped into eight factors based on their highest factor loadings. The extracted factor structure explained 74.1 percent of the variance, which is sufficient for social science research. None of the factors were dropped.

In order to test hypotheses, path coefficients (results of PLS), in addition to p-values (results of bootstrapping), were examined. In addition, the strength of the mediator variable's relationships with the other independent variables is analysed based on the guideline given by Hair Jr et al. (2021). From the results, four hypotheses were rejected, namely H1d, H2b, H3, and H5, whereby the p-value of the path coefficient is under a significant value of 0.05; $p < 0.05$. In addition, PLS-SEM was used to determine the effects of eight independent variables on the user adoption of big data. The results show this model to be structurally good ($R^2 = 0.657$), and able to predict user adoption of big data in telecommunications services. Table 6 summarises the results for hypothesis testing.

TABLE 6: SUMMARY OF RESULTS

HYPOTHESES	FROM ► TO	PATH COEFFICIENT			MEDIATION	RESULT
		PT	PR	UA		
H1a	COL	-0.119*		0.006	Full	Accepted
H1b	IA	-0.604*		0.068	Full	Accepted
H1c	ERR	0.148*		0.246*	Partial	Accepted
H1d	SU	-0.014		-0.008	No	Rejected
H2a	COL		0.369*	0.006	Full	Accepted
H2b	IA		0.008	0.068	No	Rejected
H2c	ERR		0.201*	0.246*	Partial	Accepted
H2d	SU		0.220*	-0.008	Full	Accepted
H3	SA		0.072	0.024	No	Rejected
H4	PA		0.130*	0.296*	Partial	Accepted

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HYPOTHESES	FROM ► TO	PATH COEFFICIENT			MEDIATION	RESULT
		PT	PR	UA		
H5	PT	0.018			NA	Rejected
H6	PT	0.136*			NA	Accepted
H7	PR	0.068*			NA	Accepted

Notes: Overall Model F= 48.334; *p<0.05; R2 = 0.657; adjusted R2 = 0.66

Due to the increased demand for secure Big Data implementation, the telecommunications service provider needs to understand and capture the market needs pertaining to security and privacy. Therefore, this study sought to investigate the influence of security and privacy concerns on user adoption of Big Data in telecommunications services. In addition, this study investigates the effect of security awareness and data privacy awareness on user adoption.

Concerning hypotheses H1a-d and H2a-d, the findings of the PLS structural modelling indicates partial support for our initial hypotheses that perceived trust and perceived risk will mediate the relationship between security and privacy concerns and Big Data adoption in telecommunications services. The influence of users' concern on collection towards Big Data adoption was fully mediated by perceived trust and perceived risk in telecommunications service providers. Interestingly, among all security and privacy concerns, only error

(ERR) has a direct effect on Big Data adoption, which is partially mediated by perceived trust and perceived risk. This indicates that information accuracy plays an important role in users' decision to adopt Big Data services from the telecommunications service provider. Besides this, the effect of users' concern on secondary use towards Big Data adoption was fully mediated by perceived trust only, but not by perceived risk. Thus, H1d is rejected. In contrast, users' concern on improper access does not influence Big Data adoption and was fully mediated by perceived risk only, but not by perceived trust. Therefore, H2b is not supported. The findings seem to suggest that when evaluating the potential damage from security and privacy breaches, telecommunications users are more concerned about the technical ability of the telecommunications service provider in mitigating the risks. A possible explanation for this might be due to the users' perception that risks, both financial and non-financial, are usually associated with the lack

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of competence of service providers in protecting their data, which is subject to improper access and error in the data (Dewi & Ketut, 2020).

Among the four (4) variables of security and privacy concerns, the improper access variable has a significantly higher effect on perceived trust. The findings indicate that the users feel that the telecommunications service provider is deemed trustworthy when the provider has the technical ability to protect access to their personal information from unauthorised entities. The significant relations between service providers' technical competency and customers' trust have been reviewed extensively in other industries, such as e-commerce (Connolly & Bannister, 2007) and banking (Yousafzai et al., 2003). On the other hand, the collection variable has a significantly higher effect on perceived risk among the four variables of security and privacy concerns. The findings observed in this study mirror those of previous studies (Zhou, 2011), where users feel that the telecommunications service provider is deemed trustworthy when the provider does not over-collect their personal information.

Telecommunications users' awareness of data privacy regulations greatly impacts Big Data adoption. The data privacy awareness shows that when

the users make informed choices about sharing their personal data with telecommunications providers and how their data is being processed, this will directly affect the adoption of Big Data services. Contrary to expectations, it is interesting to note that this study did not find any significant relation between perceived trust and perceived risk. The TCC Model (Siegrist et al., 2012) offers a possible explanation for the results. Under the condition where the perceived importance of the issue is low, and the users' awareness (i.e. knowledge) is high, trust will be irrelevant to perceived risk.

Specific Research Question 3

Online privacy regulations are notorious for their inconsistencies in appearance and content (Kaur et al., 2018; Ahmad et al., 2020). They are also difficult to comprehend, and do not adequately assist users in making informed judgements regarding internet service providers' data practices (Kaur et al., 2018). In addition, as stated in a study by Chua et al. (2017), to address concerns about data privacy, many countries in European, American, and Asian regions have enacted data protection legislation such as the European General Data Protection Regulation (GDPR), the USA Federal Trade Commission's (FTC) Fair Information Practice Principles (FIPs) and the UK Data Protection Act 2018

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(DPA). In Malaysia, this legislation is known as The Personal Data Protection Act 2010 (PDPA, 2010), and was enforced in November 2013.

In each piece of legislation, several principles exist that differ in name but refer to the same underlying idea. Therefore, this research focused on the review of codes of practice and privacy notices, based on PDPA principles and its features, as summarised in Table 7. The table shows the features identified from the PDPA and used in reviewing the Telecommunications code of practice and privacy notice. The scopes of the codes of practice and privacy notices are also extracted and named as General principles. They consist of two (2) features: a) Personal data is adequate, relevant, and not excessive; and b) Personal data is processed with consent and for lawful purposes.

TABLE 7: PDPA PRINCIPLES' FEATURES

PRINCIPLES	FEATURES
Notice and Choice	<ol style="list-style-type: none"> 1. Purpose personal data is processed 2. Purpose personal data is collected 3. Purpose personal data is disclosed 4. Notice Cancellation
Disclosure	Individual consent about their personal data
Security	<ol style="list-style-type: none"> 1. Protect personal data from loss 2. Protect personal from misuse 3. Protect personal data from unauthorised access 4. Protect personal data from other incidents
Retention	<ol style="list-style-type: none"> 1. How much personal data is retained 2. How long does it take 3. How to store the personal data 4. Personal data handling after the retention period
Data Integrity	<ol style="list-style-type: none"> 1. Personal data is accurate / not altered 2. Personal data is up to date 3. Personal data is verifiable
Access	The rights to the personal data

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In this research, the comparative review was carried out based on three (3) main regions, namely Asia, Europe, and America. On top of the regions reviewed, seven telecommunications providers were selected to be reviewed in terms of their privacy policy notices that are published publicly. They are Maxis, Celcom, Digi, TM ONE, Verizon, AT&T, Vodafone and Deutsche Telekom AG. In this research, the sample was taken between 22 July 2021 and 10 August 2021. Updates made after 10 August 2021 will not be reflected in our reviews. Owing to the PDPA's effective date on 15 November 2013, we assume that most companies would have had enough time to complete their privacy notices before our data collection period.

Table 8 summarises the features that exist in the privacy notices from the selected telecommunications organisations. Based on the analysis, Table 8 shows the issue discovered with regard to the Retention principle. Three of the selected Telcos did not disclose anything about retention features. From our review, it is discovered that many companies, especially in Malaysia, rarely revise their privacy notices after they have been publicly published to customers. The findings also discovered that some of the rules are unclear in the privacy notice or code of practice and need further investigation. For example, in the AT&T Privacy Policy, the retention segment is unclear in terms of the process. In TM ONE and Maxis' privacy notices, three

retention features are not stated, except for the how to store the personal data feature. Another reason that the privacy notices are unclear is because the term used for the notice cancellation feature stated in the privacy notices is different among telecommunications organisations. For example, the term 'opt-out' is used by Digi and Celcom to describe the cancellation notice to their users, whereas for Maxis, users need to understand the whole statement in the notice.

Based on the research findings, most privacy policies are drafted to shield organisations from potential privacy litigation, rather than to address consumers' privacy notice (Earp et al., 2005). This indicates that there is no standard for what and how privacy notices should be disclosed on a website, although most legislation require organisations to provide notices informing customers about their privacy practices (Chua et al., 2017). Hence, most organisations choose the content of the policy that has the most influence on their customers. Meanwhile, Scaub et al. (2017) and Ebert et al. (2021) stated that due to the complexity and indiscernibility of the privacy notice design, the privacy practices do not provide actual transparency to customers as the telecommunications organisation's objective in publishing a privacy notice is to meet the letter of the law.

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TABLE 8: COMPARATIVE REVIEW RESULT ANALYSIS

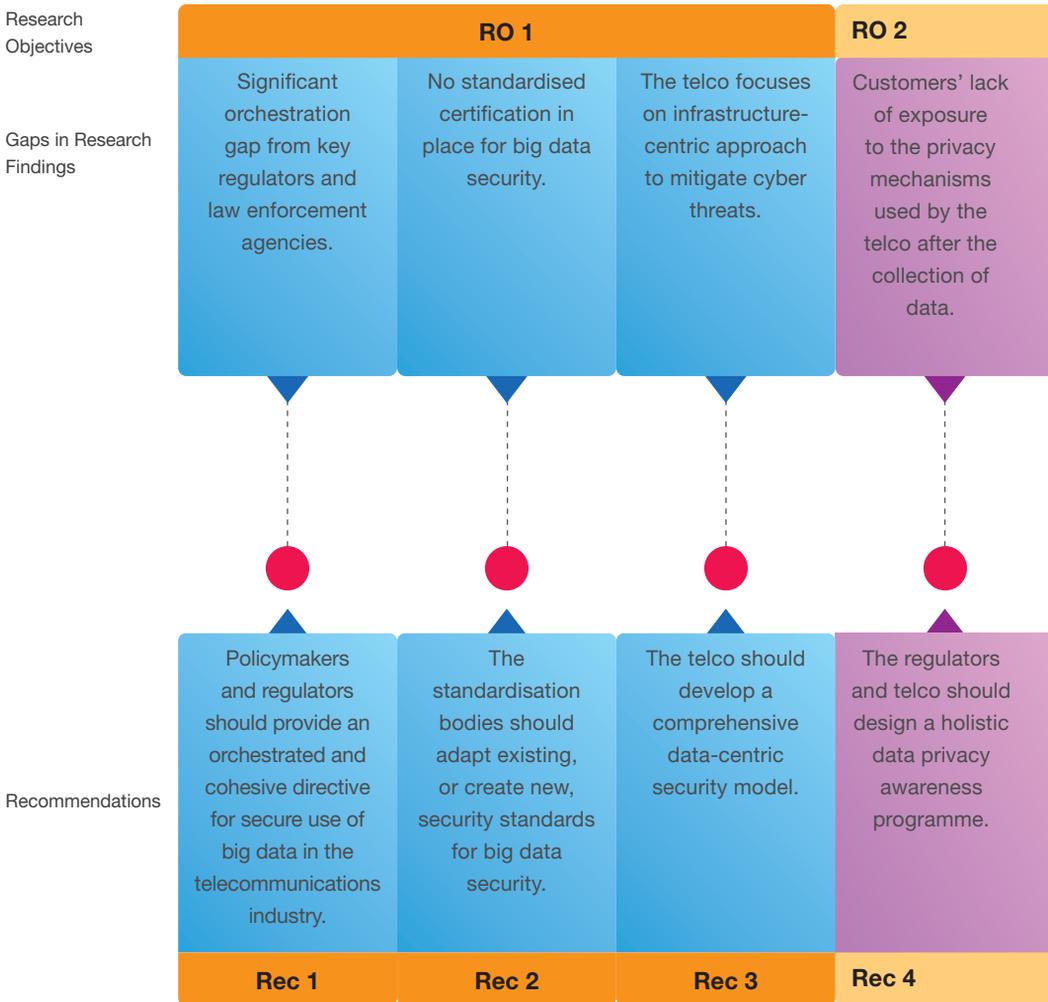
REGULATORY	SOURCES	COUNTRY / REGION	PROVIDERS	PRINCIPLES OF DATA PROTECTION						
				GENERAL		NOTICE AND CHOICE (INFORM THE PURPOSE OF PERSONAL DATA)				DISCLOSURE
				Personal data adequate relevant & not excessive	Processed with consent and for a lawful purposes	Purpose of personal data is processed	Purpose of personal data is collected	Purpose of personal data is disclosed	Notice cancellation	Individual consent about their personal data
General Consumer Code (GCC), Personal Data Act 2010 (PDPA)	Privacy Notice	Malaysia / Asia	Maxis	√	√	√	√	√	√	√
			Celcom	√	√	√	√	√	√	√
			TM	√	√	√	√	√	√	√
			Digi	√	√	√	√	√	√	√
USA Federal Trade Commission (FTC)'s Fair Information Practice Principles (FIP)	Privacy Notice	USA / North America	AT&T	√	√	√	√	√	√	√
			Verizon	√	√	√	√	√	√	√
European General Data Protection Regulation (GDPR), Data Protection Act (DPA)	Privacy Policy	UK / EU	Vodafone	√	√	√	√	√	√	√
	Rules Privacy	German / EU	Deutsche Telekom AG	√	√	√	√	√	√	√

Notes: √ denotes the existence of the features, × denotes features that may exist but are unclear, unknown or not mentioned

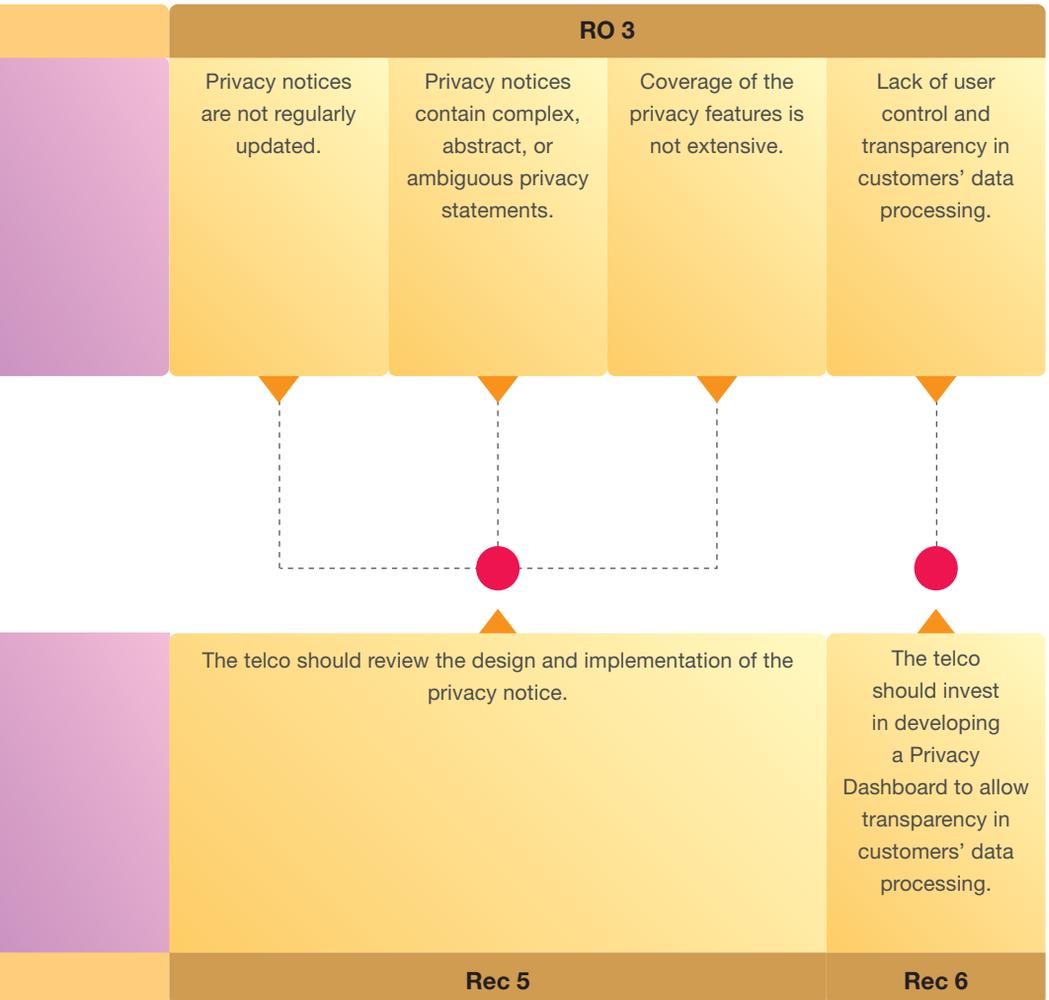
RECOMMENDATIONS

Based on the research findings, several gaps have been identified. In this section, we propose recommendations to address the gaps, as outlined in Figure 6.1.

FIGURE 6.1: MAPPING OF RECOMMENDATIONS TO GAPS IN RESEARCH FINDINGS



RECOMMENDATIONS



RECOMMENDATIONS

Recommendation 1: Policymakers and regulators should focus on providing an orchestrated and cohesive directive for secure use of big data in the telecommunications industry.

The telecommunications industry faces a significant orchestration gap from all key regulators and law enforcement agencies. Malaysia's telecommunications industry requires one party to act as an orchestrator to bridge the gap. All stakeholders participating in the publication of guidelines should tackle big data security holistically. Security and privacy must be considered not only in terms of static regulatory compliance, but must also be inclusive of the development of the industry's best practices for secure big data management.

Recommendation 2: The standardisation bodies should adapt existing, or create new, security standards for big data security.

There is currently no standardised certification in place for big data security. Adapting or adopting standards will aid the industry's growth while also improving user service. Therefore, standardisation bodies should form industry groupings that consist of big data providers, users, and regulators from relevant industries to develop uniform standards and certifications.

Recommendation 3: The telecommunications provider should develop a comprehensive data-centric security model.

Telecommunications providers are leaning towards an infrastructure-focused approach to mitigate cyber threats and cyberattacks. Findings indicate that the data subject's concern on data error directly influences big data adoption of telecommunications services. Telecommunications providers need to shift the focus of their security solutions with the aim of securing and protecting their customers' data. This includes investing in advanced automated security solutions for data anonymisation, data encryption, data tagging, data classification, data governance, and data compliance.

RECOMMENDATIONS

Recommendation 4: Regulators and telecommunications providers should design a holistic data privacy awareness programme.

Data subjects often assume that the data that has been collected by the telecommunications provider is not stored and processed properly. Therefore, regulators and telecommunications providers are responsible for making data subjects aware on how data is stored and processed by the telecommunications provider and the regulations it is bound to through their privacy notices. Regulatory agencies such as CyberSecurity Malaysia (CSM), Malaysian Communications and Multimedia Commission (MCMC) and National Cyber Security Agency (NACSA) need to sit down with telecommunications providers to discuss privacy issues that often occur among data subjects and cooperate to design and organise privacy awareness programmes. The aspect that needs to be emphasised is empowering individuals and telecommunications providers to respect privacy, protect data, enable trust, raise awareness, and promote privacy and data protection best practices.

Recommendation 5: Telecommunications providers should review the design and implementation of the privacy notice.

a. Update the privacy notice frequently and improve principal features

Many telecommunications providers rarely revise their privacy notices to reflect current risks. We suggest that the privacy notices should be regularly updated. We also propose adding a feature to the Retention principle, which is the step taken in handling personal data after the retention period, to improve data processing transparency and subsequently gain more trust in using the services.

b. Reduce the complexity and increase the readability of privacy notice content

Current privacy notices contain complex, abstract, or ambiguous privacy statements. We suggest using GDPR as the guideline for developing the privacy rules or notices because GDPR includes a comprehensive feature considered within business processing activities by design and by default.

RECOMMENDATIONS

Recommendation 6: Telecommunications providers should invest in developing a Privacy Dashboard to allow transparency in customers' data processing.

Telecommunications providers have to protect and respect their customers' privacy, including the choices they make on the use of their data. We recommend that telecommunications providers invest in developing Privacy Dashboards to allow transparency in the customers' data processing. Data subjects can view a summary of their collected information, get a copy of their information, and remove unnecessary information, as demonstrated by the Verizon Dashboard (Verizon, 2022). We also suggest an infographic data protection and data security portal be developed by providers to educate and provide awareness to their customers that is easy to access, manage, and understand, as published on Telekom AG's portal (Deutsche Telekom, 2022).

CONCLUSION

This study is significant in that it provides empirical evidence, where two (2) independent empirical studies jointly provide empirical support for the perspectives of telecommunications data users and data subjects in addressing privacy and security issues that are related to big data adoption. The outcomes of this study may serve as guidelines for regulators, telecommunications providers, and stakeholders for securing big data systems and for promoting security best practices within telecommunications industry operations.

This study offers contributions in three (3) major aspects. First, this study presents a thematic classification of security and privacy challenges and their mitigation strategies for big data adoption in the telecommunications industry. The thematic classification highlights potential gaps for future research in the big data security domain. Next, this study proposes an extended Concern for Information Privacy (CFIP) framework to address security and privacy concerns and awareness, and their association with big data adoption in telecommunications services. The extended CFIP framework may provide insights to telecommunications providers on how to alleviate data subjects' privacy concerns in order to encourage their

CONCLUSION

adoption and usage of telecommunications services. Finally, this study explores the potential gaps in codes of practice and standards being used by local and international telecommunications providers for future improvements.

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RECOMMENDATIONS FOR THE CREATION OF A GOVERNANCE FRAMEWORK FOR THE PROTECTION OF PERSONAL DATA USED IN THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE (AI) SYSTEMS

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ABSTRACT

Data privacy laws were not designed to provide for the processing of personal data for inferential analytics or automated decision-making resulting from the use of Artificial Intelligence (AI) systems. Inferences drawn from Big Data, which are large datasets, do not fall within the sphere of traditional principles of the individual's right to privacy. The research recommends the creation of a data privacy governance framework for the protection of personal data used in the development of AI systems. The governance framework must serve to manage the requirement of data privacy and protection standards without acting as an impediment in the use of AI systems. The research employed a comprehensive doctrinal investigation comprising the identification and examination of the Personal Data Protection Act 2010 (the PDPA 2010) with comparative legal research exploring and assessing how legal frameworks in other jurisdictions have been adopted (or otherwise) in managing the risks of Big Data Analytics to the data privacy legal regimes in place. In addition, a survey was carried out to determine the extent of good data governance practices employed by deployers of AI systems. This achieved the research objectives of identifying gaps within the framework by determining whether additional governance regulations are required to manage data privacy risks arising from the use of Big Data in AI systems, and included the examination of the compatibility of the data privacy principles found in the PDPA 2010 with the use of Big Data in AI systems. The recommendations of self-governance principles find a balance between ensuring the protection of data privacy resulting from the risks posed by Big Data Analytics and the facilitation of AI development and deployment in the industry. The principal output of the research is the formulation of recommendations that will serve as a precursor to the creation of a self-governance data privacy framework. The researchers recommend a graduated adoption of the recommendations. The first is the development of an internal governance structure; secondly, improving the algorithm of the AI; thirdly, the development and adoption of a framework or AI Privacy Code within the industry; fourthly, improving the normative legal framework; and finally, a co-regulatory approach.



Keywords: AI, Data Privacy Governance Framework, Data Protection, Self-governance

INTRODUCTION

While the Malaysian Personal Data Protection Act 2010 (PDPA) was enacted to deal with traditional challenges, industrial and technological development bring into question the ability of the PDPA to deal with these new challenges. The field of artificial intelligence (AI) presents new concerns, risks and threats to personal data but personal data protection principles may equally threaten the lawful use of AI owing to its incompatibility with the existing principles of the PDPA, which may impede or inhibit the use and continued innovation of AI tools.

Background

AI systems with machine learning abilities are being deployed in innumerable sectors seen as data-intensive industries. This growing trend is rapidly expanding, raising several concerns related to data privacy risks. AI systems require large amounts of datasets to be trained or to learn, make predictions, draw inferences or resolve problems. These have become synonymous with the terms “Big Data” and “Big Data Analytics”, respectively. There is a real likelihood that AI systems may be in direct violation of data privacy laws and pose new risks to data privacy rights of data subjects as a result of the use of inferred or derived data which requires additional processing and re-purposing of the data provided by or observed from the data subject or where data encompassed in big data can be

traced back to Personally Identifiable Information (PII) of the data subject. A diametrically opposed dilemma is that data privacy laws that have been enhanced to manage data privacy risks arising from the use of AI systems may inhibit the development of AI.

Problem Statement

The basis of data privacy law regimes is the emphasis on the rights of the data subject to exercise a legal right to manage the processing of their PII. These legal regimes are framed by the data protection principles (DPP) and the rights of the data subject (RDS). In Malaysia, this regime is provided by the PDPA. The use of Big Data comprising vast amounts of large datasets of consumer personal data used to train AI systems to make inferences and decisions affecting the data subject or third parties dilutes the legal right of the data subject. This use was not predicted by the government and lawmakers at the first iteration of a data privacy legal regime. There is a need to assess the protection accorded in the current legal framework – the PDPA - in order to determine whether the PDPA is able to be an effective data privacy governance framework. In the case where there are clear gaps, additional governance regulations are required to manage data privacy risks arising from the use of Big Data in AI systems. An equally important dilemma is whether the DPP and RDS are compatible with the use of Big Data in AI systems.

INTRODUCTION

**Research Objectives**

The objectives of the research were fourfold.

- 1** Firstly, the researchers embarked on identifying the privacy risks resulting from the use of Big Data in AI systems to produce results through inferential analytics and automated data processing.
- 2** The second objective of the research identified the weaknesses of the existing law in relation to the use of Big Data in AI systems, including examining whether, and to what extent, a new law or modifications in the existing law would remedy the situation.
- 3** Thirdly, the research embarked on the exploration and assessment of the adoption (or otherwise) of principles for managing data privacy risks in data privacy legal regimes in place in other jurisdictions arising from Big Data Analytics.
- 4** The final objective was the formulation of recommendations for adoption in a self-governance data privacy framework by deployers (users) of AI that upholds data protection principles while also promoting economic growth as a result of the expansion of research and development of AI systems. The recommendations encompass a general scope applicable across different verticals and will include an element of specificity to the telecommunication vertical.

LITERATURE REVIEW

Over the last decade, with the push by both the government and the private sector towards increased digitalisation, data protection is a significant concern. While the PDPA was enacted specifically for this purpose, industrial and technological development bring into question the ability of the PDPA to deal with these issues. In particular, the field of AI highlights the incompatibility of the existing principles of the PDPA.

Artificial intelligence systems inherently require large datasets to train the AI and have come to be described as “Big Data”. Prior to the advent of big data, the principles broadly applied to data protection regulations focused on personally identifiable information (PII). The PDPA 2010 adopts this approach and incorporates PII-centric principles as its core tenet, such as the General Principle, Notice and Choice Principle, Access Principle, and the Retention Principle. These principles, when tested against actual use cases of AI systems, find certain shortfalls.

For example, AI systems utilising advanced analytics may not know in advance the types of insights that may be garnered and thus obtaining consent for a specific purpose (as per the Notice and Choice Principle) may be impractical. On the other hand, data subjects’ rights are affected by these gaps as new forms of privacy concerns arise. This can be seen in

the increasing collection of “inferential data” by AI systems that (as opposed to traditional direct forms of personal data collection) is the data generated by a “probability-based analytic process” deriving insights generated by AI, which are analytical and often probabilistic in nature.

Such inferential data is different from traditional PII which is provided data and observed data, and may contain more significant repercussions as it may be used to predict sensitive, aspects of a data subject, i.e. the propensity to a certain behaviour, health, or political leanings. In Europe, the data privacy risks and legal discourse around inferred data and the use of inferential analytics present inconsistencies and contradictions within and between the views of the Article 29 Working Party (The Working Party on the Protection of Individuals with regard to the Processing of Personal Data) and the European Court of Justice (the ECJ). One position taken by the ECJ is that data protection law is not intended to ensure the accuracy of decisions and decision-making processes involving personal data or to make these processes fully transparent. This position is not helpful as it does not provide guidance on how to close the gap concerning inferential analytics and data privacy rights.

LITERATURE REVIEW

The difficulty of addressing regulation for privacy in the context of AI is not unique to any one country. Kaori Ishii identifies that while the General Data Protection Regulation (GDPR) contains commendable regulations, i.e. restrictions on profiling – Art 22(1), the requirement to inform the data subject on logic – Art 13(2)(f), requirements for Data Protection Impact Assessments (DPIA) – 35, there are still challenges such as issues of consent in the repurposing of data and transparency requirements in the context of AI black boxes.

Ishii continues to identify similar concerns in the USA and Canada, the former having a decentralised system of privacy regulation and the latter being a hybrid system of privacy regulation. Of note is the reference to the concept of Privacy by Design (PbD) in addressing the new concerns in AI. PbD, a concept now entrenched in the GDPR and finding favour internationally, is not mandated in Malaysia yet.

To the knowledge of the researchers, there has been little or no literature in Malaysia on privacy and data protection regulatory gaps in the context of AI. While there has been a call for proposals on updates to the PDPA 2010 in February 2020, PbD is

referenced as an area of consideration. However, the sufficiency of these proposals in the context of AI specifically is yet to be established.

The debate on data privacy risks resulting from the use of AI systems to mere compliance of existing legal frameworks requires considering other approaches that can lead to effective governance. While addressing the risk of automated decision-making from the use of AI systems, such use can be made “subject to accountability and governance mechanisms that will facilitate outcomes in which anticipated benefits outweigh potential harms”. The development of tools to audit and verify compliance with data protection and other legal requirements as suggested by Kroll et al. provides the researchers with the intriguing and convincing direction that can lead to a governance structure that is feasible in ensuring a balanced approach to data privacy governance. The researchers recognise that strong legal regimes that impose a highly rigorous data privacy protection scheme may impede the development of AI where AI systems may not comply with such provisions, as seen in the EU GDPR principles of the right to consent, to be forgotten, to data portability and to explanation.

LITERATURE REVIEW

The recommendations for the creation of a self-governance framework as an initial approach to the field of AI regulation allow a degree of flexibility which, in turn, encourages dynamism, innovativeness, and competitiveness in the national AI ecosystem. This is extremely important in Malaysia as the government has adopted a more collaborative approach with the private sector in developing AI capabilities. It is clear from the literature that the exploration of a “soft law” approach (i.e. favouring policy, frameworks, and self-regulation) is deemed more feasible at this stage of development of AI, as opposed to a legislative “hard law”. Hagemann noted that in emerging technology areas, hard law is seen to be a bad fit due to numerous reasons, including interest group pressure, weak priorities, confusion, and lack of foresight. This perspective is considered particularly accurate in the context of AI as the pace of development of AI far exceeds the capability of any traditional regulatory system to keep up, a challenge described as the “pacing problem”. This is coupled with the fact that the risks, benefits, and trajectories of AI are all highly uncertain at this juncture.

METHODOLOGY

The research employed mainly qualitative legal research comprising Doctrinal Legal Research and Comparative Legal Method, and quantitative research consisting of a survey.

Doctrinal Legal Research was employed when examining the national legislation, mainly the PDPA. This included the identification of the weaknesses of the existing law in relation to the use of Big Data in AI systems, highlighting issues that are not covered or partially covered by the legislation, including identifying incompatibility of the principles in the legislation with the use of Big Data, and the examination of whether and to what extent a new law or modifications in the existing law would remedy the situation.

Comparative Legal Method was utilised when reviewing and exploring legal frameworks in other jurisdictions, in particular, the European Union’s General Data Protection Regulation (GDPR), alongside other domestic laws and initiatives, especially in Canada and Singapore, to assess how these legal frameworks have been adopted or otherwise in managing the risks of Big Data Analytics to the data privacy regimes in place. Reliance on primary sources, in particular the

METHODOLOGY

domestic legislation and legislative reform, provides an essential insight into the legal discourses and dilemmas in these jurisdictions.

For the quantitative research component, a survey was conducted to determine whether good data governance practices and the law are followed by deployers of AI to ensure that privacy and data protection principles are upheld when managing personal data and AI systems. The research design was a non-experimental correlational quantitative survey done through an ad hoc instrument consisting of a total of eight structured response format items (questions) which were placed in three Pillars, of which items 1, 2 & 3 measure Deployers' respect for privacy and data protection (Pillar 1), items 4, 5 & 6 measure their control of Quality and integrity of data (Pillar 2), and items 7 and 8 measure their approach to Access to Data (Pillar 3). The items in the instrument are adapted from the pilot version of the assessment list for Trustworthy AI provided by the European Commission in its Ethics Guidelines for Trustworthy Artificial Intelligence that was developed in close collaboration with stakeholders across the public and private sectors by the European Commission's High-Level Expert Group on AI (the AI HLEG). All items in the instrument were answered on a dichotomous Yes/No scale.

The researchers wished to measure the variables within each Pillar in order to assess the statistical relationship by calculating the frequency of the "Yes" and "No" responses to determine the relationship between the two variables and the direction of the relationship between the two (2) variables.

FINDINGS, ANALYSIS AND DISCUSSION

AI and Data

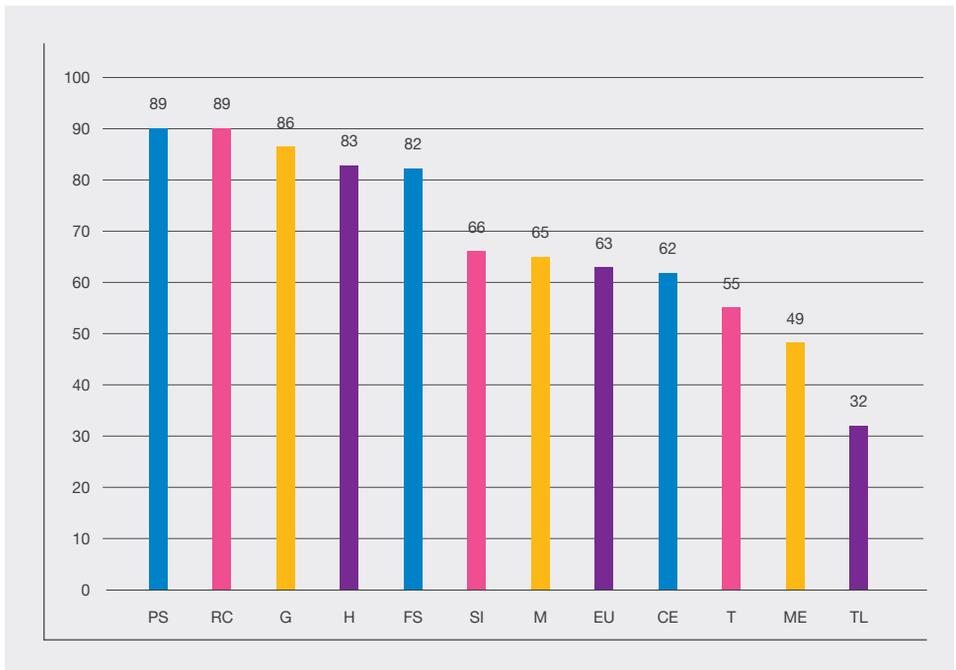
Findings from the Survey

While the findings of the qualitative research conducted by the researchers are primed at exploring the research objectives from a theoretical perspective, the researchers recognise the value of quantitative data derived from industries acting as deployers of AI. The researchers aim for the gap to be filled by responses from the survey which could provide valuable insights into actual implementation processes considering the PDPA. The survey for this research is part of a larger survey that formed the basis of the Malaysian AI Ethics Report 2021, aimed at measuring the AI Ethics Maturity of industries based on three primary values of transparency, explainability and privacy, and data governance. This Survey uses the findings of the section on privacy and data governance, which

FINDINGS, ANALYSIS AND DISCUSSION

consists of eight questions. These questions in the privacy and data governance section were further segmented into three (3) pillars - Pillar 1 relates to the respect for personal data; Pillar 2 relates to the quality and integrity of data; and Pillar 3 relates to access to data.

FIGURE 1: RANKING OF INDUSTRIES BASED ON PERCENTAGE OF TOTAL “YES” RESPONSES FOR ALL PILLARS



The researchers classed the twelve (12) respondent industries into two broad categories of data-intensive sectors (DIS) and non-data-intensive sectors (non-DIS), where DIS are defined based on the requirement for the data users to register with the Data Protection Commissioner pursuant to Personal Data Protection (Class of Data Users) Order 2013 and the Personal Data Protection (Class of Data Users) Amendment Order 2016. DIS are presumed to be carrying out activities that envisage a significant volume of personal data collection that the PDPA aims to regulate or that the risk attached to the personal data collected may be significant.

FINDINGS, ANALYSIS AND DISCUSSION

The series of questions in this Survey is closely linked to compliance with the PDPA and the findings were able to indicate the operational realities of AI Deployers and provide insights, particularly questions in Pillar One. General observations from the DIS industries indicate that while generally performing well across all pillars the top-performing industries indicated difficulties in dealing with the question on the use and control of external data in training the AI system. This observation relates to the scope of personal data under the PDPA and whether third-party datasets may constitute fair use if they are anonymised. The observations of DIS industries also indicate concerns with certain DIS industries' potential lack of compliance with the PDPA in regard to AI systems, indicating a need for guidance on privacy concerns in terms of implementation of AI systems. This observation was based on the responses by the respondents from the telecommunications industry to the question on whether the respondents had established mechanisms that allow others to flag issues related to privacy or data protection issues concerning the AI system's processes of data collection, for both training as well as operation, and data processing.

In respect of the non-DIS industries, the Survey responses indicate a recognition of the need for compliance with the PDPA in deploying AI systems. However, there seems to be a lack of initiative in going beyond compliance where it is not mandated. This may indicate a need for more comprehensive legislation as opposed to self-regulation.

The analysis of the three Pillars of the Survey noted large deviations between Pillars in the percentage of "Yes" responses. A low deviation in Pillar 1 indicated confidence across the industries for respect for personal data. However, while measures may have been taken in ensuring respect for personal data, it was not comprehensively or consistently reflected across the other two Pillars, i.e. quality and integrity of data and access to data. This finding is important as it could likely be an indicator that lack of guidance from the regulator results in a non-uniform approach. The finding prompted further analysis on a comparison between jurisdictions that took a more rigid legislative approach, i.e. Canada, and those preferring a soft law approach, i.e. Singapore.

FINDINGS, ANALYSIS AND DISCUSSION

Privacy Risks Resulting from the Use of Big Data in AI Systems to Produce Results through Inferential Analytics and Automated Data Processing

The research is limited to risks arising from data practices and the challenges faced by data protection regimes as a result of the use of Big Data in AI systems. The following aspects present the privacy risks resulting from the use of Big Data in AI systems. Each risk is inextricably linked.

Inferred data

The data subject, the individual, is unaware of the creation of this inferred data which is produced from this analysis but the personal data of the data subject is the “source data” of the large dataset. Inferences drawn from Big Data do not fall within the sphere of traditional principles of the individual’s right to privacy. Nevertheless, data subjects are unable to know how potentially impactful these inferences or decision-making can be to them.

Bias and discrimination

The datasets utilised to train AI systems may contain inherent biases that will result in discriminatory decisions. Most data protection regimes support

values that underlie the specific data protection principles – values such as fairness and that collection and use of data must respect the legitimate interests and expectations of the data subject. These values essentially cradle the sum of data protection principles. Hence, where these large datasets are tainted with bias, the AI system may be prone to producing discriminatory results when “processing” the data subject’s personal data to produce a decision or output.

Data maximisation

The use of AI systems to utilise and process large amounts of data to identify patterns is essentially data maximisation, which contradicts the essence of data protection principles embedded in the principle of data minimisation.

Weakening the purpose principle

The ability of the AI tools to collect information, for instance AI in cameras and voice-enabled devices, could provide improved services to the data subject with the data subject’s consent. This, however, presents an opportunity for the analysed data to be repurposed for training other algorithms, such as facial, emotional and voice recognition.

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Questions of transparency and intelligibility and devaluation of consent

If inferred analytics is being done without the determination of the data subject, this devalues the principle of consent. It is problematic to determine what the data subject is consenting to when AI systems operate in an opaque manner which may be outside the scope of scrutiny and, therefore, accountability.

The risk of re-identification

To anonymise may mean to remove direct identification such as the name of a person. It could also extend to indirect identification such as the characteristics of the person – for instance, race, ethnicity, religion, occupation and the like. Even if the two elements of identification are “anonymised”, AI systems still have the ability to re-identify personally identifiable information when drawing on innumerable large datasets when drawing correlations between data points.

The Weaknesses of the Existing Law in Relation to the Use of Big Data in AI Systems

In addressing the weaknesses of the existing legal data protection regime, this section of the research report serves firstly as an introduction to the Malaysian data protection legal regime, the PDPA, in terms of its scope, and secondly, as an introduction to the EU’s GDPR, the main legislation that the researchers are using as a comparator. For the latter, references will be made to the Canadian and Singaporean frameworks in the ensuing sections of the report.

The EU’s General Data Protection Regulation (GDPR) is perhaps a benchmark of a modern data protection regime and hence, the Malaysian law will be assessed alongside the GDPR framework. In addition to the GDPR, the assessment will also consider Singapore’s primary legislation on data protection, which is its Personal Data Protection Act 2012 (S-PDPA) that has seen significant amendments by way of the Personal Data Protection (Amendment) Act 2020, and Canada’s data protection laws, including the Personal Information Protection and Electronic Documents Act (PIPEDA) and the proposed Consumer Privacy Protection Bill (Bill C-11) tabled in 2020. Reference will also be made

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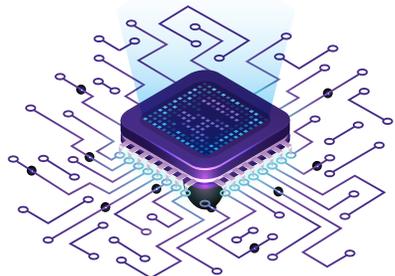
to Quebec's Bill 64 (Bill 64) which received assent in September 2021. Bill 64 is a state-level omnibus legislation that makes significant amendments to privacy legislation. Of particular interest to this research are the amendments made to the Act Respecting the Protection of Personal Information in The Private Sector.

Under the PDPA, codes of practice may be developed for a specific class of data users. There are four (4) codes of practice that have been registered. In this paper, reference is made to one such code. The use of AI tools, particularly in the context of anonymised data, is made reference to in the Personal Data Protection Code of Practice (PDP COP) for licensees under the Malaysian Communications and Multimedia Act 1998 that was registered with the Personal Data Protection Commissioner on 23 November 2017. It covers licensees that fall within the Communications Class of data users. Although it is a code of practice for self-governance of the Communications Class of licensees, it provides some guidance to the data-intensive industry that falls within the class which includes Network Facilities Providers, Network Services Providers, Applications Service Providers, and Content Applications Service Providers. The code recognises that while the PDPA is built around the personal

data protection principles couched in broad terms, certain sectors may have practices related to personal data which require more specific data protection rules when handling personal data and may have deployed unique technologies in processing that data. The PDP COP is intended to guide the setting of standards of conduct in respect of personal data. The code also aims to serve as a guide to data users; firstly, to ensure that the processing of personal data does not infringe a data subject's rights under the PDPA, and secondly, to set effective standards and measures concerning the processing of a data subject's personal data. Reference will be made to the PDP COP in the discussion where relevant.

Threats Presented by AI to Data Protection Laws

In this section, the authors raise a number of threats presented by the use of AI to process personal data and highlight aspects of these threats that may not be protected by the PDPA.



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Scope of personal data

The definition of personal data under the PDPA relates to personal data that relates to the identity of the data subject or is capable of identifying the data subject. This suggests that the definition excludes anonymised data that cannot be traced back to the data subject as a PII.

The PDPCOP provides some assistance in indicating data that is not considered to be “personal data” which includes data “pertaining to individuals that have been aggregated and/or anonymised in such a manner as to render the individual non-identifiable”. It is clear that the individual must not be capable of being identified from this type of data. “Anonymised data” is defined as “data that does not itself identify any individual and that is unlikely to allow any individual to be identified through its combination with other data”. The PDPCOP also provides instances where compliance with the Disclosure Principle and the Access Principle is excluded. This is “where personal data is processed for the preparation of statistics or carrying out research (subject to the personal data not being processed for any other purpose and the resulting statistics or the results of the research being anonymised)”. Anonymised data is also offered as an alternative to

destroying or permanently deleting the personal data as required under the Retention Principle.

The GDPR provides for a similar definition in Article 4, and Recital 26, which states that anonymised data where the individual is unidentifiable will fall outside the ambit of the law. The PDPA may benefit from a clearer definition of personal data that excludes anonymised data. Data users may also benefit from initiatives such as guidance on the use of anonymisation techniques such as the one provided by UK’s ICO, as data users have to still bear in mind the risk of re-identification of anonymised personal data.

The main concern with the definition of personal data is whether it addresses data subjects’ rights affected by gaps in it as new forms of privacy concerns arise. This can be seen in the increasing collection of inferred data by AI systems that (as opposed to traditional direct forms of personal data collection) is the data generated by AI, which are analytical and often probabilistic in nature.

Inferred data, which is different from traditional PII, falls within the category of provided data and observed data, and may contain more significant repercussions as it may be used to predict sensitive aspects of a data

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subject, such as propensity to a certain behaviour, health, or political leanings, or profile the data subject, which may result in decisions being made that may affect the individual. In Europe, the data privacy risks and legal discourse around inferred data and the use of inferential analytics present inconsistencies and contradictions within and between the views of the Article 29 Working Party (The Working Party on the Protection of Individuals with regard to the Processing of Personal Data) and the European Court of Justice (the ECJ). The Article 29 Working Party, recognising the challenge, reported that, “more often than not, it is not the information collected in itself that is sensitive, but rather, the inferences that are drawn from it and the way in which those inferences are drawn, that could give cause for concern”.

In Singapore, personal data is defined in section 2 of the S-PDPA. The recent amendments introduce the new term “derived personal data”. While clearly envisaging the use of derived personal data, the term is only referenced once in the Act in reference to the exceptions from the correction requirement under the Act. The Advisory Guidelines expand on this definition only to a limited extent. First, in the context of data portability, it does not include personal data

derived by the organisation using any prescribed means or methods which are commonly known and used by the industry (e.g. simple mathematical averaging or summation) and second, that organisations should ensure that the raw personal data is materially accurate before further processing takes place, as well as the accuracy of processing (e.g. computation of mean and median from the range of input data is accurate).

The Singaporean approach in terms of definition and application, especially in the context of new technological deployment such as artificial intelligence, seems to be a broad drafting of legislation which allows for future guidance to be issued by the PDPC to guide interpretation by the judiciary. This is coherent with Singapore’s approach of inviting technological advancement without being overly restricted by a stringent rights-based approach. While very fluid in nature, this may lead to uncertainty in the event of a shift in government direction or conflicting interpretations by the judiciary through common law.

Unlike Malaysia’s PDPA, Canada’s PIPEDA describes personal data broadly as “information about an identifiable individual”. Despite this broad definition, Canada has struggled to reconcile emerging trends

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of anonymised data and is seeking to address the problem through Bill C-11 which will introduce the scope of use of anonymised (referred to in the Bill as “de-identified”) personal data.

The Canadian OPC has, however, argued that Bill-C11 should go further to include “inferred data” as part of the scope of the Bill. In the OPC’s submission to the Standing Committee on Access to Information, Privacy and Ethics, it argued that the Canadian Supreme Court had already established that misuse of inferred data is able to cause harm in the same way as collected data. Further, inferential data constituting personal data is a concept in line with modern privacy laws such as the former European Article 29 Data Protection Working Party, California Consumer Privacy Act (CCPA) and proposed amendments to the Australian Privacy Act.

Consent and lawful processing

For the data user to lawfully process the personal data of the data subject, under the General Principle, the PDPA requires that the processing can only take place with the consent of the data subject and for a lawful purpose. Where the processing is necessary, explicit consent is not required. The processing of the data beyond the purpose for which the consent is obtained is deemed unlawful. Similarly,

the GDPR requires the personal data to be processed lawfully and with the consent of the data subject or where processing is necessary. The definition of “processing” under the PDPA is not as extensive as that of the GDPR. Nevertheless, both frameworks require a definition of “processing” capable of encompassing the processes of data analytics essential to training AI algorithms.

The Singaporean approach seems, however, to recognise commercial realities in addressing this issue. While section 13 of the S-PDPA requires consent to be obtained for most cases of collection and disclosure of personal data, with further requirements for the validity of that consent set out in section 14 of the Act, the S-PDPA envisages commercial difficulties in obtaining consent in certain circumstances. In this regard, section 15 of the S-PDPA plays a vital role in allowing “deemed consent” where personal data is presented voluntarily, and it would be reasonable that the individual would do so.

The scope of deemed consent has been expanded significantly by the 2020 Amendments to the S-PDPA on the basis of the commercial realities of successive layers of contractors requiring use of such personal data. In addition, section 15A of the S-PDPA allows for deemed consent to be

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obtained where notice has been given and a reasonable amount of time has lapsed without objection from the individual and an assessment has been carried out to identify the potential adverse impacts on the individual. This provision is particularly useful for developers of AI systems in fulfilment of an existing contract with an individual.

A new exception to consent has also been introduced in the First Schedule of the S-PDPA to include legitimate use. To rely on this exception, organisations must conduct an assessment to eliminate or reduce risks associated with the collection, use or disclosure of personal data, and must be satisfied that the overall benefit of doing so outweighs any residual adverse effect on an individual. To ensure transparency, organisations must disclose when they rely on this exception. Such an approach can be considered a balanced approach to legitimate use for AI system development where initial consent has already been obtained.

With extensive and complex use of personal and derived personal data and the shift to an accountability-based framework, the Singaporean model will depend heavily on effective enforcement by the regulator, failing which, the provisions of consent and deemed consent may be abused.

Since its inception, the Singaporean Personal Data Protection Commission (PDPC) has taken a proactive approach to issuing guidance documents to supplement the Act and set the tone for compliance by companies within the jurisdiction. This includes the Advisory Guidelines on Key Concepts In The Personal Data Protection Act (last updated on 1 October 2021) (the Advisory Guidelines). In the context of AI, the PDPC has also issued the Model Artificial Intelligence Governance Framework (Second Edition) (the Governance Framework) described as a “living and voluntary, ready-to-use tool to enable organisations that are deploying AI solutions at scale to do so in a responsible manner”.

Consent is a core aspect of the Canadian PIPEDA. Section 6.1 of PIPEDA, introduced by an amendment, defined “valid consent” as when it is reasonable to expect the individual to understand the nature, purpose and consequence of the collection.

Art. 4.3 of Schedule 4 of PIPEDA provides further clarification on consent. It emphasises “knowledge and consent”. For example, Art. 4.3.2 of the Schedule describes the need to make consent meaningful by ensuring that the individual can reasonably understand how the information will be used or disclosed. Envisaging different forms of consent, Art. 4.3.4 of the

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Schedule provides for different forms of consent depending on the level of sensitivity of the data.

The PDPA provides for consent to be obtained for the processing of personal data and explicit consent to be obtained for the processing of sensitive personal data. There is, however, no clear definition of the form of consent and its distinction from explicit consent. Further, sensitive data under the PDPA is limited to “physical or mental health or condition of a data subject, his political opinions, his religious beliefs or other beliefs of a similar nature, the commission or alleged commission by him of any offence”.

It should be noted that the proposed Bill C-11 removes the requirement for the consenting individual to understand the nature, purpose and consequence of the data collected as set out in section 6.1 of PIPEDA. The Canadian OPC expressed concern over this removal and indicated that such a removal would result in less control by individuals over their personal data and that there are limited safeguards against the typically open-ended nature of purposes cited by organisations. This concern is valid as the same issue is commonly seen in Malaysia where broad statements of intended use are often set out in privacy statements of organisations.

In respect of big data and AI tools which may be complex, the Canadian OPC recognised that uses of personal information may be known at the time of collection, or are too complex to explain, thus negating meaningful consent. Additionally, refusal to provide consent can sometimes be a disservice to the public interest when there are potential societal benefits to be gained from use of data. It therefore agreed with the proposed exceptions to obtaining consent as set out in sections 18 to 51 of Bill C-11 but with reservations, particularly to section 18 of the Bill relating to business activities.

While the proposed exceptions under the Bill suggest an incentive for AI system development, section 18(2) of the Bill importantly addressed the issue of profiling as it stipulates that the personal data may not be collected without consent if it is to be used for the purpose of influencing the individual’s behaviour or decisions.

Bill C-11 further proposes to allow use of de-identified data without the knowledge or consent of the individual in certain circumstances, i.e. research and development, prospective business transactions, and socially beneficial purposes. The Bill also provides for safeguards of de-identified data in a broad sense requiring technical and administrative measures that are proportionate to

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the nature of the data, as well as a prohibition against the re-identification of personal data except for security testing.

Notice and purpose

The PDPA clearly requires, under the Notice and Choice Principle, that the data subject is informed of the use of the data subject's personal data, the purpose of its use, including the right of the data subject to access the said data, to correct it, whether it is obligatory or voluntary for the data subject to supply the said data, and the dissemination of the data.

This is often referred to as the requirement for transparency and is provided for extensively in the GDPR. The GDPR has the benefit of the additional explanation of Recital 60 which states that the notice must be in line with the principles of fair and transparent processing that require that the data subject "be informed of the existence of the processing operation and its purposes" and additionally, "of the existence of profiling and the consequences of such profiling".

The privacy notice imposes an obligation on the data user to produce a notice that sufficiently details the manner in which the personal data is being processed or where it is being used for training the AI algorithm,

including the type of inferences that will be drawn in relation to the data subject from the personal data.

The challenge here is, even when the data user has notified that personal data will be used for analytics through the use of AI tools, the result produced by the AI algorithm may be unanticipated and unexpected by the data user. O'Callaghan states that when this happens, the data user has to assess whether this unpredictable and unanticipated outcome is in some way compatible with the purpose for which the use of the AI tool was employed, failing which the purpose limitation is breached.

In Singapore, the requirement for notification for purpose is set out in section 20 of the S-PDPA. The Advisory Guidelines clarify that this notification obligation does not refer to activities which an organisation may intend to undertake but rather to its objectives or reasons. Hence, when specifying its purposes relating to personal data, an organisation is not required to specify every activity which it may undertake, but only its objectives or reasons relating to personal data.

The broad overview approach taken by the PDPC is also reflected in its guidelines on explainability in the Governance Framework. The PDPC there takes the position that perfect

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explainability is “impossible to attain”. Flowing from this, explainability is considered as a value to be strived towards as opposed to an absolute right.

In Canada, the existing principle of openness and transparency is found in Art. 4.8 of Schedule 4 of the PIPEDA which requires organisations to make available to individuals specific information about its policies and practices relating to the management of personal information. This is quite different from the notice and choice principle as set out in section 7 of the Malaysian PDPA which has a fixed parameter of items to be set out in its notice to data subjects. The effectiveness of the requirement for notice in Malaysia is questionable as organisations have been able to fulfil the requirement of the PDPA by utilising long legalistic forms of notice that set out a typically wide scope of use of the data collected. Section 7 of the PDPA also does not require the organisation to declare the processes of how the purpose of the data collection is fulfilled. It may therefore be said that there is no requirement for transparency in the PDPA.

The proposed Bill C-11 will introduce the concept of automated decision-making defined in section 2 of the Bill as “any technology that assists or replaces

the judgement of human decision-makers using techniques such as rules-based systems, regression analysis, predictive analytics, machine learning, deep learning and neural nets”. In keeping with the existing principle, section 62(2)(c) of the Bill will require organisations to declare in general how automated systems are being used and the impact they may have on the individual. Further, Art. 63(3) of the Bill will extend the principle of openness and transparency by giving individuals a right to explainability if an automated system was used to make predictions, recommendations or decisions about that individual.

Section 99 of Bill 64 refers specifically to “profiling”, providing a formal definition and provides that in addition to informing a subject that the personal information being collected may be used for profiling, notice must be given as to whether there is an option to “deactivate” the function for profiling. As this section does not compel such a function to be included, it remains to be seen how the Canadian community will respond to profiling functions that do not have a deactivation function. From a technical standpoint, it also remains a question whether such a function will impede the operation of an AI system if subjects are opting in and out at will.

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Threats of Data Protection Laws on AI

When using AI, the algorithm may operate in a manner unpredicted by its programmers. Neural networks may contain many “sharp corners” that may achieve objectives that the designer did not think about. Kearns and Roth explain that “complicated, automated decision-making that can arise from machine learning has a character of its own, distinct from that of its designer. The designer may have had a good understanding of the algorithm that was used to find the decision-making model, but not the model itself”. Designing an algorithm to conform to legal principles may stifle its potential.

The various dimensions of an AI include an AI that acts humanly as it will include AI for “automated reasoning” and “machine learning”. Automated reasoning uses “stored information to answer questions and to draw new conclusions” whereas machine learning adapts “to new circumstances and to detect and extrapolate patterns”. The traditional notice and consent models clearly present a challenge when the processing produces inferred data. Kuner et al. adds that “machine learning is data driven, typically involving both existing data sets and live data streams in complex training and deployment workflows” and therefore, it may be

difficult to reconcile such dynamic processes with purposes that are specified narrowly in advance.

The principle on data minimisation that descends from the tenet that personal data collected must be necessary to the purposes of the data processing is another principle that runs contrary to the functionality of AI systems that discovers correlations that may go beyond what is necessary.

The retention principle under the PDPA equally presents a problem where it imposes a requirement that the data shall not be kept longer than is necessary for the attainment of the purpose for which it has been collected and processed and requires the deletion of the data. The GDPR has a more extensive provision in the form of the right to be forgotten. By operationalising this principle, developers and deployers of AI will be disadvantaged as they will not be allowed to utilise datasets that may infringe this principle and will be unable to train the said algorithm on these datasets. The potential regression is phenomenal as this may require the programmers to re-train the AI.

Obtaining fresh consent each time a new set of inferred data is created is equally problematic. Even more problematic is the principle of withdrawal of consent. Under

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the PDPA, the data subject has the right to withdraw the consent to process personal data, and there are similar provisions under the GDPR. Processing of personal data must cease upon the data user receiving the notice to withdraw consent. The data subject has the additional right to prevent or restrict processing. Erasure and deletion fall within the realm of the retention principle. As a result of these rights, the data point that represents the personal data belonging to that particular data subject has to be removed from the dataset that has been used to train the algorithm. Humerick believes that “the prior processing would be lawful” but the “further processing of and learning from these specific data points would constitute a violation of the GDPR”. He adds that the challenge is that, since “AI continues to learn from past data, the issue becomes how to simultaneously stop AI’s learning from this data, without impacting its prior development”. Hence, the “withdrawal of consent, coupled by the continuation of learning through the processing of prior learned behaviours, would constitute a violation of the GDPR”.

In Canada, the rights-based approach may place heavy burdens as there is no distinction drawn between the types of AI systems in the current or proposed legislation. The scope of

Art. 63(3) of Bill C-11, which includes the right of explainability even for “recommendations”, may extend to simple AI tools such as marketing algorithms and therefore place a heavy burden on companies intending to use black box systems for low-risk outcomes.

Art. 4.2 of Schedule 4, PIPEDA, which requires that “personal information is collected shall be identified by the organisation at or before the time the information is collected”, may be at odds with the use of AI systems which may shift in their objective as training progresses. De-identification of the data only bypasses the principle for consent and knowledge.

While consent may be dispensed with in the context of business activities where a reasonable person would expect such a collection or use for that activity, a caveat is provided for that such personal information collected may not be used for the purpose of influencing the individual’s behaviour or decisions. Such a broad description may still invite the need for consent in most AI-related systems, thus circling back to the issue of feasibility of consent in AI systems.

Contrasting this approach, the intentional omission of narrow statutory tools as the primary approach

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in Singapore minimises threats from the laws on AI development. Instead, the guidance given by the regulator is aimed at assisting developers and deployers adhere to broad principles based on highly descriptive guidelines. For example, while not mentioned in the S-PDPC, the practice of anonymisation is recognised by the PDPC and it has even provided extensive guidelines on anonymisation practices in its Guide To Basic Data Anonymisation Techniques.

Consideration of a New Law or Modifications to the Existing Law

To answer this research question, the researchers referenced regulatory and governance models used where the subject matter to be regulated is technology.

Whenever technology presents legal challenges, the regulatory model posited is a normative framework that relies on regulatory tools to minimise risks arising from the technology. Normative key principles found in legislation may not be fit-for-purpose and practical when the subject matter of the legislation is one that is on a growth trajectory where a comprehensive legal framework may

appear as a Charlie horse in a drag race – unable to keep pace with the development of AI technologies in terms of their potential altruistic and utilitarian uses and the potential harms and risks that may arise. At this time, the issues around data practices arising from the use of AI and the use of AI technology of Big Data are at an early stage of adoption.

The research question is vital in understanding that if the law reform is undertaken, will it serve as an effective governance tool? Governance in general means a collective binding decision made by stakeholders to govern a system. This definition indicates a discontinuity from state “command-and-control” regulation, widening the involvement of a wider range of stakeholders who are involved. The shift from rule-making and enforcement of rules to “interaction, cooperation and negotiations between stakeholders” indicates a new approach to governance which is decentralised. Therefore, a governance model suitable for personal data and the datafication process in the context of this research, related to AI and Big Data, is required. There are four Data Governance Models proposed by Micheli et al. (refer to Table below).

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TABLE 1: DATA GOVERNANCE MODELS

MODEL	KEY ACTORS	GOALS	VALUE	MECHANISMS
Data sharing pools (DSPs)	<ul style="list-style-type: none"> • Business entities • Public bodies 	<ul style="list-style-type: none"> • Fill knowledge gaps through data sharing • Innovate and develop new services 	<ul style="list-style-type: none"> • Private profit • Economic growth 	<ul style="list-style-type: none"> • Principle of “data as a commodity” • Partnership • Contracts (e.g. repeatable frameworks)
Data cooperatives (DCs)	<ul style="list-style-type: none"> • Civic organisations • Data subjects 	<ul style="list-style-type: none"> • Rebalance power imbalances of the current data economy • Address societal challenges • Foster social justice and fairer conditions for value production 	<ul style="list-style-type: none"> • Public interest • Scientific research • Empowered data subjects 	<ul style="list-style-type: none"> • Principles from the cooperative movement • Data commons • “Bottom-up” data trusts • GDPR Right to data portability
Public data trusts (PDTs)	<ul style="list-style-type: none"> • Public bodies 	<ul style="list-style-type: none"> • Inform policymaking • Address societal challenges • Innovate • Adopt a responsible approach to data 	<ul style="list-style-type: none"> • Public interest • More efficient public service delivery 	<ul style="list-style-type: none"> • Principle of “data as a public infrastructure” • Trust-building initiatives • Trusted intermediaries • Enabling legal frameworks
Personal data sovereignty (PDS)	<ul style="list-style-type: none"> • Business entities • Data subjects 	<ul style="list-style-type: none"> • Data subjects’ self-determination • Rebalance power imbalances of the current data economy • Develop new digital services • Centred on users’ needs 	<ul style="list-style-type: none"> • Empowered data subjects • Economic growth • Private profit • Knowledge 	<ul style="list-style-type: none"> • Principle of “technology sovereignty” • Communities and movements (e.g. MyData) • Intermediary digital services (personal data spaces) • GDPR Right to data portability

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The most aligned Data Governance model to the conceptual framework employed in the research is Personal Data Sovereignty (PDS, for short). The goals of the PDS data governance model place the data subjects' right to self-determination, which carries the value of empowering data subjects, but at the same time focus on developing new technological tools vital to economic growth. The recommendations serve to find this balance as the recommendations aim to protect the rights of data subjects while promoting the use of AI tools.

The researchers are of the view that the output of the research in making recommendations to regulate data practices related to AI involving personal data is prescient to any legal reform. AI innovation and integration is at a nascent stage in Malaysia. To suggest a *lex specialis* or amendments to the current legislation is inopportune and hasty. The AI ecosystem needs to have an adequate number of use cases where data practices have shown evidence of vulnerabilities of data subjects' personal data. It is key to adopt an approach premised on the cooperation of different stakeholders. And in the case of the PDS model, one that involves business entities and data subjects. A regulatory framework following the PDS model increases the opportunity of developing principles that enhance the adoption of AI, which serves the interests and benefits of all parties.

RECOMMENDATIONS

The following are several preliminary recommendations. While the recommendations require, to a large extent, amendment to the current data protection legal framework, pending such steps, the first three recommendations may form the basis of a self-governance model. The researchers recommend a graduated adoption of the recommendations. The first is the development of an internal governance structure; secondly, improving the algorithm of the AI; thirdly, the development and adoption of a framework or AI Privacy Code within the industry; fourthly, improving the normative legal framework; and finally, a co-regulatory approach. The recommendations are set out in Table 2 on the next page.

RECOMMENDATIONS

TABLE 2: RECOMMENDATIONS

INTERNAL GOVERNANCE

Human in the loop

Enhanced role of the individual in overseeing the technology to ensure ethical development and deployment of AI (Kuner et al., 2017).

Recognition of substantive AI provisions

Deployers must recognise and adopt substantive AI principles that promote trustworthy and responsible AI (Declaration on Ethics and Data Protection in Artificial Intelligence, 2018).

Data Protection Impact Assessment

Each AI deployed must include a data privacy analysis which measures the data protection risk of deploying the said AI tool (Information Commissioner's Office, UK, 2017).

Socio-Ethical Impact Assessment

A governance assessment can also include a measure to ensure the altruistic value of the AI systems.

IMPROVING AI

Improved algorithm that unlearns and prevents re-identification

Companies can develop AI models to combat withdrawal and restriction of consent by designing algorithms specifically to unlearn certain data inputs without needing to retrain the entire AI neural network (Humerick, 2018).

Privacy by design and by default

If AI models respect societal norms, the algorithm has to be designed in the manner that achieves this goal, i.e. through privacy in its design and as a default (Kearns & Roth, 2020).

Adoption of a standard in the anonymisation of data

National initiatives can be undertaken to impose standards to be adopted to ensure anonymisation of data in line with the above recommendations. (Information Commissioner's Office, 2017; Personal Data Protection Commissioner, Singapore, 2020).

RECOMMENDATIONS

INDUSTRY-LEVEL GOVERNANCE

Industry Oversight Body

The body will play the role of creating awareness around the adoption of good data practices in the deployment of AI systems by creating a regulatory sandbox, implementing a criteria of categorising data practices as prohibited, high risk, low risk or no risk, and crafting an AI Data Practice Code (e.g. AI Singapore, UK's Office of AI).

Regulatory Sandbox

Development of “a controlled environment that facilitates the development, testing and validation of innovative AI systems for a limited time before their placement on the market...” (Art. 53, EC AI Law; Information Commissioner's Office, UK; Ministry of Local Government and Modernisation, Norway).

AI Data Practice Code

The adoption of a practice code specific to data practices within an industry or an organisation that develops or deploys AI.

CO-REGULATORY FRAMEWORK

Traditional rule-making may not achieve the objectives of a framework that sets guidelines for AI systems. Normative legal frameworks may not be sufficiently agile in the trajectory of the development of the technology. Therefore, a hybrid approach of using a soft law with an overarching legal framework may incentivise innovation while promoting trust and accountability. This could be done with the establishment of a regulatory body with assigned responsibility to engage with stakeholders, including terms of reference to promote trustworthy and responsible AI, one of which being through good data practices.

RECOMMENDATIONS

LEGAL NORMATIVE FRAMEWORK

Obtaining consent for inferred data

Adoption of “graduated consent” through “just in time notifications” to seek consent to new uses of data as they emerge (Information Commissioner’s Office, UK, 2017).

Improved definition for processing

Need for a more explicit definition of processing to include inferential analytics or processing by AI systems (s. 2, PDPA; Art. 4(2) GDPR).

Improved requirement for notice and transparency

Inclusion of notice of the standards of fair and transparent processing and consequences of profiling, which is a predominant outcome of using AI tools, in the PDPA (Recital 60 GDPR).

Categorisation of Data Practices

Categorisation of data practices into four categories - completely prohibited, high risk, low risk and no risk. This type of categorisation will assist in minimising risks related to the use of big data in the training of the algorithm (EC AI Law).

Tribunal

Establishment of a data protection tribunal to hear complaints of contravention of the Act, empowered to award compensation, to be distinguished from the Appeals Tribunal established under section 93, PDPA (Bill C-11, Canada).

Developing a right to explanation

The right to explanation of the process and logic of the working of the algorithm in arriving at a decision has emerged as one of the challenges when AI tools use personal data. Such a right is important as it allows the data subject to question the data user as to how a particular decision was arrived at by the algorithm (Watcher et al., 2017).

CONCLUDING REMARKS

FINAL STRANDS OF THOUGHT

To the knowledge of the researchers, there has been little or no literature in Malaysia on privacy and data protection regulatory gaps in the context of AI. While there has been a call for proposals on updates to the PDPA 2010 in February 2020, PbD is referenced as an area of consideration. However, the sufficiency of these proposals in the context of AI specifically is yet to be established.

While Malaysia may look towards the GDPR for inspiration, awareness around its inadequacies weighs on this aspiration. Ishii identifies that while the GDPR contains commendable regulations, i.e. restrictions on profiling in Article 22(1), the requirement to inform the data subject on logic in Article 13(2)(f), requirements for Data Protection Impact Assessments (DPIA) in Article 35, there are still challenges such as issues of consent in the repurposing of data and transparency requirements in the context of AI black boxes that require further assessments.

The debate on data privacy risks resulting from the use of AI systems to mere compliance with existing legal frameworks requires a consideration of other approaches that can lead to effective governance. While addressing the risk of automated decision-making from the use of AI systems, such use can be made “subject to accountability and governance mechanisms that

will facilitate outcomes in which anticipated benefits outweigh potential harms”. The development of tools to audit and verify compliance with data protection and other legal requirements, as suggested by Kroll et al., provides the research with an intriguing and convincing direction that can lead to a governance structure that is feasible in ensuring a balanced approach to data privacy governance. The study recognises that strong legal regimes that impose a high standard of data privacy protection may impede the development of AI as these systems will be seen to operate in a manner that is incompatible with, for instance, the GDPR principles of the right to consent, to be forgotten, to data portability and to explanation.

The recommendations for the creation of a self-governance framework as an initial approach to the field of AI regulation allow a degree of flexibility which, in turn, encourages dynamism, innovativeness, and competitiveness in the national AI ecosystem. This is extremely important in Malaysia as the government has adopted a more collaborative approach with the private sector in developing AI capabilities. It is clear from the literature that the exploration of a “soft law” approach (i.e. favouring policy, frameworks and self-regulation) is deemed more feasible at this stage of development of AI, as opposed to a legislative

CONCLUDING REMARKS

FINAL STRANDS OF THOUGHT

“hard law”. Hagemann noted that in emerging technology areas, hard law is seen to be a bad fit due to numerous reasons, including interest group pressure, weak priorities, confusion, and lack of foresight. This perspective is considered particularly accurate in the context of AI as the pace of development of AI far exceeds the capability of any traditional regulatory system to keep up, a challenge described as the “pacing problem”. This is coupled with the fact that the risks, benefits and trajectories of AI are all highly uncertain at this juncture. The journey forward requires a national AI body that has a clear AI National Strategy which includes a statement on ethical and legal values that must be ingrained in all AI systems.

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Legislation, Codes of Practice and Bills

Malaysia

- Personal Data Protection Act 2010
- Personal Data Protection Rules 2013 & 2016
- Code of Practice for the Banking and Financial Sector 2017
- Personal Data Protection Code of Practice for the Utilities Sector (Electricity) 2017
- Code of Practice on Personal Data Protection for the Insurance and Takaful Industries in Malaysia 2017
- Personal Data Protection Code of Practice for the Communications Class Data Users 2017

European Union

- General Data Protection Regulation

Canada

- Personal Information Protection and Electronic Documents Act S.C. 2000 c.5
- Digital Privacy Act S.C. 2015, c. 32 House of Commons Canada, Bill C-11 (First Reading) Act to Modernize Legislative Provisions as Regard the Protection of Personal Information, Statutes of Quebec 2021, c.25
- Act Respecting the Protection of Personal Information in The Private Sector, Compilation of Québec Laws and Regulations (CQLR) c.39.1

Singapore

- Personal Data Protection Act 2012
- Personal Data Protection (Amendment) Act 2020

United States of America

- Data Protection Bill 2021 (117th Congress)

AN IMPACT STUDY OF *PUSAT EKONOMI DIGITAL KELUARGA MALAYSIA (PEDI)* AND THEIR ROLE IN THE DIGITAL INCLUSION OF COMMUNITY WITHIN THE *PUSAT PERUMAHAN RAKYAT (PPR)* RESIDENCES

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ABSTRACT

In 2001, UNESCO built Community Multimedia Centres (CMCs), public Internet access points that Malaysia utilises to support rural transformation, entrepreneurship, and uplift local communities. The Malaysian Communications and Multimedia Commission (MCMC) has invested heavily in CMCs, and after their recent rebranding to *Pusat Ekonomi Digital Keluarga Malaysia* (PEDi), they function as digital transformation centres for underserved communities, with an emphasis on youth, in order to enhance their socioeconomic condition. Since their inception, researchers have been debating the centres' successes and failures. The long-term sustainability and benefits of PEDis after the USP financing cycle is completed are major problems. This research project analysed how the impacts of PEDis have expanded beyond economic growth and explored the meaningful use of internet connectivity and training opportunities. To achieve the objectives, a qualitative methodology, "Most Significant Change (MSC)", was adopted to analyse the data, which consisted of PEDi user success stories, quarterly reports, and interviews with key stakeholders, including PEDi staff members, Designated Universal Service Providers (DUSPs), and MCMC representatives. The data was then analysed using the Content Analysis Technique and with Leximancer. The analysis reveals that PEDi promotes favourable perceptions of the centres in the local communities and enhances the capabilities of *Pusat Perumahan Rakyat* (PPR) communities by providing IT training and assistance in both entrepreneurial and educational settings. The support strengthened entrepreneurial businesses and helped youngsters throughout the pandemic. The study's results highlight PEDi's issues in community engagement training, community awareness, high staff turnover, and community member mobilisation to participate in training and services.



Keywords: PEDi, PPR Communities, IT Training, PEDi Impact, MCMC, DUSPs

INTRODUCTION

Information and Communication Technology (ICT) is essential in a country's development towards becoming a developed nation. It provides opportunities for marginalised groups to empower themselves via lifelong learning, finding a job, and promoting their business products (Rozak & Jah, 2019; Norizan et al., 2009).

To promote and provide digital access to underserved people, ICT-led initiatives have been adopted globally as a solution for contemporary society. The Government of Malaysia has long recognised the importance of digital technology and has established a number of ICT programmes, for example, Telecentres, *Kampung Wi-Fi*, Digital Library, *Pusat Info Desa* (PID), and *Pusat Ekonomi Digital Keluarga Malaysia* (PEDi), to bridge the Digital Divide (BDD) between rural/semi-rural and urban areas and improve the socioeconomic conditions of underserved communities. The Digital Malaysia Blueprint will contribute to the growth of Malaysia's digital economy by allowing Malaysians to connect globally and interact directly, hence increasing productivity and GDP and empowering government, businesses, and citizens.

Emergence of *Pusat Ekonomi Digital Keluarga Malaysia* (PEDi)

The MCMC implemented *Pusat Internet Komuniti* in 2007 as part of the Universal Service Provision (USP) project. These centres are now known as PEDi. PEDis are located in urban poor, suburban, rural, and remote areas, including FELDA communities, villages, and the PPR.

PEDi aims to offer Internet connectivity to underserved communities and promote the interests of marginalised communities in ICT; the centres actively conduct training programmes and ICT-related events. PEDi also provides value-added services to enrolled members, such as free entrepreneurial training sessions to improve local communities' economic and social conditions. PEDi assists children, women, adults, entrepreneurs, and seniors (Rozak & Jah, 2019).

Currently, 911 PEDis serve as digital transformation hubs for the local community, especially for the youth. Researchers have highlighted that it is still necessary to determine if these communities are reaping the potential advantages of the facilities provided (Vannini, 2014). Therefore, comprehensive and incisive insights are required to measure the socioeconomic (and beyond) impacts of PEDis.

INTRODUCTION

Problem Statement

As MCMC strives to improve Internet connectivity nationwide, it is vital to assess the impact of PEDi and one of its main objectives, which is to bridge the digital divide. Earlier exploratory work demonstrated a continuing need to provide access and services via PEDi and supported PEDi's role as an agent of socioeconomic development. This indicates a need for further studies to determine the users' perception and adaptability of PEDi services, besides the impact of provided training and facilities on their well-being.



Research Objectives

Hence, this study investigates the socioeconomic implications of PEDi at the grassroots level of the PPR residences and the young generation. The focus of the study is to assess PEDi's role in supporting the local community members to achieve their developmental goals. Specifically, this study's objectives are:

- 1** Investigate users' perceptions and explore the community's needs within the context of digital inclusion.
- 2** Examine factors that drive the usage/participation and satisfaction for PEDi services.
- 3** Evaluate the impact of PEDis on the PPR communities (strengths, weaknesses, opportunities, and threats) to enhance the sense of belonging of PEDis to the communities.
- 4** Assess and provide recommendations for enhancing the effectiveness of PEDi and its role in improving digital inclusion within the community, including sustainable business model(s) for PEDis located at PPR residences.

INTRODUCTION

Conceptual Framework

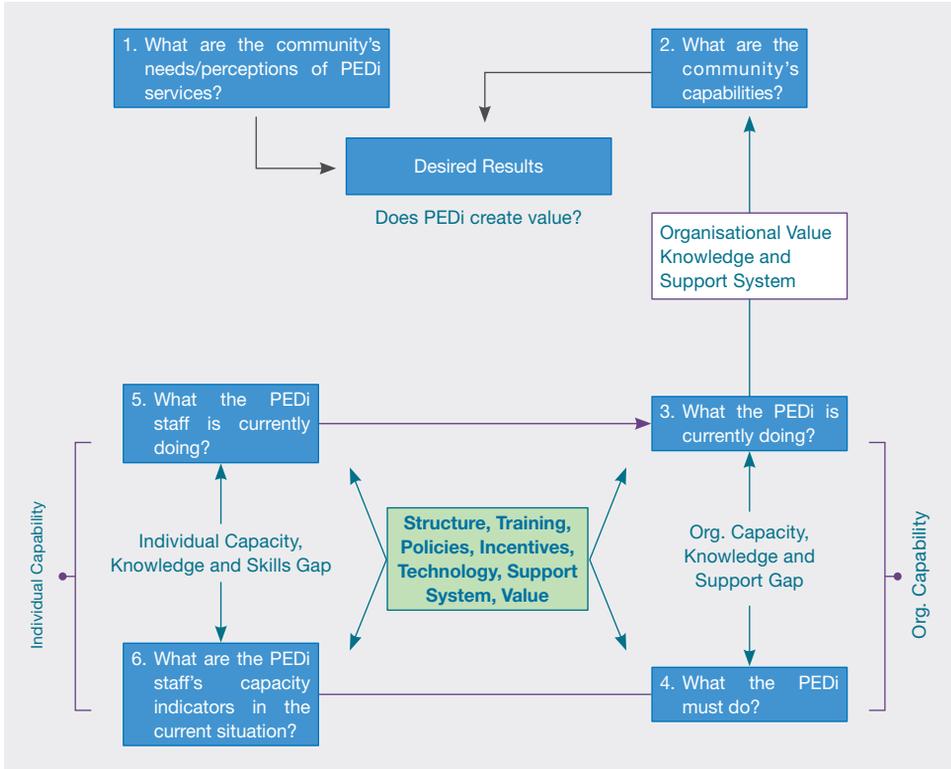
The conceptual framework proposed in this study is Amartya Sen's Capability Approach (Sen, 1999) and Kleine's Choice Framework (Kleine, 2010). The Capability Approach has primarily been used to evaluate interventions in developing countries, but Sen never meant for the Capability Approach to be exclusively used in "orthodox" development contexts. Of course, even the poorest need better health facilities, better education, etc. (Sen, 1999).

The Capability Approach is a broad framework that can be used for various aims (Robeyns, 2005). The focus of the Capability Approach is the expansion of people's freedom of choice to live a life they have reason to value (Sen, 1999). The choice aspect is complex and has been addressed in, e.g., Kleine's choice framework (Kleine, 2010). Grounding her framework on Alsop and Heinsohn's (2005) work, Kleine differentiates between four dimensions of choice: first, the existence of choice: if an individual has different possibilities to choose from; second, the sense of choice: if an individual is aware of the choices available; third, use of choice: if an individual acts on the choices; and finally, achievement of choice: if the outcomes of the choice match the individual's expectations.

Kleine derived a choice framework from Sen's Capability Approach, further developed by Alsop and Heinsohn (2005). While Alsop and Heinsohn (2005) consistently place choice at the centre of their framework and recognise structure and agency elements as interlinked, its layout suggests that individuals can, with the help of their resource portfolios, negotiate a social structure to achieve using their active choices, the development outcomes they desire.

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FIGURE 1: CONCEPTUAL FRAMEWORK



Limitations

This research has several limitations. One of the study's limitations is the structure of the online research, which we were unable to follow due to delayed PEDI staff responses and the unavailability of purposively selected participants. Some participants were unable to join because they lacked access to an online meeting platform (Zoom or Google Meet). Given the conditions, we conducted a field study in PPR Seduan, Sibu, Sarawak; PPR Senawang, Seremban, Negeri Sembilan; and PPR Jelatek, Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur. The PPR Semarak, Tawau, Sabah staff mainly provided information by email. We also aimed to include non-user participants of PEDI in our sample size, but due to

INTRODUCTION

the COVID-19 situation, we could not obtain access to any of them. We had difficulty locating user participants, and their availability was a significant concern during the data collection. Initially, with the help of provided lists of PEDi staff, we selected the participants for in-depth interviews based on the purposive sampling technique (nine participants). However, we were unable to gain access to the selected participants. As a result, the research team relied heavily on the PEDi staff to identify participants using convenience sampling. Therefore, the inferences made are limited to the sample itself.

LITERATURE REVIEW

Emergence of Community ICT-led Initiatives

ICT-led initiatives are often considered having a significant role in expanding human capabilities and giving access to opportunities in multidimensional domains (social, economic, political) that result in quality of life improvements (Hamel, 2010; Kleine, 2010). Giger's (2011) study concludes that enhancing people's informational capabilities is the most critical factor determining the impact of ICT on their well-being through improved information and capabilities for the poor and underserved to make

strategic life decisions to achieve the lifestyle they value. Given that, a review of other studies pointed out that lack of access to ICT is a significant barrier in developed and developing countries, limiting economic progress and social and political participation (Horn & Gifford, 2022).

Several studies (Bar et al., 2013; Proenza, 2015) indicate that public shared access enables people to interact with their families, enhance their work abilities and career opportunities, and entertain themselves. Public access builds social networks and social capital. The first initiative to build telecentres to improve access to address the digital divide started in the late 1980s (Benjamin, 2000).

For years, Malaysia was one of the developing Asian countries that aggressively promoted ICT for BDD and poverty alleviation. In 1996, the Malaysian government established the Multimedia Super Corridor (MSC) as a catalyst to move Malaysia towards a knowledge-based economy by the year 2020. The initiative has led to various ICT projects (such as MID, RIC, PID, and PEDi) transforming the Malaysian society into a K-economy using ICT in education, healthcare, commerce, and industries. Even in 2020 alone, development inside the digital economy has naturally sped up

LITERATURE REVIEW

as the COVID-19 pandemic brought forth new digital businesses, forced traditional brick-and-mortar enterprises to pivot online, and saw many Malaysians go virtual for their e-Commerce, entertainment, and even education needs.

To empower Malaysians, the Government of Malaysia launched a new initiative, “MyDIGITAL”, on 19 February (RM Ke-12). Kamarudin et al. (2021), Tabassum et al. (2019), Aji et al. (2016), and Hassan et al. (2010) investigated the role, context, and perceptions of digital divide initiatives, notably telecentre programmes in Malaysia. These studies demonstrate that the telecentres movement in Malaysia has provided people and partner communities with outstanding opportunities. According to MCMC (2022), by the fourth quarter of 2022, Malaysia achieved mobile broadband penetration of 128.2 percent and fixed broadband penetration of 41.2 percent. MCMC will lead and implement the NFCP five (5)-year plan 2019-2023 to provide affordable, sustainable, and comprehensive digital connectivity (EPU, 2021).

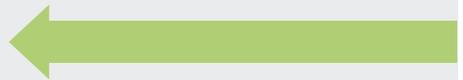
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and fixed broadband penetration of

41.2%



LITERATURE REVIEW

People's Housing Project (*Projek Perumahan Rakyat - PPR*)

The United Nations Universal Declaration of Human Rights (UN-UDHR) recognises that access to adequate, affordable housing is critical to people's health and well-being and the smooth operation of economies. It serves as a foundation for developing robust and stable communities with better economic, educational, and health outcomes. Furthermore, housing construction is a critical driver of the country's economic and social development (Yam, 2013).

Recognising the importance of building sufficient essential/affordable housing enhances people's well-being and catalyses the improvement of the country's socioeconomic condition. Malaysia's government, like any other country, has long acknowledged the necessity of affordable housing for the well-being of the country's fast-growing low- and middle-income population. The Government of Malaysia has focused its efforts on ensuring that vulnerable groups have access to appropriate and inexpensive housing since 1966, as is evident in the First Malaysia Plan (1966-1970). In the 7th (1996-2000), 8th (2001-2005), 9th (2006-2010), 10th (2011-2015), and 11th (2016-2020) Malaysia Plans, the government was committed to providing affordable and adequate

housing for all income levels, especially for low-income communities (2016-2020).

This demonstrates that the Government of Malaysia has placed strong emphasis on ensuring that targeted populations have access to adequate, affordable, and decent-quality housing (Mohd-Rahim et al., 2019). The Malaysian government has launched several initiatives and programmes to promote and build affordable housing for targeted groups, including MyHome, *Perumahan Rakyat 1Malaysia* (PR1MA), *Rumah Mesra Rakyat* (RMR1M), *Program Rumah Mampu Milik* (RMM), *Program Penyelenggaraan 1Malaysia* (TP1M), MyDeposit Scheme, and People's Housing Project (PPR) (Azmi et al., 2019; Mohd-Rahim et al., 2019). One of the most well-known housing programmes is the "People's Housing Programme" (*Projek Perumahan Rakyat - PPR*), one of the government's efforts to provide inexpensive housing, particularly for low-income people, primarily designed to target individuals with RM2,500 per month and lower (Wahi & Zin, 2018). The PPR Programme aims to ensure and provide housing for impoverished people living in squatter areas and victims of exceptional situations, such as fires, and people or families from developing nations. Like many of its counterparts in Peninsular Malaysia and Sabah,

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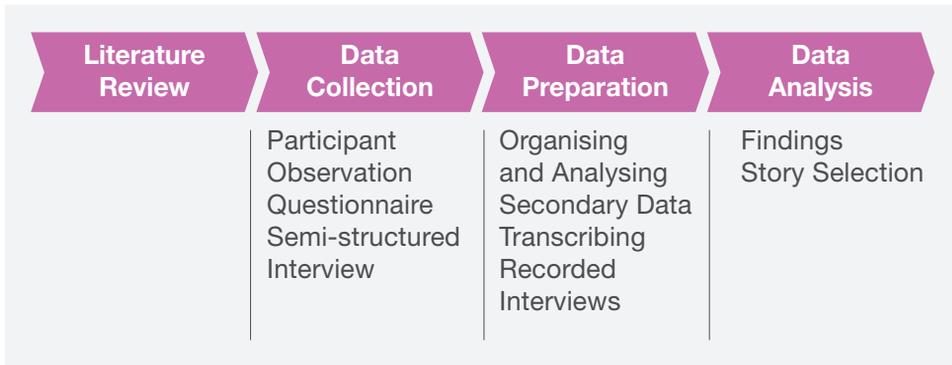
Sarawak is rapidly urbanising, and the pace is accelerating in the state's major cities. Kuching, Sibul, Bintulu, and Miri are Sarawak's bigger towns, functioning as magnets, luring residents from less developed areas to migrate to the inner cities for various reasons and purposes (MLGH, 2020).

RESEARCH METHODOLOGY

Research Design

This research study was both exploratory and empirical in nature. Following a search of secondary literature, survey questions were generated and analysed.

FIGURE 2: RESEARCH DESIGN/METHODOLOGY



Data Collection

The data for this study was gathered from both secondary and primary sources.

Secondary Data Collection Process

Secondary data was obtained from PEDI's staff, who provided us with the documented 121 Success Stories of PEDI users, of which nine (9) were duplicates and eight (8) were uncleaned. Consequently, we analysed 104 stories.

RESEARCH METHODOLOGY

Primary Data Collection Process

The qualitative research approach collected primary data, including participant observation, semi-structured interviews, and questionnaires (see Tables 5.1 and 5.2). The study was conducted in four (4) sites of East and West Malaysia, namely PPR Seduan (Sibu, Sarawak), PPR Semarak (Tawau, Sabah), PPR Senawang (Seremban, Negeri Sembilan) and PPR Jelatek (Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur). Specifically, a semi-structured questionnaire was designed to interview the respondents.

Thirteen (13) interviews were conducted in total, with five (5) PEDi users (Seduan, Semarak, and Senawang), five (5) PEDi staff (Seduan, Jelatek, and Senawang), and three (3) DUSP staff (Digi, Maxis, Onsite). All interviews with PEDi staff took place in person, while those with PEDi users and DUSP representatives took place online. At the same time, feedback from the MCMC representative was gathered through a survey questionnaire.

Data Preparation

Organising and Analysing Primary Data

The primary source interviews were recorded with detailed notes and a

video recorder, then translated and transcribed into Microsoft Word documents for further analysis.

Organising and Analysing Secondary Data

The following steps were taken to organise and analyse secondary data: cleaning, processing, and data documentation. The first step consisted of counting and organising all stories. The total number of success stories gathered from Seduan, Senawang, Semarak, and Jelatek was 121. In the second step, 17 duplicate stories were eliminated, while stories from PEDi Jelatek were not included for further processing due to the imprecise description. The stories received from the four (4) sites were not aligned in a uniform format. After the data cleaning process, the next step was the story selection process.

This study used an “iterative voting” method to select significant change stories. Davies and Dart (2005) define iterative voting as follows: after casting their votes, individuals debate their selections. Then, a second and a third vote will be held to obtain unanimity. A dissident opinion may consist of a story element that is ambiguous or contradicts the story’s central theme. For even groups, two (2) stories may be necessary. It takes time, but it results in better decisions.

RESEARCH METHODOLOGY

Before voting, the research team for the case study read the stories aloud. During the selection process, the PEDI-related experiences of the user beneficiaries were examined. After discussion, the research team chose the stories of significant change that best showed the most valued results: improving employability, business opportunities/income, and quality of life of the beneficiaries. A third vote was needed to reach unanimity. After agreeing upon a significant change story, each team member provided feedback.

Data Analysis

Two (2) techniques were used to identify significant changes in the respondents' dataset: (1) The Content Analysis Technique and (2) Leximancer software. Content analysis is a qualitative research technique for categorising data and eliciting meaning. It is defined as "a research method for subjective interpretation of text data through systematic coding and theme or pattern classification" (Hsieh & Shannon, 2005). The second data analysis technique analyses the interviews using the Leximancer analytical software. Leximancer employs word occurrence and co-occurrence counts to extract main thematic and conceptual content directly from input text (Angus, Rintel

and Wiles, 2013). This automated approach provides a tailored taxonomy displayed graphically as an interactive concept map or as tables identifying key concepts and conceptual relationships.

FINDINGS AND DISCUSSION

The findings are divided into two (2) parts. The first part represents the findings of primary data analysis using the content analysis technique and the Leximancer software. The second part presents secondary data findings from PEDI's success stories.

Part 1: Findings - Primary Data

The research data presented in this report is preliminary and includes only data collected from PEDI users, PEDI staff, and representatives from the MCMC and DUSPs.

Demographic Profile

A total of 13 interviews were conducted (See Table 1) with a total of six (6) males and seven (7) female participants. Out of a total of 13 interviews, five (5) were conducted with the users of PEDI services, five (5) PEDI staff members, three (3) DUSP officials, and one (1) MCMC representative.

FINDINGS AND DISCUSSION

TABLE 1: DEMOGRAPHIC INFORMATION OF USER RESPONDENTS

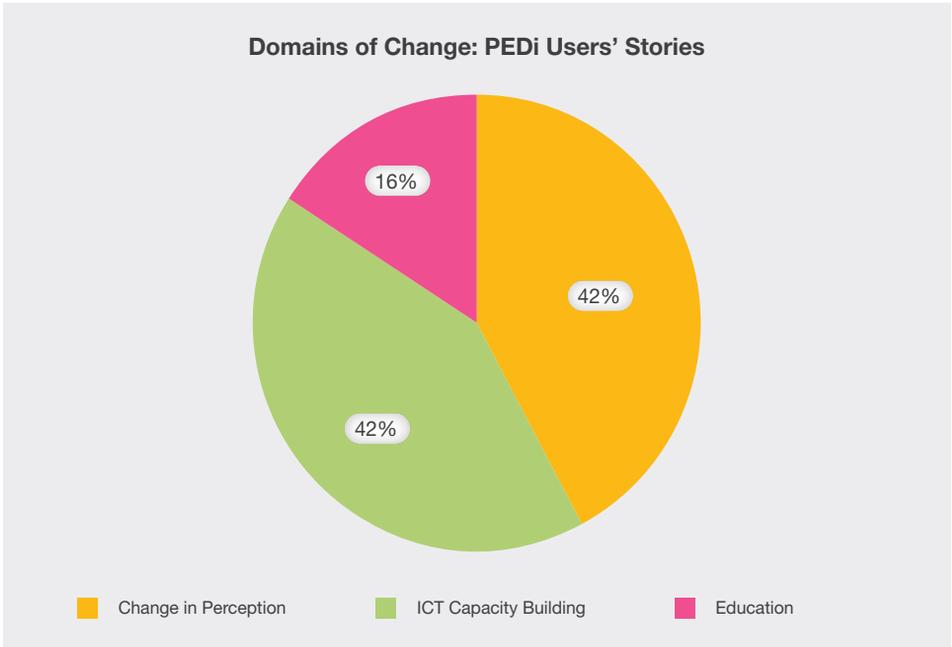
No	Research Sites	Gender	Age	Occupation	ICT Usage	Obtained IT Training
1.	PEDi Semarak	Male	17	Student	Online study/ homework	Microsoft Office, Kahoot!
2.		Female	34	Self- employed (Tailor)	Internet, computer, applying for funding online, writing letters, etc.	Canva, stickers, FB pages, Shopee, Microsoft Office, editing video/pictures, WhatsApp Web and Telegram
3.	PEDi Seduan	Male	12	Student	Online study/ homework	IT training
4.		Female	26	Office worker	Internet, computer	Excel, Shopee, ATM registration, privacy
5.	PEDi Senawang	Female	25	Employed	Internet, computer	Shopee, training and learning techniques/basic skills

Findings from Primary Data Content Analysis: Domains of Change (User Beneficiaries of PEDi Services)

The three (3) most prevalent domains of change that PEDi user participants indicated in their reported stories regarding impacts on the community are (refer to Figure 3) Positive Perceptions (42 percent), ICT Capacity Building (42 percent), and Education (16 percent). The user stories illustrate the stated results by describing related outcomes from their expressed views. Figure 4 depicts nine (9) subdomains of change, indicating how user beneficiaries perceive PEDi's role in facilitating access to ICT facilities and training courses.

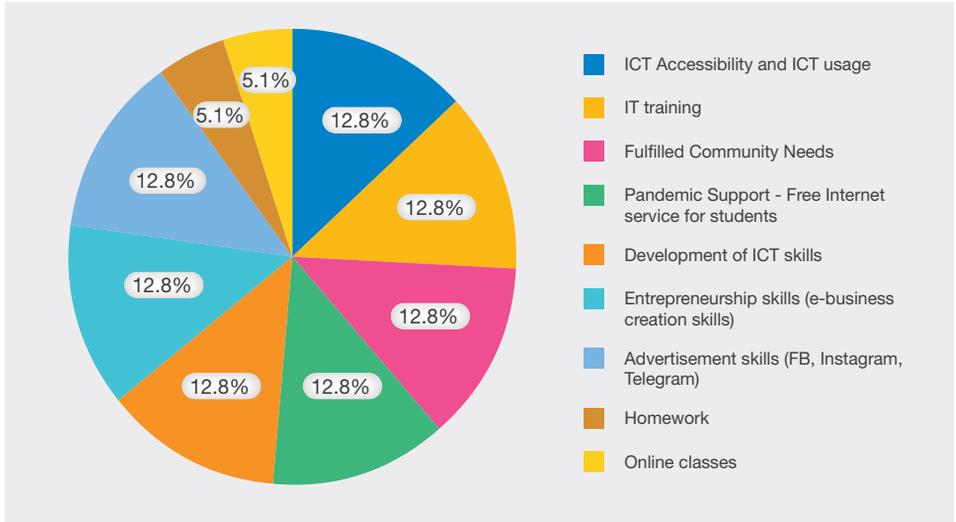
FINDINGS AND DISCUSSION

FIGURE 3: CONTENT ANALYSIS OF USERS' STORIES BY DOMAINS OF CHANGE



FINDINGS AND DISCUSSION

FIGURE 4: CONTENT ANALYSIS OF STORIES BY SUBDOMAINS OF CHANGE OF STORIES COLLECTED FROM USER BENEFICIARIES OF PEDI SERVICES



Leximancer Analysis

The collected data was analysed using Leximancer 5 software to uncover essential concepts and themes. The data was uploaded in MS Word document format, and the analysis was carried out with the default settings of two (2) sentences per block and a prose threshold of one. Figure 5 and Table 2 depict a map of data obtained on PEDI's impacts on the PPR communities and stakeholders' management roles/responsibilities in PEDI projects (i.e. DUSPs, PEDI managers, and the MCMC). The map depicts the high-level classification of themes/concepts discovered in the data, with grey dots representing

points and black text representing texts. The coloured circles on the map in Figure 5 reflect clusters of concepts linked together by themes. The images are grouped into higher-level "themes" when the map is created. Concepts that are regularly mentioned in the same piece of text tend to cluster together in the map space. The name of each theme is derived from the name of the most significant concept contained within the theme sphere. Leximancer displayed connection by giving the researcher a percentage (%) approximation of theme covers across the data. The percentage (percent) refers to the total co-occurring frequency of each concept inside the theme.

FINDINGS AND DISCUSSION

Explanation of Leximancer Analysis: Users, PEDi Staff, DUSPs, and MCMC Theme/Concepts Map

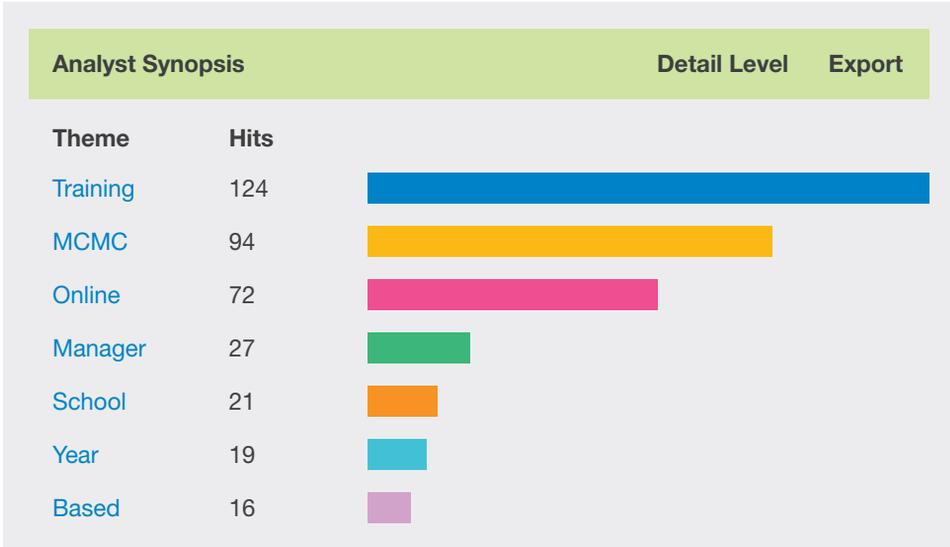
The initial presentation of the theme map highlights seven (7) key themes that are deemed to be the most relevant since they reflect both users' experiences and the role of PEDi management (PEDi staff, DUSPs, and MCMC) in operating and managing PEDi operations. Overlapping themes demonstrate interconnection, implying that the dominant themes of "Training", "MCMC", "Online", "School", "Manager", and "Year" are strongly connected. In Figure 5, overlapping themes indicate that users' perceptions in the context of utilising PEDi's services are positive, and PEDi's training on IT and entrepreneurship for adults and schoolchildren are recognised and appreciated by respondents in their respective locations. The overlying themes ("MCMC," "Training", "Manager") show that management of PEDi (PEDi staff, DUSPs, and MCMC as the regulators), in terms of training arrangement, strategies for achieving Key Performance Indicators (KPIs) and PEDi operations, is dependent on communication between all stakeholders.

On the other hand, the theme map also demonstrates the MCMC's prominent role in monitoring the volume of users who come to PEDi for entrepreneurship and IT training and the number of participants in those training sessions. Overall, the map demonstrates that the community desires PEDi's services and offered facilities because it supports the development of users' IT and entrepreneurial skills. In addition, PEDi promotes and facilitates online commerce and entrepreneurship training to fulfil the KPIs. PEDi also improved academic performance in schoolchildren and user perception of the PEDi. To notify people about the training in their respective locations, a Facebook or WhatsApp group was used. PEDi operated even during the pandemic (adhering to SOPs) by providing services online to help deal with challenges. The map also depicts the challenges of PEDi staff in training, community engagement, persuading people to use PEDi's facilities and training participation.

Table 2 summarises the top seven (7) highlighted themes in the text, as well as the frequency and number of occurrences. The Hits column shows the number of text blocks associated with the Theme (Leximancer Manual). In this example, the theme "Training" was recorded 124 times, and "MCMC" was recorded 94 times. This demonstrates a strong connection between the most prevalent themes.

FINDINGS AND DISCUSSION

INTERVIEWS TABLE 2: THEMATIC MAP OF THE SUCCESS STORIES



Findings from Interviews with PEDi Staff, DUSPs, and MCMC

The following section provides a summary of the findings and information gathered from interviews with individuals involved in PEDi project management (such as PEDi staff, DUSPs, and MCMC) with regard to PEDi's role, objectives, plans and the associated challenges.

Key Performance Indicators (KPIs)

The DUSP representative shared a list of KPIs set by MCMC. The interviews revealed that the goal of achieving KPIs drives planning and activities to serve the local communities; however, the KPIs are not standardised, and are dependent on the preferences of the regulators (alignment with government policies and organisational goals) and, in some cases, DUSP's business goals. Therefore, we requested a list of PEDi KPIs for the last five (5) years to explore a relationship between the KPIs and the performance of each PEDi (with secondary data: Objective 2 and 4) which we could not obtain for this study.

FINDINGS AND DISCUSSION

Allocation of Funds for Community Engagement Activities

To support the community engagement activities, the interviews revealed different procedures, such as some DUSPs allocated small budgets for this purpose while the others did not have any allocation.

Lack of Long-Term Strategies

According to DUSP representatives and PEDI staff, there is a lack of long-term strategies because of the short-term contract, which is up for renewal on a yearly basis. The uncertainty of contracts (DUSP) and lack of job security (PEDI staff) are two (2) obstacles that obstruct long-term planning.

Community Engagement

According to the PEDI staff, it is difficult to engage with the community due to the lack of community engagement skills. A DUSP staff interviewed revealed that there is no training provided on community engagement, while the other two (2) DUSP staff mentioned that they have some components of community engagement training in the yearly refresher workshop. The focus of the training for PEDI staff is leadership, entrepreneurial training, and IT skill-based training.

Part 2: Secondary Data Findings and Interpretation

Demographic Profile

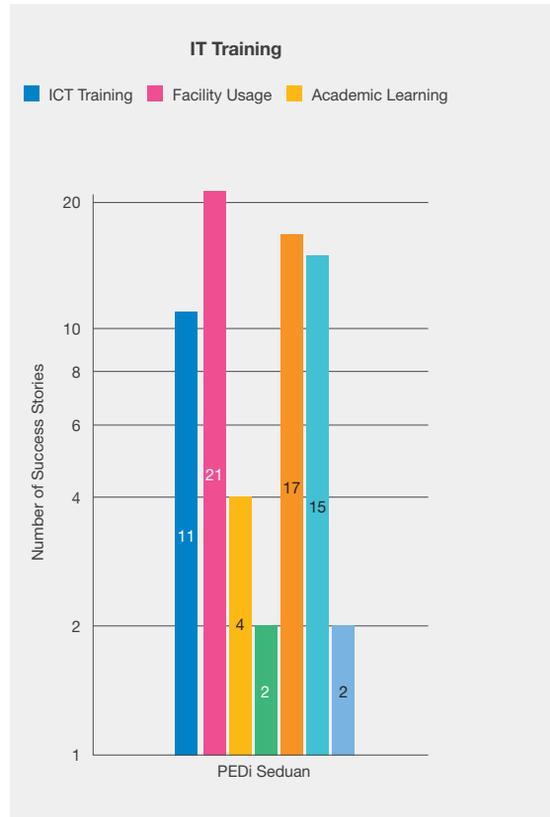
The demographic profile was examined based on age, gender, IT training, and the goals achieved via PEDI-provided services, which included entrepreneurs and students (refer to Table 4.6 below). The gender proportion appeared to be 37 males and 67 females based on the respondent profiles. The ages of the respondents are classified based on the training groups: “IT Training and ICT Uses” and “Entrepreneurs”. The respondents in the “IT usage/learning” category are from eight (8) to 37 years old with a majority at 34 years of age. The “Entrepreneurship” category had 47 respondents, of ages between 15 and 67 years. Most respondents (37 out of 47) are aged 15-38. According to the success stories, most respondents used the PEDI resources for schoolwork, homework, and learning, as well as for entrepreneurship businesses. It is pertinent to mention that 15 respondents did not state their age (9 in “IT usage/learning” and 6 in “Entrepreneurs”).

FINDINGS AND DISCUSSION

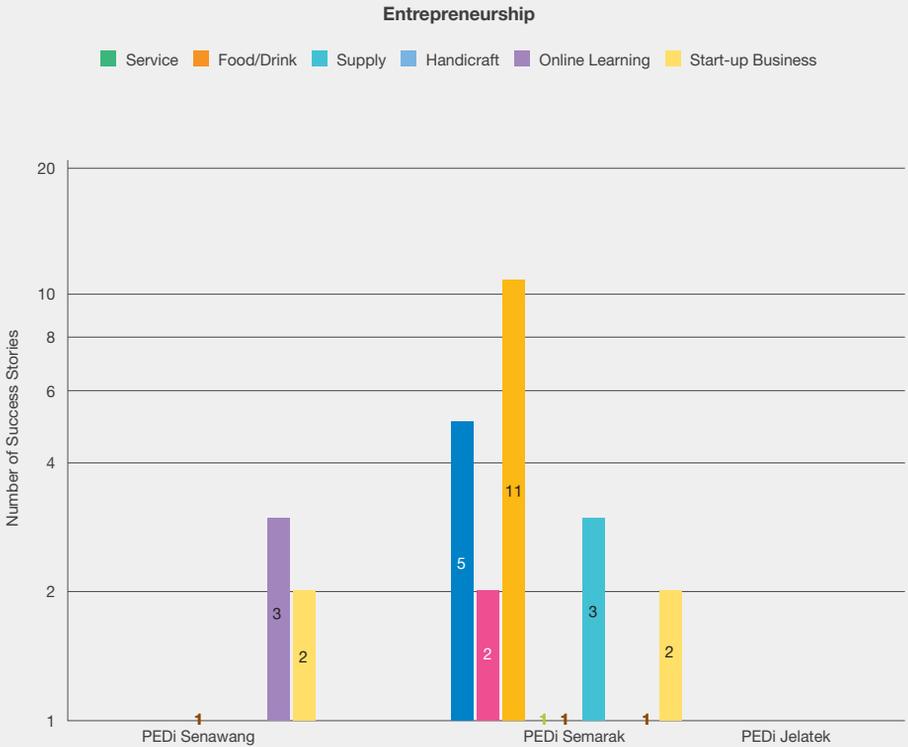
Findings from 104 Success Stories Content Analysis and Interpretation

The content analysis findings are presented collectively in the form of categories/domains of change (Figure 6), namely “ICT training”, and “Entrepreneurship”, with each primary category further divided into subcategories based on similar types of experiences described by users, such as “ICT Training”, “Facility Usage”, “Academic Learning”, “Promotion”, “Service”, “Food/Drink”, “Supply”, “Handicraft”, “Online Learning” and “Start-up Business”. According to the Success Stories analysis results, a total of 35 respondents are schoolchildren, who attended IT training at the PEDi centre and made use of the centre’s facilities for academic learning, online classes, group studies, and other related activities. Meanwhile, the other respondent groups from Seduan (38 respondents) and Semarak (five respondents) were entrepreneurs, who promoted their businesses online through PEDi, with positive impact on their livelihood. On the other hand, respondents from Senawang and Semarak reaped the benefits of utilising PEDi facilities for online learning and establishing business start-ups.

FIGURE 6: CONTENT ANALYSIS FINDINGS OF SUCCESS STORIES (SECONDARY DATA)



FINDINGS AND DISCUSSION



FINDINGS AND DISCUSSION

**Research Objectives****Research Objective 1****Investigate Users' Perceptions and Explore the Needs of the Community within the Context of Digital Inclusion**

The data reveals that all beneficiaries positively perceived PEDI's facilities and provided IT training. The data demonstrates that both young and adult users can instantly use PEDI facilities as some shared that the unavailability of the Internet at their residence required them to travel into town for access. The staff informed us that their KPIs focus on providing training to local businesses to advertise on social media platforms such as Facebook and Instagram. However, fulfilling the set KPIs is always a challenge, which is based on the number of entrepreneurs trained, while not everyone in the community may be interested in being an entrepreneur. The findings indicate that PEDI provided students under 18 free access to the Internet for one (1) hour and online training, which helped them do better in school. The study results revealed that community members expressed satisfaction with PEDI's services to meet community needs. Both children and adults appreciated PEDI's role in providing communities with easy access to ICT and training courses on academic learning, basic ICT skills, and entrepreneurship. Some participants indicated a need for advanced training in computer applications such as sticker design, logo creation for entrepreneurs, and "Kahoot!" for youngsters.

FINDINGS AND DISCUSSION

Research Objective 2**Examine Factors that Drive the Usage/Participation and Satisfaction for PEDi Services**

The findings of this study revealed that several factors influence the usage/participation and satisfaction levels of PPR communities with regard to PEDi services, including users' understanding, ease of ICT access, ease of ICT use, users' satisfaction, users' awareness of the importance of IT training, and the facilities/services provided by PEDi. In addition to meeting KPIs, PEDi staff designed IT training courses based on the needs of the community and their own abilities. The facilities and services are open to everybody, and to use the facilities and register as a member, the public pays a one-time membership fee of RM5. In accordance with MCMC's policy, free memberships are provided to students, older people, and OKU. The question of whether the PPR community wants to utilise or participate in PEDi is dependent on their experiences with the provided services. The study revealed that community satisfaction with PEDi-offered services is significantly determined by the services' ability to meet their needs and expectations as well as by the community's awareness of the benefits. The factors that influence participation in PEDi programmes may vary based on the distance of the PEDi from the user's house, its facilities, and its engagement strategies. PEDi appears to have improved children's and adults' ICT access, use, and capacity development by providing ICT and entrepreneurial training. One of the key factors that shaped a positive image of PEDi was uninterrupted Internet access throughout the epidemic, enabling students to continue online education. The participants highlighted the flexible nature of the training and community engagement as important factors that drive community satisfaction with PEDi services. The PEDi staff used competitions (based on the results of pre- and post-tests of the training) as a strategy to enhance community participation. Aside from this, the PEDi role is also affected by other things, such as community engagement, which PEDi Jelatek says is the biggest problem.

FINDINGS AND DISCUSSION

Research Objective 3**Evaluate the Impact of PEDis on the PPR Communities (Strengths, Weaknesses, Opportunities, and Threats) to Enhance the Sense of Belonging of PEDis to the Communities**

The following SWOT analysis summarises PEDis' strengths, weaknesses, opportunities, and threats.

Strengths (Internal Factors):

- **Users appreciate PEDI's infrastructure:** All users and PEDI staff complimented PEDI's facilities and infrastructure.
- **Users' acknowledgement and appreciation for PEDI:** Most PEDis are located in remote locations or at the outskirts of towns within PPR areas. Adult users and students recognise and appreciate PEDI's contributions to the PPR community. Contributions include affordable Internet access, training in IT and entrepreneurship, and education for both children and adults.
- **Online entrepreneurship training:** PEDis, in their respective locations, contributed to the development of the community's IT and entrepreneurship skills. PEDI respondents learned how to conduct and market online business utilising various digital tools.
- **Pandemic support - Free Internet service for students:** Students and parents appreciated and commended PEDI for its facilities, training, and free one-hour daily Internet access for children throughout the pandemic.
- **IT training programmes:** The service providers have launched targeted programmes aimed at boosting community digitalisation. For instance, Maxis provided eKelas, or online tutoring to schoolchildren, which was extremely popular in many Maxis-operated PEDis.

FINDINGS AND DISCUSSION

Research Objective 3**Weaknesses (Internal Factors):**

- **Lack of community engagement training for PEDi staff:** The staff continue to face obstacles and problems in achieving their goals due to low awareness and motivation in surrounding communities. According to PEDi staff, they encountered challenges in engaging with local community members during training, due to a lack of community engagement skills.
- **Inadequate training in advanced ICT and entrepreneurship:** PEDi staff have to self-learn advanced ICT skills to train the local community members. They could, however, only do so with limitation because of the specialised nature and non-availability of free online material.
- **Lack of promotion and marketing of PEDi to PPR communities:** The staff reported a lack of material or programmes for PEDi's promotion and marketing in the local communities.
- **No training for special need individuals (OKU):** The centres' facilities are in good condition, but they are not accessible to special needs individuals.
- **No rewards for PEDi managers:** Staff turnover is high; hence, without a long-term plan, incentives, and benefits, the PEDi staff are changing their jobs swiftly and seeking new employment opportunities.

FINDINGS AND DISCUSSION

Research Objective 3**Opportunities (External Factors):**

- **Building future generations of ICT-savvy users:** The bulk of users are eager-to-learn school-aged children. The centre allows them to perform their schoolwork online and learn ICT. The Maxis-run institutes also offer free tuition/extra lessons whereby this strategic engagement with children can enhance the brand reputation of PEDI.
- **Collaboration with universities and colleges:** PEDI has formed some partnerships with local institutions like schools and the Agriculture Department. However, this is not sustainable and management may collaborate with regional universities on specific projects and participate in the SULAM programme (<https://sulam.mohe.gov.my/web/>).
- **Advanced training for PEDI staff:** People in PPR communities who want to improve their IT and entrepreneurial skills need further training. It is necessary to offer advanced IT training as Microsoft Office and social networking for business seem basic to urban PPR dwellers.

FINDINGS AND DISCUSSION

Research Objective 3**Threats (External Factors):**

- **Misuse of the PEDi facilities:** PEDi was used for other purposes, for example, as a waiting area or for unrelated activities and meetings by the community leaders. Several parents left their children at PEDi while working or running errands. PEDi facilities were also sometimes vandalised, causing damage to the equipment.
- **Insufficient marketing and image branding of PEDi services:** PEDi staff are assumed to have broad community outreach via promotion. Without proper training and support for marketing, the PEDi staff expressed their failure in creating a community-based brand for PEDi. Many people see PEDi as a “government centre” with free Internet access. However, leaders in the community supported PEDi programmes and training at limited venues.
- **Knowledge gap, community needs and services of PEDi:** The community needs rapid changes. During the pandemic, providing training was one of the major challenges for PEDi staff while their performance indicators did not change and adapt (except with some flexibility). Therefore, the staff reported a big gap between the community needs and PEDi offerings.

RECOMMENDATIONS

Specific Research Objective 4 - Assess and Provide Recommendations for Enhancing the Effectiveness of PEDi and its Role in Improving Digital Inclusion within the Community, including Sustainable Business Model(s) for PEDis Located at PPR Residences.

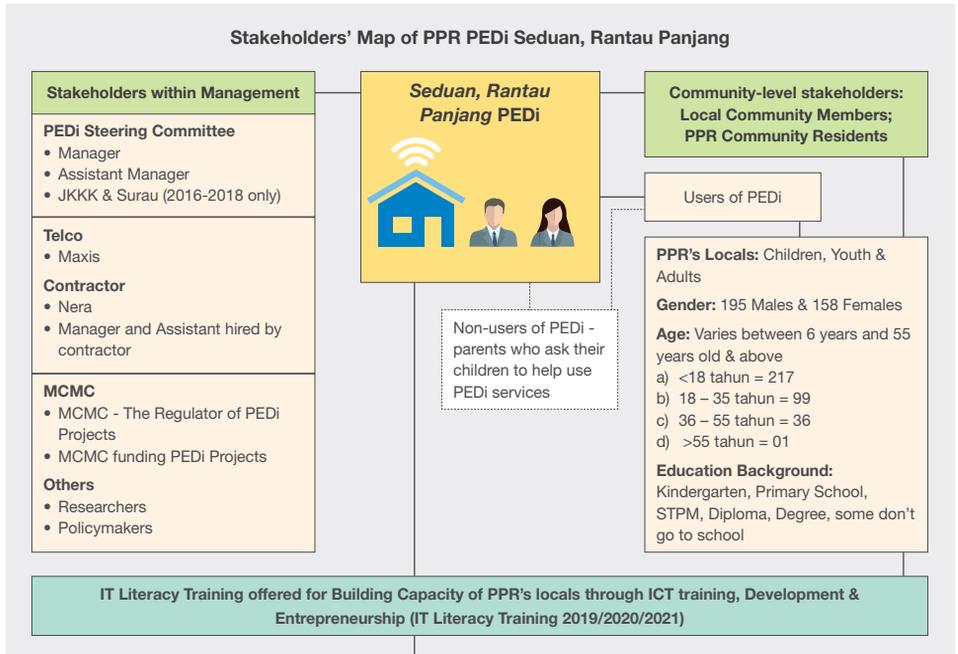
Community Awareness and Stakeholder Analysis

This research study shed light on PEDi staff's community awareness programmes, indicating that meetings with PPR community members were held and a quarterly Open Day was organised. However, the staff still have issues engaging meaningfully with local community members. PEDi staff overemphasised social media to promote activities, training, and services; however, they also accepted that "not everyone in the community is on Facebook, and not everyone is aware of PEDi events". We recommend training programmes to better understand the local community, stakeholder mapping process, developing marketing strategy and targeted communication with the stakeholders, including PEDi users.

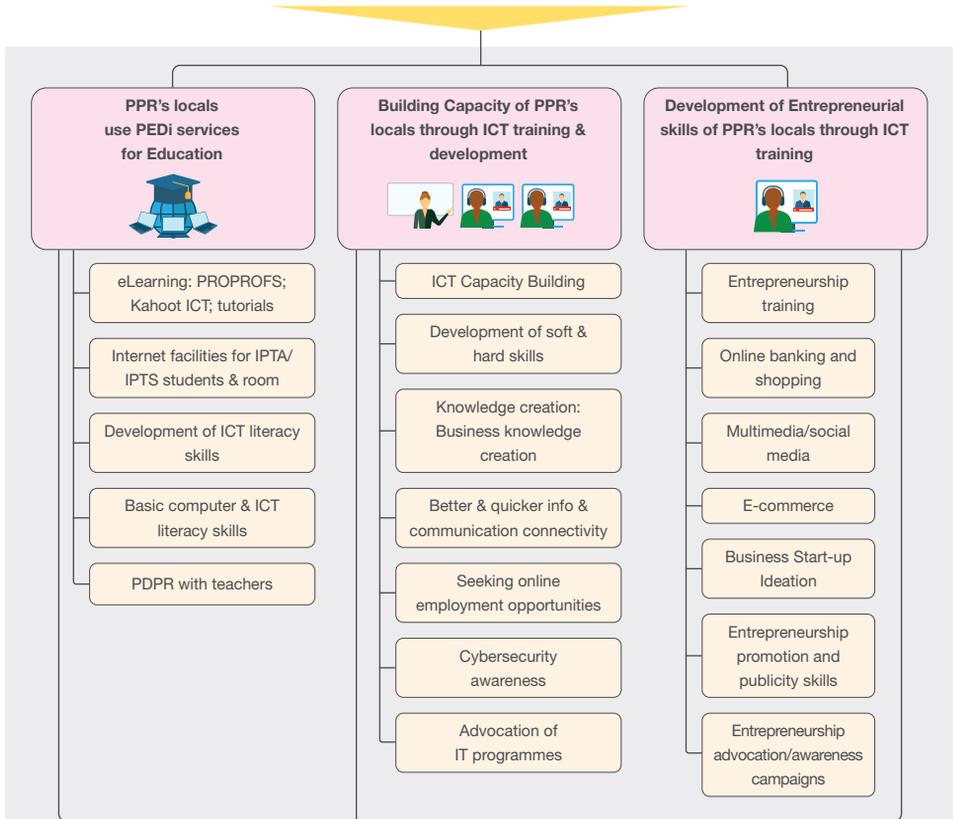
The community members require the right content in the appropriate format, at the right time, and in the right place. This study also suggests that it is essential for each PEDi to develop a stakeholders' map for its respective location and conduct a detailed stakeholder analysis to identify and classify the stakeholders. We have created a stakeholders' map for PEDi Seduan (see Figure 7) which highlights stakeholders, both individuals/entities. Thus, similar classifications or concepts of a PEDi stakeholders' map can be developed for other PEDis. In the next stage, it is recommended that the PEDis should also have a communication strategy.

RECOMMENDATIONS

FIGURE 7: STAKEHOLDERS' MAP OF PEDI SEDUAN



RECOMMENDATIONS



List of IT training and programmes attended by users of PEDI

IT literacy programmes (training, 2019/2020/2021)

- Introduction to WhatsApp web application technology
- MS Office SESI 1 & 2 – Basic ICT
- MS POWERPOINT (SESI 1 & 2) & USAHAWAN-BASIC ICT (PAC MAN GAME; Resume; Animation; Soft Skills; Text Animation; Timer; Cyber; Patrol; Animation)
- MS Office Word; PROPROFS-MS Word; Basic ICT
- Basic module of animation (Father's Day animation) & advocation SESI 1 & 2
- PDPR with teachers
- Application
- Introduction to the Canva website
- 3D PRINTER
- 3D QUIVER VISION
- Basic ICT & hardware
- PROPROFS & BASIC ICT
- Basic computer
- Kahoot ICT-MS Office; Kahoot Basic IT
- Kahoot ICT-Merdekaan
- Kahoot ICT-Multimedia
- Ms Office Excel-Principal Course-Basic ICT
- Internet facilities for IPTA/IPTS students & Zoom
- JobStreet & Canva website tutorial

RECOMMENDATIONS

List of IT training and programmes attended by users of PIK

IT Literacy training & Avocation programmes (training, 2019/2020/2021)

- Financial fraud advocation quiz
- False info advocacy & quiz
- Cyber bullying advocation quiz
- Ms Word SESI 1 & 2
- Ms Excel SESI 1 & 2 & advocacy
- PROPROFS & Merdekaan 2020
- Basic computer & Advocacy

- CANA & Advocacy
- My census & Advocacy
- PROPROFS advocacy
- Intro to Gmail advocation
- Sarawak recruitment & advocation account update
- MS PowerPoint – Basic ICT SESI 1, SESI 2 & advocacy

eLearning (training, 2019/2020/2021)

- Kahoot ICT MS PPT (Cyber Patrol Game)
- Kahoot ICT-Basic ICT
- ICT class's introduction to internet and email

- Kahoot (PROPROFS Merdeka 2020)
- Kahoot ICT – PROPROFS
- eLearning Tutorial 1 & 2
- Kahoot Merdeka 2020

Multimedia/business publicity/promotion (training, 2019/2020/2021)

- Multimedia photo & animation
- ASAS multimedia & PROPROFS multimedia
- Multimedia (transparent background)
- Multimedia (photo & graphics) SESI 1 & 2
- Wonder share filmora software

- Kahoot & Merdekaan
- ASAS Multimedia
- Blogs & advocacy
- Multimedia introduction sesi 1, sesi 2
- Multimedia Pow Toon
- Tutorial logo maker

Entrepreneurship (training, 2019/2020/2021)

- Introduction to Shopee & advocacy
- Introduction to open a Maybank current account without introducer (SME first account-1)
- Update BSN account online
- Introduction to Shopee

- Marketing, financial management & sales
- Business plan
- Mobile E-Waste
- Independence programme - invention
- Online banking & Shopee
- Online shop

RECOMMENDATIONS

Community Engagement

This study recommends that the staff need to be trained on comprehensive community engagement processes, which should include intercultural communication, relationship building, and communications for development (C4D). Community engagement and management is seen as an academic and development area in which networking and communication capabilities are critical; hence, we suggest that all managers and assistant managers should have training opportunities to develop skills such as engagement skills, interpersonal communication, intercultural communication, and relationship building. In addition, the activities of community engagement should have an equal, if not more, influence on the performance indicators of PEDis. An example of community engagement training modules is developed in the TIED and CONNECTS project commissioned by MAXIS Sdn Bhd (<https://www.isiti.unimas.my/mainsite-tied-connects>). The information contained in the documented reports may be beneficial to the management in terms of determining the nature of community engagement training for PEDi staff.

Co-designing Programmes and Services with the Community

A combination of top-down and bottom-up approaches where the community members are part of designing the training programmes, which will also help in developing KPIs for PEDi and its related staff. Another important aspect is the engagement of OKU in PEDi activities. PEDi's goal is to provide Internet access services on a collective basis, with a concentration on underdeveloped areas (MCMC, 2019). This indicates that PEDi projects prioritise outreach to underserved groups, such as people with special needs, single mothers, and young children. The staff members of PEDi should meaningfully interact with underserved groups in order to co-create programmes. However, engaging with and co-designing programmes with special groups and children need specialised training and skills. The Participatory Design community (<https://pdc2022.org/>) has many tools and training programmes to support researchers and practitioners in co-designing technologies and services with special groups and children and we can provide more details if needed.

RECOMMENDATIONS

Knowledge Broker (Use of Institutional Expertise, Knowledge, and Training Skills)

In our prior engagement with PEDi programmes, we suggested a model of Knowledge Broker for PEDi staff instead of mastering all skills. As a Knowledge Broker, the focus of PEDi staff is to work as a facilitator and their role is to understand and document the community needs, identify the partner organisations, develop partnerships and facilitate the partners in providing services to the local community. If PEDi staff are adequately trained as Knowledge Brokers, they will know and understand how to extend the stakeholders' network and bring institutional support into the community, allowing it to give high-quality training and services to local residents. For example, PEDi can act as a facilitator for the SULAM programme, which is a preferred form of experiential education for students. SULAM is supervised teaching and learning, where the students are engaged in activities that address community needs together with structured opportunities of learning, bringing together higher education institutions and the community. For example, please visit <https://www.youtube.com/watch?v=bzW5hZoyLdE>.

CONCLUSION

Although there are 900 PEDis in Malaysia, the results from this study, which covers only four (4) PPR selected area sites, still yield useful insights for various reasons. It is affirmed that PEDis are working well as community learning and services centres, and frequently act as a catalyst for social and economic change. The recommendations may help MCMC and the DUSPs in understanding and addressing the current challenges that the local communities and PEDi staff are facing. However, we also suggest an in-depth longitudinal study to uncover the relationship between the causes and effects of PEDi programmes. With the data we have, it is difficult to suggest a successful business model for PEDi; however, the recommendations suggest networking, community engagement and co-designing programmes with local communities, which will help in making the PEDis and PEDi staff resilient to community needs and demands.

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AN IMPACT STUDY OF THE MALAYSIA ICT VOLUNTEERS (MIV) PROGRAMME

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ABSTRACT

This research aims to measure, assess, and evaluate the impact of the Malaysia ICT Volunteers (MIV) Programme, which will provide a holistic understanding of the effectiveness of the MIV programme (including MIV roles and gap areas) and provide suggestions on effective ways to engage, ensure knowledge transfer and inculcate positive elements in the community. As part of this investigation, guided by the theory of planned behaviour (TPB), an online survey was employed to elicit the views of MIV volunteers and community members who have benefitted from the MIV initiatives. Two (2) questionnaires were developed for this purpose, and their face and content validity were assessed through focus group discussions with experts from MCMC. During the data collection period from August to October 2021, 329 valid cases from the MIV volunteers and 250 valid cases from the MIV community were gathered. Structural Equation Modelling (SEM) was used to determine the effectiveness of the MIV programme in terms of its impact on the community members' digital literacy and MIV volunteers' willingness to contribute to MIV initiatives. Statistical results confirmed that Attitude towards MIV and Perceived Behavioural Control exert significant influence on Intention to Volunteer, which in turn significantly influences the ICT Volunteering Behaviour of MIV volunteers. The findings related to the MIV community similarly reveal that their Attitude towards MIV and Perceived Behavioural Control have a significant impact on MIV Awareness (AW), which exerts a significant influence on their Digital Literacy Behaviour. On the other hand, Subjective Norms do not play a significant role in the participants' attitudes toward the MIV programme. Another important finding that emerged from this study is that the MIV programme is effective in promoting both ICT Volunteering Behaviour and Digital Literacy Behaviour by exerting a positive influence on the participants' willingness and attitude by increasing their confidence in the MIV programme's advantages. However, its benefits can be further enhanced by strengthening partnerships with schools, higher education institutions, private/government agencies, and non-governmental organisations (NGOs), as well as through more active social media utilisation for the promotion of ICT knowledge-sharing and engagement.



Keywords: MIV, Volunteers, Community, ICT, Theory of Planned Behaviour, Digital Literacy, Change of Behaviour, SEM

INTRODUCTION

The MCMC has undertaken many initiatives to raise awareness and educate the community. One of the initiatives is the Malaysia ICT Volunteers (MIV) programme, initiated in 2016. MIV aims to empower Malaysians to become digital citizens, besides supporting the 'Smart Digital Nation' initiative. It focuses on four (4) focus groups, namely MIV with community, MIV with school, MIV with Institutions of Higher Education (IHE), and MIV with international ICT volunteers (IIV).

The MIV community needs to impart the positive use of ICT knowledge and encourage digital adoption among themselves. In a nutshell, the MIV programme promotes and encourages digital and media literacy among citizens. Nevertheless, the effectiveness of the MIV programme in promoting positive behaviour in the usage of digital tools and media among the MIV community has yet to be assessed. It is very important to review and assess how effective it is in promoting digital literacy awareness. Thus, this study aims to measure the effectiveness of the MIV programme. This study has been carried out based on two (2) research models, ICT Volunteering Behaviour and Digital Literacy Behaviour, to gauge the effectiveness of the MIV programme based on the Theory of Planned Behaviour (TPB).

Problem Statement

There continues to be a persistent ICT Skills gap among underserved groups, exacerbated by the rising need to fall back on online interaction and practise social distancing as the numbers of those affected by the COVID-19 pandemic continue to rise. Thus, in the age of digital dependence, there is a growing need for ICT Skills among all portions of society to be able to operate within the new norms. Prior to the pandemic, MCMC had introduced a cadre of university volunteers known as the MIV to act as communications technology ambassadors. Although the activities of these volunteers have been curtailed during the pandemic, MCMC is hopeful of effective new norm workarounds and approaches to ensure the continued role of MIV as a human element in delivering awareness and ICT skills to ensure improved digital usage and adoption among identified communities. Since 2016, MIV as an empowerment platform aims at increasing the level of digital literacy, promoting digital inclusion, developing digital champions, reducing the digital divide and empowering digital citizenship.

INTRODUCTION



Research Objectives

The research aims to measure, assess and evaluate the impact of the MIV Programme, which will provide holistic understanding of the:

- a. Effectiveness of the MIV programme (including MIV roles and gap areas); and
- b. Provide suggestions on effective ways to engage, ensure knowledge transfer and inculcate positive elements in the community.

The following are the research objectives (ROs) which answer the specific research questions:

- 1 Evaluate the effectiveness of the MIV programme.
- 2 Conduct comparative studies (benchmark, best practices and metrics and indicators for digital literacy) with models in other countries.
- 3 Examine whether the programme has brought about a change in the population's attitudes and usage of the Internet in a safe and positive manner.
- 4 Assess and provide recommendations for enhancing the effectiveness of the MIV programme.

LITERATURE REVIEW

This section will review related work that studied the hypotheses (H1 to H8) addressing the relationship between TPB and volunteerism.

Attitude towards MIV has an influence on Intention to Volunteer

H1: Attitude towards MIV has an influence on Intention to Volunteer

According to the TPB, attitudes towards something can be operationalised using different labels depending on the context (Warburton & Terry, 2000). While Harrison (1995) failed to establish a link between attitudes and intention to volunteer, Okun and Sloane (2002) reported contrasting results. This view is supported by Maes, Leroy, and Sels (2014), who argued that, according to the TPB postulates, entrepreneurial intention and behaviour depend on three factors, one of which is attitude. Similarly, Lee, Reisinger, Kim, and Yoon (2014) and Chua, Meng, Ryu, and Han (2021) found that positive attitudes towards volunteering enhance the likelihood of working as a volunteer, even in the long term.

Subjective Norms has an influence on Intention to Volunteer

H2: Subjective Norms has an influence on Intention to Volunteer

Subjective Norms influence the Intention to Volunteer via social pressure, as individual behaviours are often guided by the opinions of significant others (Rhodes & Courneya, 2003). According to Brayley et al. (2015), Subjective Norms are essential for a person to decide whether to be a volunteer. Based on their study, one will continue to volunteer in the mentoring programme if they can feel the support of significant others towards them. Even in intention on purchasing green food, it was found that Subjective Norms have a significant correlation with the intention to purchase it (Ham, Jeger & Frajman Ivkovic, 2015). It is because people tend to consider other people's perspectives and expectations of their behaviour and are concerned about how people will behave. Thus, in making a decision, Subjective Norms have an influence on them.

LITERATURE REVIEW

Perceived Behavioural Control has an influence on Intention to Volunteer*H3: Perceived Behavioural Control has an influence on Intention to Volunteer*

According to the TPB, human behaviour is guided by behavioural, normative, and control beliefs, which will in turn give rise to perceived behavioural control (Ajzen, 2002). Randle and Dolnicar (2009) found that Perceived Behavioural Control was among the most important influential factors on volunteering intentions. France et al. (2014) similarly noted that Perceived Behavioural Control was strongly related to one's intention to donate blood. Perceived Behavioural Control was identified as a reliable predictor of Intention to Volunteer by several authors, including Warburton and Terry (2000), Lee, Won, and Bang (2014), and Reuveni and Werner (2015).

Intention to Volunteer has an influence on ICT Volunteering Behaviour*H4: Intention to Volunteer has an influence on ICT Volunteering Behaviour*

ICT Volunteering Behaviour is a special form of prosocial behaviour geared towards helping others, often through non-profit organisations (Law & Shek, 2009). According to Ajzen (2002), stronger functional beliefs related to volunteering will lead to a stronger Intention to Volunteer and thus the actual prosocial behaviour. In an earlier study, Ajzen (1991) found that intention is a reliable predictor of behaviour and these findings were later confirmed by Hagger, Chatzisarantis, and Biddle (2002), and Sheeran (2002). Teo and Lee (2010) also found that pre-service teachers' intention to use technology was influenced by their behaviour towards computers, while Ayob, Sheau-Ting, Jalil, and Chin (2017) established that intention leads to better waste management.

LITERATURE REVIEW

Attitude towards MIV has an influence on MIV Awareness

H5: Attitude towards MIV has an influence on MIV Awareness

According to the TPB, individuals' behaviour is directly influenced by their attitudes (Ranjbarian, Gharibpoor, & Lari, 2012). Wilkie (1994) defined attitude as "a learned predisposition to respond to an object in a consistently favourable or unfavourable way". Evidence also shows that those who use ICT systems in the volunteer programme are more likely to believe that they are of value to them in meeting the demands of their work than those who do not use ICT systems (Harrison, Murray, & MacGregor, 2004). As attitude is also affected by a person's level of familiarity with something, individuals are less likely to volunteer in unfamiliar initiatives. Consequently, millennials are more likely to participate in citizen science volunteer programmes because they have more positive attitudes towards technology, higher mobile phone use, and a great attraction to video games (Bowser et al., 2013).

Subjective Norms has an influence on MIV Awareness

H6: Subjective Norms has an influence on MIV Awareness

Subjective Norms are formed according to certain referents and motivations and are thus the key determinants of behavioural intention towards using technology (Akar, 2019). Foltz, Anderson, and Schwager (2007), as well as Wilson and Grant (2013), purport that influential groups are most relevant for the formation of subjective norms. Foltz, Anderson and Schwager (2007) explained that there are respondents who were not aware of computer usage policies because they are unconcerned with the opinions of others. Besides attitudes and Perceived Behaviour Control, Subjective Norms lead to an individual's intention to behave, including their level of awareness. According to Wilson and Grant (2013), as consumers feel pressured by certain groups, they might act according to those specific groups, thus creating awareness on the subject matter. They added that Subjective Norms are contributing factors in creating awareness for non-Muslims to purchase halal products as they consider food safety, cleanliness, etc.

LITERATURE REVIEW

Perceived Behavioural Control has an influence on MIV Awareness

H7: Perceived Behavioural Control has an influence on MIV Awareness

As explained by Ajzen (1991), Perceived Behavioural Control refers to the person's assessment of the behaviour to be performed in terms of its difficulty, making it more likely that an individual would engage in a task perceived as easy. Consequently, as noted by Foltz et al. (2007), Rezai, Teng, Mohamed, and Shamsudin (2012), and Record, Straub, and Stump (2019), greater awareness of certain subjects and tasks are correlated with the perception of greater behavioural control. A study by Record, Straub & Stump (2019) found that users of Instagram are unaware that a self-harm reporting feature exists within the platform. However, once they were informed about the tool, it was shown that Perceived Behavioural Control influenced high intention to use the tool and increased their awareness on addressing risks of self-harm.

MIV Awareness has an influence on Digital Literacy Behaviour

H8: MIV Awareness has an influence on Digital Literacy Behaviour

Given that awareness affects behaviour in everyday life (Schwarzer et al., 2007), Adebowale and Dare (2012) were motivated to establish if this also applies to broader concepts and found that a high level of awareness of the country's educational policy on ICT increases individuals' interest in this subject. Ibrahim, Fisol, and Othman (2017) similarly noted that greater awareness of religious norms promotes adherence to religious customs, even when choosing financial products. On the other hand, Xu, Wang, and Yu (2020) reported that environmental awareness influenced consumers' intention to purchase green products.

METHODOLOGY

This section describes the steps involved to achieve the study's objectives.

Research Design

FIGURE 1: RESEARCH DESIGN

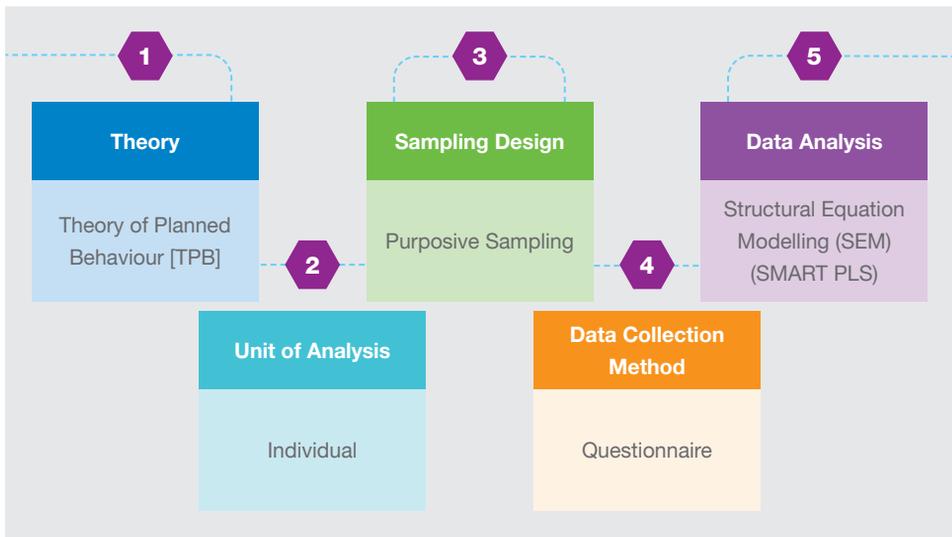


Figure 1 shows the research design used in this study. The quantitative approach was applied in this study based on the research objectives. To examine the relationships between variables, this study has proposed eight (8) hypotheses, four (4) for each research model. Thus, the use of such an approach is appropriate since quantitative studies usually investigate the relationships between variables and occasionally explain the causes of those relationships (Fraenkel & Wallen, 2009).

A survey is considered the most appropriate method because of its accuracy in gathering information and enabling researchers to generalise findings, from a sample to a population (Creswell, 2012). It is also appropriate for studies with large sample sizes, as it is expedient, cost-effective, and administratively efficient (Sekaran & Bougie, 2009). Finally, a survey is also relevant when querying respondents about their perceptions, opinions, and feelings (Shaughnessy, Zechmeister, & Zechmeister, 2012), which fits the nature of this study. The

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potential respondents were invited via email invitations, and an online survey is used to capture responses from respondents during the data collection period. This method allows this study to gain a faster and higher response rate while permitting real-time data monitoring (Cooper & Schindler, 2008).

Research Instrument

The outcome of the initial theoretical investigation was later used to develop the instruments to measure the effectiveness of the MIV programme. The instruments consist of a set of statements that were adapted from several sources and reformulated to suit the perspective of this study. Additionally, face validation, content validation, and a pilot study were employed during the instrument development stage to produce a valid and reliable instrument. The instrument comprises two (2) main parts, (i) Part A: Respondent's Demographic, and (ii) Part B: MIV programme's Evaluation.

To facilitate understanding among respondents, the items are presented in dual-language, Malay and English. The measurement scale for every construct is a seven-point numerical scale, which ranges from 1 to 7 ['1' extremely disagree to '7' extremely agree]. The scale is applied because

it provides a wider range and prevents respondents from selecting the neutral value. Thus, the chances of biasness will be decreased (Dwivedi et al., 2010).

Data Collection

Once a valid and reliable instrument had been successfully produced, the study proceeded with data collection. Primary data collection was conducted from August to October 2021. For the first category of respondents, MIV volunteers, the prospects were selected from the list of MIV volunteers given by the MCMC. The MIV volunteers answered the online survey through the URL link provided: <https://bit.ly/MIV-VOLUNTEER>, while for the MIV community, the URL link for the online survey was: <https://bit.ly/MIV-COMMUNITY>. The data collection for the second respondent category (general community) posed a challenge to the researchers because the list of participants was not available. In response to this limitation, the study employed two (2) alternative sampling procedures. First, MIV volunteers were reached through phone calls and emails and their personal connections with participants were recorded. Second, two (2) MIV programmes were conducted, and the responses were collected from among the participants at the end of the programmes.

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Data Analysis

The gathered data was analysed using statistical techniques to validate the research model that was developed based on the TPB model. Accordingly, the descriptive statistics and PLS-SEM were used to discover participants' change of behaviours prior to the MIV programme. This data analysis phase was done in two (2) stages. Both datasets first underwent data cleansing and preparation procedures, which focused on: i) outliers, ii) multicollinearity, and iii) normality. Next, the main analysis began with two (2) types of descriptive statistics, respectively, for respondents and constructs of this study. Finally, the PLS-SEM analysis was performed in two (2) stages: the Measurement Model and Structural Model. The research model based on the TPB Model was validated using PLS-SEM during the implementation phase. Finally, the results of the survey were reported and presented to the MCMC.



This study aims to investigate the behavioural changes triggered by MIV programmes for two categories of respondents, namely the MIV general community and volunteers. In order to make sense of the statistical findings produced in the prior stage, the interpretation and discussion were carefully and critically evaluated during the last stage of this study. This stage also highlighted

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the strengths and weaknesses of the current implementation of MIV programmes, along with suggestions for future improvements. These were done based on empirical findings yielded by the descriptive and inferential statistical analyses.

MIV Volunteers

At the end of the data collection period, this study managed to gather 415 responses. During the cleansing procedures, 86 deletions were made, thus producing 329 valid cases for the final PLS-SEM analysis.

Descriptive Statistics of Respondents

This section presents the summarisation of the demographic information of the respondents based on the returned questionnaires. The information obtained from the survey included the phone number, name, email, age, gender, race, highest education, and working status. From the survey, 329 respondents of MIV, aged between 18 years old and above 50 years old, have answered the questionnaires. Out of 329 respondents, 263 respondents are female volunteers (79.94 percent) and another 66 respondents are male

volunteers (20.06 percent). From the data collected, the questionnaires have been answered by most of the respondents with age range between, 31-40 years old, which is 150 respondents (45.59 percent), 96 respondents with age range between 26-30 years old (29.18 percent), 64 respondents with age range between 18-25 years old (19.45 percent), 18 respondents with age range between 40-50 years old (5.47 percent) and another one respondent with age > 50 years old (0.30 percent).

Moreover, respondents comprised different ethnicities where the majority of respondents are Malays (231 or 70.22 percent), while 97 respondents (29.48 percent) are from other races and ethnicities (Siam, Bajau, Banjar, Bidayuh, Bugis, Brunei, Cocos, Dusun, Iban, Iranun, Jawa, Kadazan, Kadazan Dusun, Kenyah, Kimaragang, Kedayan, Kayan, Kagayan, Lunbawang, Murut, Rungus, Salako, Sino, Sungai, Suluk, and Tidung) and only one (1) respondent (0.30 percent) is Chinese. In terms of education level, 183 respondents (55.62 percent) have a degree, 79 respondents (24.01 percent) have diplomas, 52 respondents (15.81 percent) have SPM//SPMV//STPM/Foundation, 12 respondents (3.65 percent) have a Masters, and one

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respondent each has a Sijil Kemahiran Malaysia, SRP and UPSR. In terms of work status, 220 respondents (66.87 percent) work full-time in the private sector. Of the remaining respondents, 26 volunteers are students (7.90 percent), followed by 25 volunteers (7.60 percent) working full-time in the government or in a government agency. In addition, 14 respondents (4.26 percent) are self-employed, 12 (3.64 percent) are housewives, 11 respondents (3.34 percent) are unemployed, two (2) respondents (0.61 percent) are self-employed and housewives, two (2) respondents (0.61 percent) are students and working in the government or in a

government agency and another two (2) respondents (0.61 percent) work part-time in government, while the remaining 15 respondents (4.56 percent) have other working status or hold two (2) jobs. Table 1 indicates a summarisation of the demographic information of the respondents.

329

respondents of MIV aged between 18 years old and above 50 years old have answered the questionnaires.



TABLE 1: SUMMARISATION OF DEMOGRAPHIC INFORMATION OF THE RESPONDENTS

ITEM	FREQUENCY	PERCENTAGE
Gender		
Female	263	79.94
Male	66	20.06
Total	329	100
Age		
18 - 25 years old	64	19.45
26 - 30 years old	150	45.59
31 - 40 years old	96	29.18
40 - 50 years old	18	5.47
>50 years old	1	0.30
Total	329	100

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ITEM	FREQUENCY	PERCENTAGE
Race		
Malay	231	70.22
Chinese	1	0.30
Other Races	97	29.48
Total	329	100
Highest Education		
Degree	183	55.62
Diploma	79	24.01
SPM/SPMV/STPM/ Foundation	52	15.81
Masters	12	3.65
<i>Sijil Kemahiran Malaysia</i>	1	0.30
SRP/PMR	1	0.30
UPSR	1	0.30
Total	329	100
Working Status		
Full-time private	220	66.87
Student	26	7.90
Full-time government/agency	25	7.60
Self-employed	14	4.26
Housewife	12	3.64
Unemployed	11	3.34
Self-employed & Housewife	2	0.61
Student & Full-time government / agency	2	0.61
Part-time government	2	0.61
Other working status	15	4.56
Total	329	100

FINDINGS AND ANALYSIS

Structural Equation Modelling

A. Assessment of Measurement Model

The measurement model is examined for construct reliability and validity. First, the construct reliability was assessed through Cronbach's Alpha (CA) and composite reliability (CR), with the recommended value of 0.700 (Hair et al., 2014). The result shows that Perceived Behavioural Control has the lowest construct reliability (CA=0.906, CR=0.925) while the highest belongs to Intention to Volunteer (CA=0.970, CR=0.977). Thus, the results illustrate that the indicators used to present the construct have desirable internal consistency reliability. Second, the constructs' validity was evaluated through convergent and discriminant validity. In this study, Average Variance Extracted (AVE) was tested to examine the convergent validity. The results indicate that the AVE values ranged between 0.640 to 0.894, which were all higher than the suggested value of 0.500. Given these results, the convergent validity is ascertained. This study employs the HTMT criterion for assessing the discriminant validity. The HTMT criterion is considered to be satisfied since all the values were below the accepted value of 0.900. Therefore, the discriminant validity is established.

B. Assessment of Structural Model

After the CFA that was done during the measurement model analysis, the structural model was examined. The conceptual model of this study consists of four (4) hypotheses. The R² value is 0.618 and 0.497 each for Intention to Volunteer and the ICT Volunteering Behaviour. It is suggested that 61.8 percent of the variance in MIV Awareness can be explained by Attitude towards MIV, Subjective Norms and Perceived Behavioural Control. Furthermore, 49.7 percent of the variance in Digital Literacy Behaviour can be explained by MIV Awareness. Table 2 summarises the assessment of the four (4) hypotheses in the structural model.

FINDINGS AND ANALYSIS

TABLE 2: HYPOTHESES IN THE STRUCTURAL MODEL

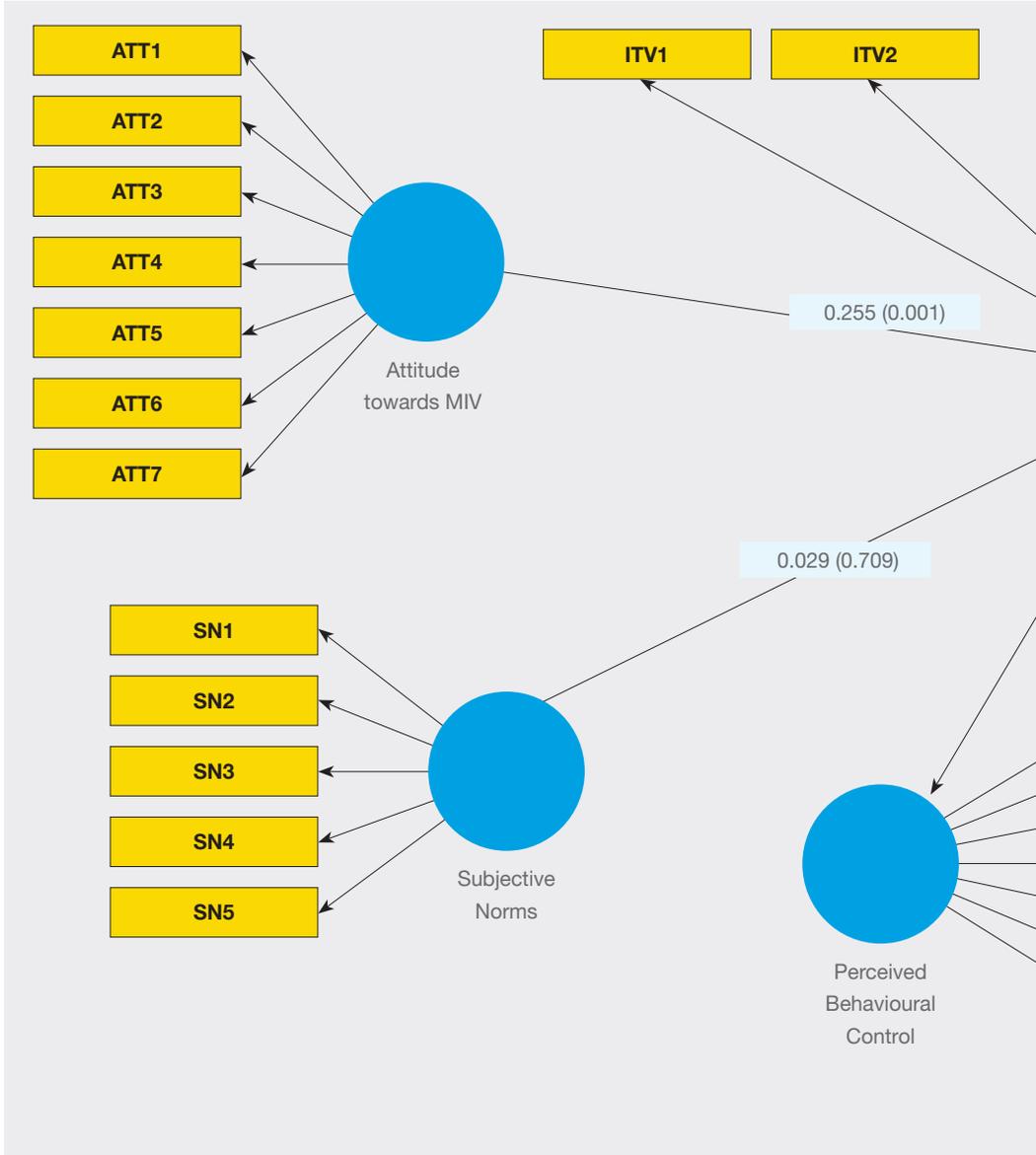
HYPOTHESIS		BETA	P VALUE	T VALUE	DECISION
H1	ATT->ITV	0.255	0.001***	4.409	Supported
H2	SN->ITV	0.029	0.709NS	1.400	Returned
H3	PBC->ITV	0.574	0.000***	7.664	Supported
H4	ITV->VB	0.732	0.000***	17.924	Supported

Note: 1.65 (* $p < 0.10$), 1.96 (** $p < 0.05$), 2.58 (***) $p < 0.01$), NS=Not Significant, ATT=Attitude towards MIV, SN=Subjective Norms, PBC=Perceived Behavioural Control, ITV=Intention to Volunteer, VB=Volunteering Behaviour

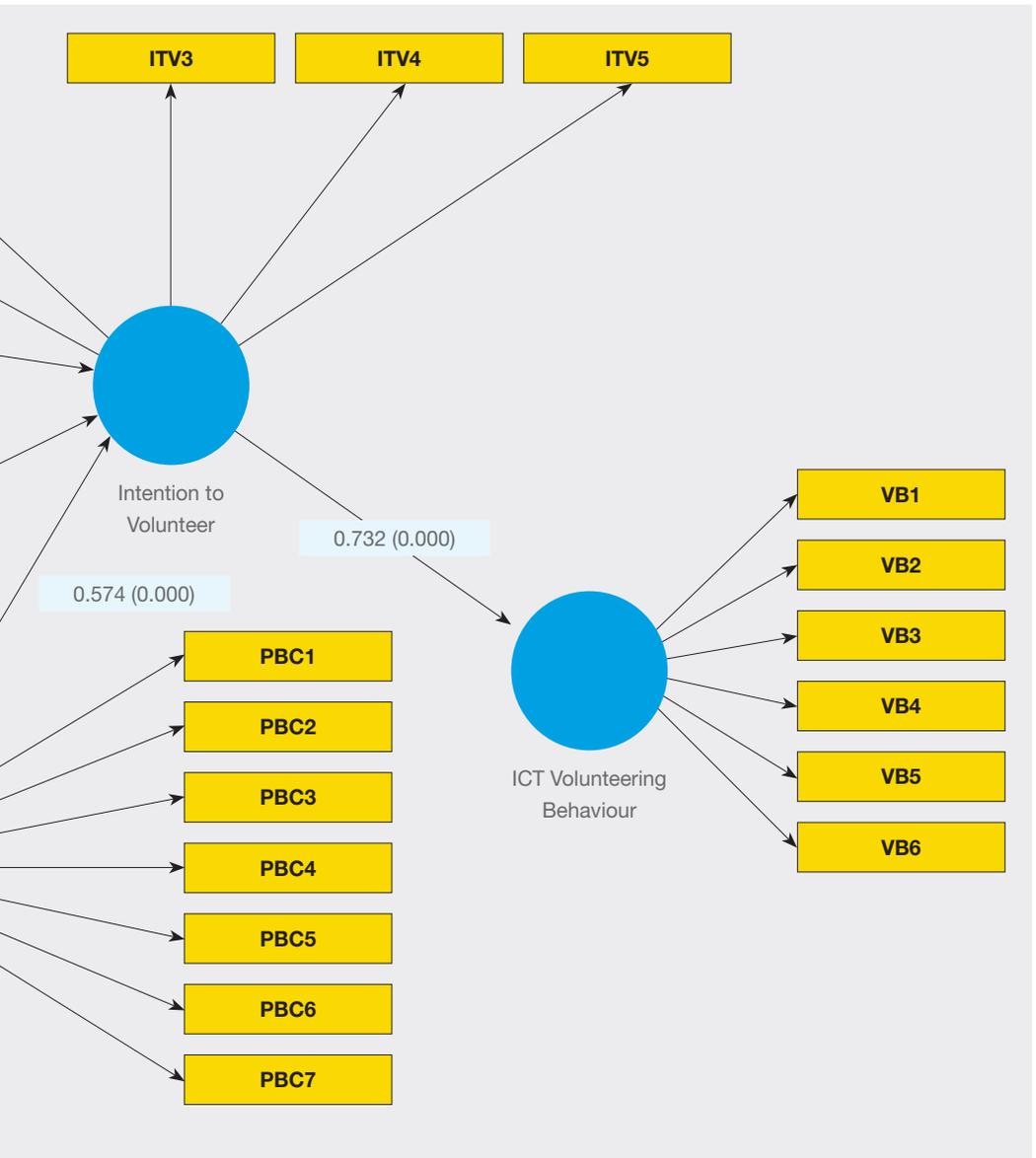
Hypothesis H1 postulated that ATT significantly influences the ITV among MIV volunteers. From the analysis, it was discovered that this relationship is significant ($\beta=0.255$, $t=4.409$, $p<0.01$). Therefore, this finding supports hypothesis H1. However, the result shows that SN did not significantly affect ITV ($\beta=0.029$, $t=1.400$, $p=0.709$), which returned the hypothesis H2. Meanwhile, hypothesis H3 posited that PBC would significantly influence the ITV. The analysis shows that this hypothesis is supported ($\beta=0.574$, $t=7.664$, $p<0.01$), thus supporting the proposed hypothesis. Similarly, hypothesis H4, which postulated a significant relationship between ITV and VB, is also supported ($\beta=0.732$, $t=17.924$, $p<0.01$) in this study. Figure 2 illustrates the bootstrapping analysis of the structural model for MIV volunteers.

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FIGURE 2: THE STRUCTURAL MODEL FOR MIV VOLUNTEERS



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Discussion

The study findings indicate that the MIV volunteers are committed to volunteering in their community, school, MIV, and institutions of higher education because they are aware of the importance of promoting digital and media literacy, thus supporting H1 and concurring with the results reported by Edelman (2014). ICT volunteering is increasingly recognised as an effective means of promoting digital literacy at the global level, as this allows local talents, ideas, insights, and resources to be leveraged to enhance innovation and influence community attitudes towards digital literacy. However, as volunteers' subjective norms (i.e. opinions of friends and family and other influential individuals) were found not to affect their intention to volunteer, H2 is not supported. These results are also countered by the findings reported by other authors (Ajzen, 2020; Chu, 2011; Wang, Min, & Han, 2016), possibly due to the differences in the research aims and the methodology adopted, or the participants' characteristics.

As noted by Knabe (2012), the decision to volunteer in MIV programmes is guided by individual judgement. This is consistent with the current study finding that Perceived Behavioural Control influences Intention to Volunteer, thus supporting H3. Nonetheless, to sustain volunteers' motivation, they

should be offered appropriate financial or non-financial rewards (Sander & Nummenmaa, 2021), and their efforts should be recognised more explicitly, via appreciation letters from MCMC superiors or similar initiatives. In terms of the MIV programme's ability to impact volunteering behaviour, the analyses revealed that this influence was exerted via Intention to Volunteer, thus supporting H4 and concurring with available evidence (Chandon, Morwitz, & Reinartz, 2005; Wang & Kim, 2017). Hence, to ensure that volunteers remain engaged in this and other ICT initiatives in Malaysia, strategies for improving their willingness, efforts, readiness, and confidence should be investigated.

MIV Community

At the end of the data collection period, this study managed to gather 296 responses. During the cleansing procedures, 46 deletions were made, thus producing 250 valid cases for the final PLS-SEM analysis.

Descriptive Statistics of Respondents

This section presents the summarisation of demographic information of the respondents based on the returned questionnaires. The information obtained from the survey included the phone number, name,

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email, age, gender, race, highest education and working status of the respondent. 250 respondents aged between 18 years old and above 50 years old have answered the questionnaires. Out of that number, 199 respondents are female (79.60 percent), and another 51 are male (20.40 percent). In terms of age, 180 respondents are between 18-25 years old (72 percent), 32 respondents are between 31-40 years old (12.80 percent), 19 respondents are between 26-30 years old (7.60 percent), 8 respondents are between 41-50 years old (3.20 percent), 6 respondent are > 50 years old (2.40 percent), 4 respondents are between 13-17 years old (1.60 percent) and one respondent is under 12 years old (0.40 percent). Respondents are represented by different races and ethnicities where 194 respondents are Malay (77.60 percent), 26 respondents (10.40 percent) Chinese, 25 from other ethnicities (10 percent) (Bajau, Bisaya, Brunei, Bugis, Bumiputra Sabah, Bumiputra Sarawak, Dusun, Iban, Iban Dayak, Kadazan, Kadazan Dusun, Lunbawang, Melanau, Other, Rungus) and another five (5) respondents (2 percent) being Indian.

For highest education attained, 159 respondents (63.60 percent) have SPM/SPMV/STPM/Foundation, 48 respondents (19.2 percent) have

degrees, 21 respondents (8.40 percent) have diplomas, eight (8) respondents (3.20 percent) attended secondary school, six (6) respondents (2.40 percent) have *Sijil (Kemahiran, Komuniti, etc.)*, five (5) respondents (2.00 percent) have a Masters, two (2) respondents (0.80 percent) attended primary school and one (1) has a PhD (0.40 percent). Lastly, in terms of work status, most of the respondents are students (68.40 percent). Of the remaining respondents, 33 work full-time in the private sector (13.20 percent), followed by 13 respondents (5.20 percent) who are self-employed, 10 respondents (4.00 percent) working full-time with the government/agency, seven (2.80 percent) working part-time with the government/agency, five (5) respondents (2.00 percent) who are homemakers and another 11 respondents (0.61 percent) with other types of jobs. Table 3 indicates a summarisation of the demographic information of the respondents.

250



respondents aged between 18 years old and above 50 years old have answered the questionnaires.

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TABLE 3: SUMMARISATION OF DEMOGRAPHIC INFORMATION OF THE RESPONDENTS

ITEM	FREQUENCY	PERCENTAGE
Gender		
Female	199	79.60
Male	51	20.40
Total	250	100
Age		
<12 years old	1	0.40
13 - 17 years old	4	1.60
18 - 25 years old	180	72.00
26 - 30 years old	19	7.60
31 - 40 years old	32	12.80
41 - 50 years old	8	3.20
>50 years old	6	2.40
Total	250	100
Race		
Malay	194	77.60
Chinese	26	10.40
Indian	5	2.00
Other Races	25	10.00
Total	250	100

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ITEM	FREQUENCY	PERCENTAGE
Highest Education		
PhD	1	0.40
Masters	5	2.00
Degree	48	19.20
Diploma	21	8.40
<i>Sijil (Kemahiran, Komuniti, etc.)</i>	6	2.40
SPM/SPMV/STPM/ Foundation	159	63.60
Secondary School	8	3.20
Primary School	2	0.80
Total	250	100
Working Status		
Student	171	68.40
Full-time private	33	13.20
Self-employed	13	5.20
Full-time government/ agency	10	4.00
Part-time government/ agency	7	2.80
Housewife	5	2.00
Others	11	4.40
Total	250	100

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Structural Equation Modelling

A. Assessment of Measurement Model

In this study, Perceived Behavioural Control has the lowest CA and CR compared to other constructs, with the value of CA 0.839 and CR 0.887, which reflects a good level of internal consistency. The results indicate that the AVE values ranged between 0.612 and 0.823, which were all higher than the threshold value of 0.500. Hence, convergent validity is established. The HTMT criterion is satisfied since all the values were below the cut-off value of 0.900. Thus, the measurement model demonstrated adequate discriminant validity.

B. Assessment of Structural Model

The conceptual model for MIV Community consists of four hypotheses. The R² value is 0.651 and 0.705 each for MIV Awareness and community Digital Literacy Behaviour, respectively. It is suggested that 65.1 percent of the variance in MIV Awareness can be explained by Attitude towards MIV, Subjective Norms and Perceived Behavioural Control. Furthermore, 70.5 percent of the variance in Digital Literacy Behaviour can be explained by MIV Awareness. Table 2 summarises the assessment of the four hypotheses in the structural model. Table 4 presents the analysis of the structural model, including MIV Awareness as a constant moderating factor.

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TABLE 4: THE RESULTS OF HYPOTHESIS TESTING

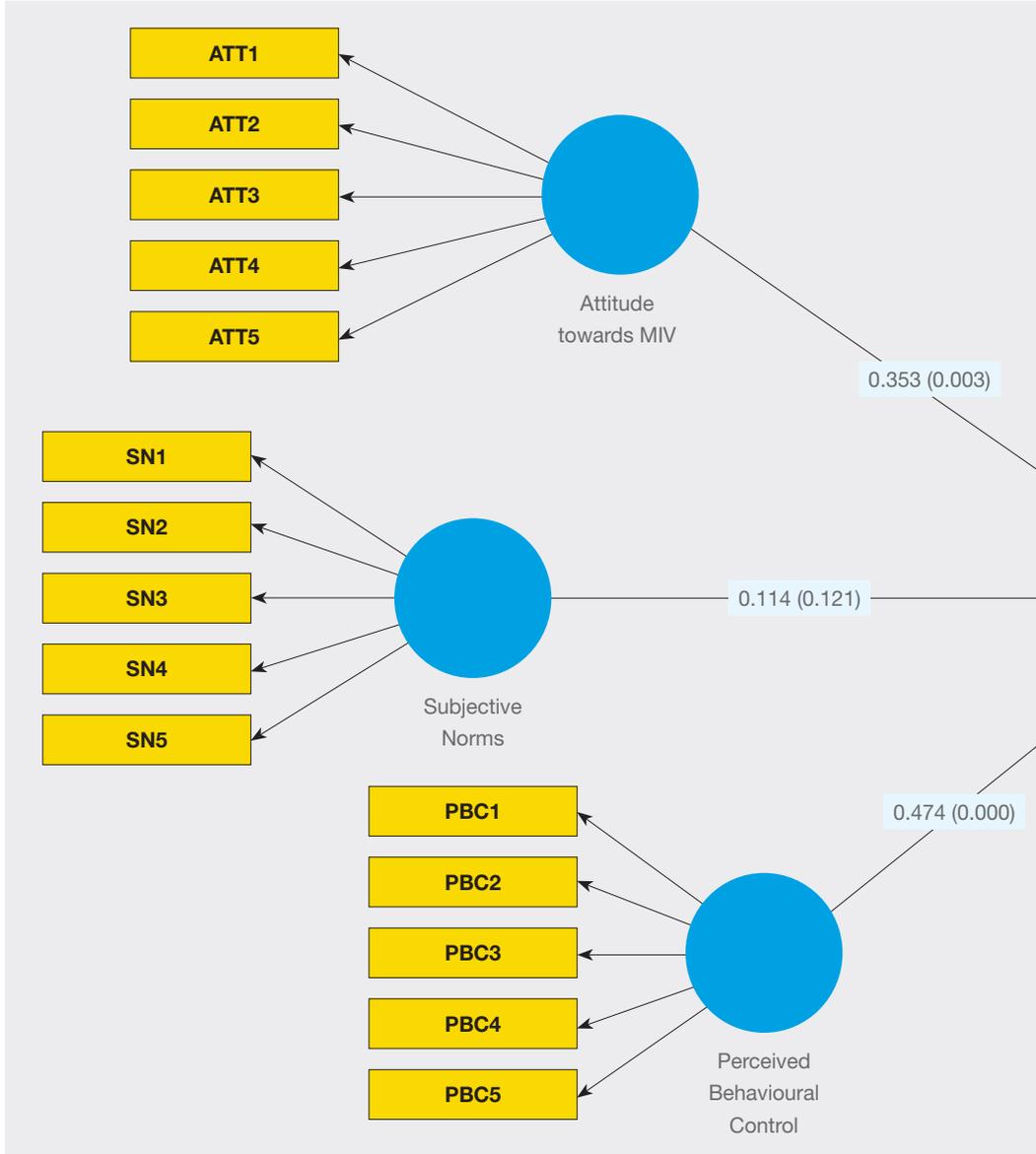
HYPOTHESIS		BETA	P VALUE	T VALUE	DECISION
H5	ATT - > AW	0.353	0.003	3.023	Supported
H6	SN - > AW	0.114	0.121	1.552	Returned
H7	PBC - > AW	0.474	0.000	3.738	Supported
H8	AW - > DLB	0.923	0.000	43.282	Supported

Note: ATT=Attitude towards MIV, SN=Subjective Norms, PBC=Perceived Behavioural Control, AW=MIV Awareness, DLB=Digital Literacy Behaviour

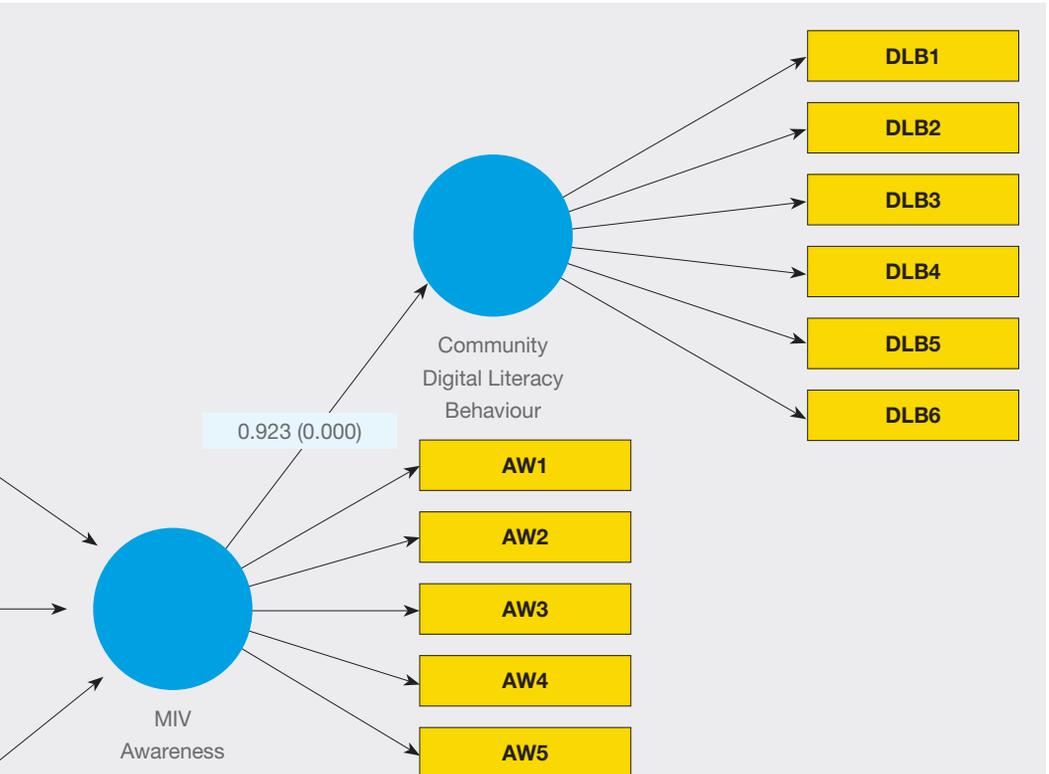
Hypothesis H5 stated that Attitude towards MIV leads to MIV Awareness. This hypothesis is supported and has a moderate path coefficient of 0.391 ($p < 0.05$). On the other hand, hypothesis H6 is returned, whereby Subjective Norms can be considered as having a weak and insignificant influence on MIV Awareness with a path coefficient of 0.114 ($p = 0.121$). Hypothesis H7 is supported as Perceived Behavioural Control also increases MIV Awareness with a path coefficient of 0.355 ($p < 0.05$). Similarly, MIV Awareness is found to have a strong direct effect and influence on Digital Literacy Behaviour with a path coefficient of 0.839 ($p < 0.05$). Thus, hypothesis H8 is also supported. Figure 3 illustrates the bootstrapping analysis of the structural model for MIV community.

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FIGURE 3: THE STRUCTURAL MODEL FOR MIV COMMUNITY



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Discussion

When the data obtained through the community survey was analysed, a significant and positive relationship between attitude towards MIV and MIV awareness emerged, thus supporting H5 and findings yielded by extant studies (Chu, 2011; Tuurosong & Faisal, 2014; Wang & Sun, 2010). Therefore, to further benefit from the MIV programme, community awareness of the MIV implementation needs to be increased. However, as noted before, MIV awareness was not influenced by the participants' subjective norms, due to which H6 was rejected. This finding is also discordant with the results reported by other authors (Knabe, 2012; Kritzinger, 2017; Makaure, 2019; Zhang et al., 2018), likely due to different research settings. Therefore, different means of improving community awareness are needed to fully realise the benefits of the MIV programme.

On the other hand, perceived behavioural control was found to positively and significantly influence community members' MIV awareness, as found in previous studies (Ajzen, 2020; Dwivedi et al., 2015). This finding is not surprising given that the MIV

programme focuses on current issues related to technology use, including Love Scam, E-Waste, Check Your Label, and Oversharing. Consequently, by continuing to offer relevant training and enhancing MIV programme quality and accessibility, the community will likely continue to find it relevant.

In support of H8, MIV awareness was found to exert a positive and significant influence on the community members' digital literacy behaviour, which is also in line with published data (Ajzen, 2015; Kazaure, 2019; Makaure, 2019; Mabitle & Kritzinger, 2021; Ranga et al., 2019). In particular, the majority of MIV participants concurred with the statements that the programme has enhanced the quality of their lives and has improved their ICT usage, including their understanding of how to share the information safely and ethically. As the majority of the MIV participants concurred that, upon programme completion, they had become more cautious about online risks and threats, the programme objectives had been met. This evidence can be used to develop other programmes, focusing on children, teenagers and the elderly, or other user groups.

RECOMMENDATIONS

The study findings revealed that MIV volunteers, as well as the MIV community, have changed their behaviour after attending the MIV programme, but their subjective norms (which are influenced by the external environment, and especially by peers and family members) do not exert a significant impact on the effectiveness of the MIV programme. Therefore, additional promotions are needed to reach out to MIV volunteers and participants in order to motivate them to serve as MIV programme influencers. Changing people's behaviour is a challenging task, as it requires synergy between diverse stakeholders as well as their willingness to actively engage in this MIV programme, especially schools, higher education institutions, private and public agencies, and NGOs. A strategic collaboration of these entities would create an excellent opportunity for MIV volunteers to network, engage, and reconnect with their peers while sharing their best practices with regard to digital literacy.

In addition, the MCMC should consider customising the MIV digital literacy module to different age groups and aptitude levels, starting with children, teenagers, and the elderly, as this will increase community interest in participation as well as the benefits

derived from the programme. To sustain volunteer motivation, it is necessary to adopt a suitable reward system, while continuing to improve the quality of the ICT programme by partnering with diverse stakeholders such as schools, higher institutions, private and public agencies and NGOs.

To understand deeper in terms of the level of each construct in certain demographic groups, richer data is required for both categories of respondents, MIV volunteers and the general community (participants). Accordingly, richer data means that deeper analyses could be done, and more meaningful knowledge could be obtained. Using the same research approach (survey), some extra demographic information and required MIV topics are suggested to be collected in future research for further understanding of behaviours and characteristics of specific demographic groups. For example, a more advanced analysis like cross tabulation could be done with the availability of certain demographic data like states, races and ethnicities, as well as age groups. In addition, the availability of the data related to the required MIV topics would be useful to map the preferences with the available resources/expertise.

CONCLUSION

As MIV programmes rely on volunteers, it is essential to ensure their continued commitment, which can be achieved by a better-designed reward and recognition system, as well as opportunities to network and collaborate with ICT volunteers in other parts of the world. Moreover, even though digital literacy is important for the social growth of communities and the economic prosperity of nations, the effectiveness of such ICT programmes has not been extensively studied. This gap in extant knowledge was addressed in the present study. Its findings indicate that attitude towards MIV, subjective norms, perceived behavioural control, intention to volunteer, and ICT volunteering behaviour can potentially influence digital and media literacy at both individual and community levels. Thus, it is essential to develop new ways of promoting the MIV programme to the wider community to increase the number of potential participants as well as MIV volunteers. It is also important to forge relationships with relevant entities that can provide knowledge and resources for the MIV programmes.

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FREE-TO-AIR CHANNEL: USES AND GRATIFICATION OF USERS IN SABAH

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ABSTRACT

With technological advancement in the broadcasting industry, Malaysia has transformed its traditional analogue Free-to-Air Terrestrial TV broadcasting to digital TV. This rapid change has propelled the Malaysian government to introduce the myFreeview Service with a digital-quality Free-to-Air channel, thus enabling users to view higher-quality programmes compared to the analogue. Despite the introduction, the penetration rate of smartphones in Malaysia (nearly 94 percent of the population uses smartphones) has given users a better option which includes personal and individual demand for content. However, in Sabah, accessibility to the Television Receive Only (TVRO) Channel and service is easily attainable, especially in the remote areas as well as border areas which are located near Indonesia. This research aims to investigate the Uses, Motivation and Gratification of users in Sabah with regard to the myFreeview Service. This research applied the quantitative method with 533 respondents participating in data collection whereby survey forms were distributed by an enumerator via WhatsApp. The data has been analysed using Statistical Package for Social Sciences. The data analysis shows that respondents who utilised the myFreeview service experienced better uses and gratification compared to normal Free-to-Air Channel users.

INTRODUCTION

Free-to-Air Television (FTA TV) is one of the main channels of information and entertainment for most Malaysians. However, with constant changes in technology and easy access to the Internet, most of the public has changed and switched their preference from watching FTA TV to Internet-Based TV services such as tonton.com.my.

This was subsequently followed by the Malaysian government switching from analogue TV to digital TV. The introduction of myFreeview TV via the National Broadcasting Digitalisation Project has allowed high-quality content to be offered to users, even reaching rural and remote areas of Malaysia such as Sabah.

Most users are relatively unaware of the accessibility to the terrestrial-based FTA TV, which in turn has resulted in low demand for myFreeview TV. Apart from that, their selective preference for, as well as high participation in, social media have contributed to this situation. In addition, it has been established through general observation that Sabah is one of the states with the largest number of illegal TVRO users. Two (2) major factors that have contributed to this phenomenon are: geographical attributes (i.e. topography, proximity to neighbouring countries)

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and technological aspects (i.e. 'open sky', borderless world, easier and cheaper access to equipment, etc.). Despite the efforts by the Malaysian government to provide more infrastructure to enable high-quality digital channels accessibility, it can be seen that the acceptance rate of the public is low. This is due to the lack of other facilities, especially in rural areas, such as electricity, as well as financial constraints faced by households which may deter them from purchasing a TV set and Set Top Box.

Meanwhile, to improve and enhance the quality of FTA TV channels in Malaysia, the Government of Malaysia introduced the myFreeview Service in June 2017 to facilitate the migration from analogue to digital TV broadcasting. Currently, users may access the myFreeview Service via the connection of a TV to a Set Top Box or via an integrated Digital TV with a built-in tuner installed to an indoor/outdoor antenna. The service can be obtained with a one-off payment covering 18 channels.

This research aims to understand the phenomenon of the Uses, Motivations and Gratification factors of respondents in Sabah. Therefore, this research is able to:

1. Understand the phenomena of user preference with regard to myFreeview
2. Review the content of myFreeview according to user preference
3. Review the accessibility and connectivity of myFreeview
4. Review the economic factors (e.g. device price) to assist rural area users, especially the B40 group

Problem Statement

Although the penetration of FTA TV in Malaysia, especially in East Malaysia, has been relatively high for decades (since 1996), the aforementioned cable and satellite subscription services (Pay TV) such as ASTRO have penetrated more than 70 percent of Malaysian households. The convergence has facilitated the digitalisation of television systems and stimulated the take-up of Internet access, which is bundled with cable television services. In line with that, the Malaysian government, via the Ministry of Information and Multimedia, has taken this opportunity to introduce myFreeview TV.

INTRODUCTION

The aforementioned cable and satellite subscription services (Pay TV) such as ASTRO have penetrated more than

70%

of Malaysian households.

In Malaysia, it is reported that (the country) has nearly

94%

penetration of smartphone users (Statistica.com).

It is also worth noting that Netflix and even iFlix, as well as other local YouTube-based content have greatly expanded in the market, especially among smartphone users. In Malaysia, it is reported that (the country) has nearly 94 percent penetration of smartphone users (Statistica.com), and this figure indicates that the switching from conventional local media direct content-based TV (FTA TV) to personalised and demand-based content (user-generated content) is most sought after, based on the characteristics of these channels which cater for the “demand and on-the-go” lifestyle.

In this case, when a particular group of audience seeks out media services, they would choose what can gratify their various needs. Therefore, this research is designed to explore and investigate the issue based on a set of pre-identified parameters (see Table 1). This approach has the ability to capture the main features of FTA TV users, and also to provide a market context and perspective. Thus, the outcome will be useful to facilitate a better understanding of consumption patterns and motivations behind the use of myFreeview in Sabah.

INTRODUCTION



Research Objectives

This research is mainly to establish the usage patterns of myFreeview in Sabah. Using these identified patterns as the baseline data, investigation of the motivational factors that drive consumers to use myFreeview, as well as of their Gratification level is then carried out. The usage patterns will be examined based on several categories: socio-culture backgrounds, socio-economic standards and demographic characteristics. Specifically, this research aims to:

- 1 Identify the usage pattern of myFreeview among users in Sabah
- 2 Identify the Gratification level of myFreeview users in Sabah
- 3 Examine the relationship between usage pattern and gratification level of myFreeview users in Sabah
- 4 Identify the level of readiness of users in Sabah towards the myFreeview service

LITERATURE REVIEW

The Uses and Gratifications Model has been cited and utilised in different research frameworks related to the utilisation of media ranging from FTA via mobile (Shin, Kim, Han & Lee, 2020); digital media (Pantic, 2017); media and social networks (Gan & Li, 2018; Florenthal, 2015; Gan & Wang, 2015); and photosharing via social media (Malik, Dhir & Nieminen, 2016); to education via social networks (Gruzd Haythornthwaite & Paulin, 2018); media technology (Lin, Hsu, Chen & Fang, 2017); and involvement of NGOs in Human Crisis (Mansoor & Ahmad, 2020), including cross-industry sectors such as tourism (Ho & See-To, 2018) and sports (Whittle, 2018), as well as measuring brand awareness (Northfelt, 2020).

LITERATURE REVIEW

From the 1960s to the 1980s, the Uses and Gratifications approach flourished as a major strand of mass communication scholarship. According to its adherents, instead of studying what media does to people, we should be asking what people do with the media, particularly the Gratifications they aim to derive from the fare on offer (Blumler, 2019). Ruggerio (2000) claimed that the U&G theory has provided “a cutting-edge approach in the initial stages of each new communication medium: newspaper, radio, television, and now the Internet” (p. 27). The theory was first developed in research on the effectiveness of the radio in the 1940s. Mainly, it focuses on the explanations for audience members’ motivations and associated behaviours. Thus, the Uses and Gratifications Theory is relevant to measure myFreeview acceptance and Gratification.

The evolution of Information and Communications Technology (ICT) has led to the rapid development of all sorts of innovative products in the television industry. This includes the Free-to-Air (FTA) Broadcast Television service which was introduced to the market as an alternative to cable and satellite TV. FTA TV enables any household with appropriate digital equipment to receive and watch TV content without having to subscribe or pay ongoing fees (Züll, 2017).

Much research has been conducted on Free-to-Air Channels, such as Menezes and Carvalho (2009) who studied the impact of FTA TV on the digital terrestrial TV industry, Rothbauer and Sieg (2011) who examined the welfare effects of public and private broadcast information in the context of the FTA TV market, and Peitz and Vallett (2008) who investigated the difference in content and advertising between Pay TV and FTA TV.

Recently, several studies have also been conducted to understand users’ adoption of and behaviours in using digital TV. A study conducted by Ariansyah and Yuniarti (2021) found that household income, educational level and awareness were among the factors that influenced consumers’ adoption of FTA TV. On the other hand, Wahdaniah et al. (2020) claimed that satisfaction with the digital set top box and picture quality, perceived ease of use, the socialisation factor, education and age were statistically and significantly related to FTA TV use behaviour. Meanwhile, Frank and Milković (2018) found that intention to use electronic guides on FTA TV was influenced by perceived usefulness, perceived ease-of-use, personal habit and cost of service.

LITERATURE REVIEW

In understanding consumers' adoption of new technology, prior studies have shown that perceived usefulness and ease-of-use are the two (2) frequently mentioned factors which have significant influence on consumers' attitudes towards the new technology and intention to use it. Perceived usefulness is the degree to which a person believes that the technology is useful for what they want to do while perceived ease-of-use refers to the degree to which a person believes that using that technology would be effortless (Camilleri & Falzon, 2020; Davis, 1989).

Studies like Camilleri and Falzon (2020), Tefertiller (2020), Yang and Lee (2018) and Cha (2013) have shown that perceived usefulness is one of the significant antecedents of intention to use streaming media services. Daud et al. (2018) claimed that perceived usefulness of Internet Protocol Television (IPTV) services mediates between customer trust and customer loyalty and satisfaction.

Previous studies have also shown that individuals' perceived ease-of-use was found to have a positive and significant effect on their intention to use online streaming services (Camilleri & Falzon, 2020), smartphones (Joo & Sang, 2013), e-book readers (Jung,

Chan-Olmsted, Park, & Kim, 2011), IPTV services (Daud et al., 2018) and online social TV (Habes, 2019). Amin et al. (2014) revealed that perceived ease-of-use and perceived usefulness were both significantly related to user satisfaction with mobile websites.

The UGT theory suggests that consumers' media choice depends on their personal motives and a particular media's ability to fulfil certain gratifications and needs (Luo, 2002). Based on this notion, Li (2013) claimed that some audiences preferred Internet TV over conventional TV because of process gratification where they can choose the place, use time wisely via digital devices, or pick specific episodes freely to watch the shows. Marinelli and Andò (2014) found that people chose social TV because of content and social gratification due to their needs for information, self-expression and social interaction. Similarly, Hwang and Lim (2015) revealed that some viewers chose social TV in watching live sports programmes because of their needs for social presence and were influenced by information and excitement motives.

Habes (2019) also found that personal identity, information seeking, social interaction, and entertainment were among the gratifications obtained

LITERATURE REVIEW

through the use of social media. Camilleri and Falzon (2020) added that individuals sought emotional gratifications from online streaming technologies, as they allowed them to distract themselves into a better mood, and to relax in their leisure time.

The level of use of a particular media and gratifications obtained from it are also different based on socio-demographic factors (Choi, Kim, & Mcmillan, 2009; Alam, Alam, Mushtaq, Khatun, Arifeen, & Mamun, 2019; Cardon, Deforche, Owen, De Cocker, Wijndaele, & De Bourdeaudhuij, 2011; Kalmus, Realo, & Siibak, 2011).

In the context of FTA TV, Ariansyah and Yuniarti (2021) claimed that family income is a relevant predictor for the use of digital TV. Wardahnia et al. (2020) stated that users' behaviour towards digital TV can also be influenced by their age and education. Similarly, Züll (2017) claimed that viewers' likelihood to use social media to share opinions and information about programmes on FTA TV varied according to viewers' age, education, gender and income.

Based on the review above, it is evident that audiences' media choice can be influenced by how they perceive the uses (usefulness and ease of use) of a particular media and their motivational needs (social, information and emotional). In addition, the level of media use and gratifications is different based on socio-demographic factors. Nevertheless, only few studies have investigated the influence of these factors in the context of FTA TV (Ariansyah & Yuniarti, 2021; Wardahnia, Yuniarti, & Ariansyah, 2020; Frank & Milković, 2018).

Not much has been done to understand how these factors contribute to the adoption of FTA TV among Malaysian viewers, especially myFreeview TV Services. Therefore, this study was conducted to understand to what extent audiences' perception of the Uses of FTA TV and their motivational needs contributed towards Gratification upon usage of FTA TV in the context of TV audiences in Sabah.

METHODOLOGY

The method adopted in this study is the quantitative research method, using a survey, with the correlation method to identify the relationship levels among the constructs of the study, as suggested by Creswell (2013). This study examined Uses and Motivations factors as the independent variable as well as Gratification as a dependent variable. This research utilises a Google Form of self-administered questionnaires distributed to 384 respondents to collect data based on the benefits enumerated by Bernard (2011). Enumerators were appointed for this research in eight (8) different zones to assist data collection, especially to identify the right respondents representing each zone. Finally, 533 respondents participated in the exercise during two (2) weeks of data collection conducted in early August 2021. The questionnaire used 5-point Likert scale and was translated to *Bahasa Melayu* for ease and familiarity of the majority of respondents. Prior to data collection, the validity process of the instrument as well as ethical approval was implemented on 1 July 2021 via a virtual meeting between the researchers and the MCMC Panel from the Research Enterprise Department.

Based on the pilot and actual study conducted, the researchers have verified the instrument to be reliable (Cronbach alpha = 0.979) with a specific

reliability for uses (Cronbach alpha = 0.969), motivations (Cronbach alpha = 0.918) and gratifications (Cronbach alpha = 0.968) and valid for all items including uses (KMO-Bartlett = 0.961), motivations (KMO-Bartlett = 0.861) and gratifications (KMO-Bartlett = 0.954).

FINDINGS AND ANALYSIS

Descriptive Analysis of Specific Research

Question 5 - Overall Free-to-Air (n = 533) Users versus myFreeview Users (n = 214)

Based on the mean score (Table 1), the researchers found that the users' perception of usage among respondents who had installed the myFreeview Set Top Box (n = 214) indicated a higher Uses score compared to overall respondents (n = 533). These results were applicable to all 29 items measured under the Uses parameters. At the same time, the data showed that the Gratifications level of users was higher among respondents (n = 214).

The research can therefore infer that the level of satisfaction of users with the myFreeview Set Top Box services fulfils its role as a platform serving multiple objectives.

FINDINGS AND ANALYSIS

The level of Uses and Gratification for FTA Channels in conducting the research (mean = 3.92 versus 4.15) shows an increased satisfaction level of users. Even in a comparative analysis, the data shows myFreeview achieved a mean score of 3.97 versus 4.26, thus further supporting this hypothesis.

When FTA channels are utilised for Formal or Informal education, both comparative analysis show an increase in the Uses value (mean score = 3.70 and 3.99). Similarly, the value saw an increase in Gratification (mean score 3.90 and 4.16). The myFreeview score also supports this data pattern which shows an increased value between the Uses and Gratification value (mean score = 3.66 to 3.91) for the Formal Education and Informal Education score (mean score = 4.04 to 4.18). Communication is the factor for Uses achieving a mean score of 3.88 versus 4.04 while Gratification hit a higher value with a mean score of 4.09 versus 4.17, which proves that FTA channels and myFreeview play their roles as a platform to disseminate information.

When comparing between mean score value for Interaction with Family Members (which increased by one (1) percent for Uses and three (3) percent for Gratification), Interaction with Others (which increased by one (1) percent for Uses and seven (7) percent

for Gratification) and Socialising with Others (which increased by two (2) percent for Uses and one (1) percent for Gratification), the data shows a reverse trend.

Under the item Observation towards Source Credibility for Uses, the mean score increased from 4.12 to 4.17 while the Gratification mean score increased from 4.19 to 4.23. Observation to Overcome Anxiety also showed a mean score increase from 4.03 to 4.11 for Uses and 4.12 to 4.18 for Gratification.

In the aspect of entertainment, the comparison value for the Uses mean score was 4.42 versus 4.46 and the Gratification mean score was 4.41 versus 4.47. For Social Utility, the mean score for Uses was 4.16 versus 4.19 while for Gratification the mean score was 4.19 versus 4.24.

The data shows an increase in mean scores for items on searching for information on various topics such as Religion (Uses mean score = 4.07 to 4.14; Gratification mean score = 4.12 to 4.30), Social Issues (Uses mean score = 4.21 to 4.26; Gratification mean score = 4.29 to 4.37), Economy (Uses mean score = 4.30 to 4.36; Gratification mean score = 4.36 to 4.44), Politics (Uses mean score = 4.27 to 4.37; Gratification mean score = 4.33

FINDINGS AND ANALYSIS

to 4.42), Culture (Uses mean score = 4.27 to 4.29; Gratification mean score = 4.34 to 4.40) and Health (Uses mean score = 4.34 to 4.39; Gratification mean score = 4.40 to 4.50). This proves that FTA channels are valid and credible sources to search for information.

Users watched programmes on FTA channels in order to Release Emotional Pressure (Uses mean score = 4.12 to 4.14; Gratification mean score = 4.17 to 4.22) as well as to Rest & Relax (Uses mean score = 4.27 to 4.31; Gratification mean score = 4.34 to 4.40). They also helped in Getting Rid of Boredom (Uses mean score = 4.21 to 4.22; Gratification mean score = 4.27 to 4.34). The data, however, showed a reverse pattern when comparing the factor of Isolation from Family Members (Uses mean score = 2.94 to 2.85; Gratification mean score = 3.14 to 3.07) which showed a decrease in Uses and Gratification.

The factor accessibility to information related to items such as Easy Access to Information (Uses mean score = 4.05

to 4.02; Gratification mean score = 4.14 to 4.19), Faster Access to Information (Uses mean score = 3.96 to 3.98; Gratification mean score = 4.10 to 4.14), Access to Reliable Information (Uses mean score = 4.17 to 4.24; Gratification mean score = 4.27 to 4.39), Product Information (Uses mean score = 4.01 to 4.08; Gratification mean score = 4.16 to 4.28), Technical Support Information (Uses mean score = 3.97 to 4.03; Gratification mean score = 4.07 to 4.17) and Access to Material that is not available via the internet (Uses mean score = 3.99 to 4.00; Gratification mean score = 4.13 to 4.14).

For the comparative mean score on Business/Customer Online Transactions, the Uses mean score was 3.51 to 3.57 and the Gratification mean score was 3.77 to 3.84, which showed that users in Sabah have a low Uses and Gratification value for home shopping channels like WowShop and GoShop, with values below the mean score of 4.0.

FINDINGS AND ANALYSIS

TABLE 1: MEAN SCORE COMPARISON BETWEEN OVERALL RESPONDENTS (N = 533) AND myFREEVIEW SET TOP BOX RESPONDENTS (N = 214)

ITEM	OVERALL SCORE (n = 533)		myFREEVIEW SCORE (n = 214)	
	USES	GRATIFICATION	USES	GRATIFICATION
Conducting a Research	3.92	4.15	3.97	4.26
Formal Education	3.70	3.90	3.66	3.91
Informal Education	3.99	4.16	4.04	4.18
Communication	3.88	4.09	3.95	4.17
Interaction with Family Members	4.02	4.23	4.07	4.35
Interaction with Others	3.77	3.77	3.82	4.04
Socialising with Others	3.73	3.99	3.80	4.03
Observation towards Source Credibility	4.12	4.19	4.17	4.23
Observation to Overcome Anxiety	4.03	4.12	4.11	4.18
Entertainment	4.42	4.41	4.46	4.47
Social Utility	4.16	4.19	4.19	4.24
Searching for Information (Religious)	4.07	4.21	4.14	4.30
Searching for Information (Social)	4.21	4.29	4.26	4.37
Searching for Information (Economy)	4.30	4.36	4.36	4.44
Searching for Information (Politics)	4.27	4.33	4.35	4.42
Searching for Information (Culture)	4.27	4.34	4.29	4.40

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ITEM	OVERALL SCORE (n = 533)		myFREEVIEW SCORE (n = 214)	
	USES	GRATIFICATION	USES	GRATIFICATION
Searching for Information (Health)	4.34	4.40	4.39	4.50
Rest	4.25	4.34	4.31	4.40
Release Emotional Pressure	4.12	4.17	4.14	4.22
Isolation from Family Members	2.94	3.14	2.85	3.07
Relationship Withdrawal from Others	2.95	3.16	2.86	3.09
Get Rid of Boredom	4.21	4.27	4.22	4.34
Access to Material that is not available via the internet	3.99	4.13	4.00	4.14
Easy Access to Information	4.05	4.14	4.02	4.19
Faster Access to Information	3.96	4.10	3.98	4.14
Access to Reliable Information	4.17	4.27	4.24	4.39
Product Information	4.01	4.16	4.08	4.28
Technical Support Information	3.97	4.07	4.03	4.17
Business/Customer Online Transactions	3.51	3.77	3.57	3.84

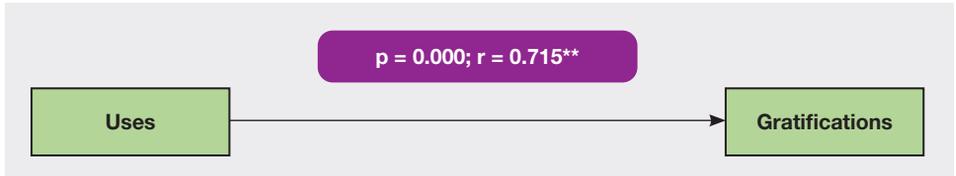
Inferential Analysis of Specific Research

Question 4 - Inferential Analysis of Uses and Motivations towards Gratifications among Users in Sabah (n= 533)

From the data analysis (Diagram 1), the researchers found that the Uses factor has a significant relationship with Gratifications and both variables have a medium level of correlation ($p = 0.000$, $r = 0.715$), whereas Motivation has a significant relationship with Gratification with a medium level of correlation ($p = 0.000$, $r = 0.564$).

FINDINGS AND ANALYSIS

DIAGRAM 1: CORRELATION BETWEEN USES AND GRATIFICATIONS



From Table 2, all 29 items under Uses indicated a significant relationship with Gratification items, with a medium level of correlation. This result indicates that all items related to Uses have an influence on Gratification among users of myFreeview in Sabah.

TABLE 2: INFERENTIAL ANALYSIS OF RELATIONSHIP BETWEEN ITEMS (USES TO GRATIFICATIONS)

Item	P Value	R Value (two-tail)
Conducting research on any issues	0.000	0.465
Formal learning purposes	0.000	0.488
Informal learning objectives	0.000	0.502
To Communicate	0.000	0.508
Interaction with Family Members	0.000	0.499
Interaction with Other individuals	0.000	0.562
Socialising with Others	0.000	0.535
Observations on the credibility of information sources	0.000	0.515
Observation to address Anxiety	0.000	0.585
Seeking Entertainment	0.000	0.452
Social Utility channels	0.000	0.563

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Item	P Value	R Value (two-tail)
Searching for Information (Religious)	0.000	0.540
Searching for Information (Social)	0.000	0.569
Searching for Information (Economy)	0.000	0.549
Searching for Information (Politics)	0.000	0.562
Searching for Information (Culture)	0.000	0.555
Searching for Information (Health)	0.000	0.580
Stimulating Mind	0.000	0.467
Rest / Take a break	0.000	0.481
Releasing Emotional Stress	0.000	0.330
Withdraw from contact with Family Members (Isolation)	0.000	0.352
Get Rid of Boredom	0.000	0.457
Access to Material that is not available via the internet	0.000	0.604
Easy access to information	0.000	0.618
Faster access to information	0.000	0.621
Access to reliable information	0.000	0.570
Seeking Product Information	0.000	0.618
Seeking Technical Support Information	0.000	0.630
Conducting Business/Customer Online Transactions	0.000	0.547

FINDINGS AND ANALYSIS

Non-myFreeview User Readiness to Accept myFreeview Service

Based on the research data (Table 14), 76.4 percent of respondents have heard about the myFreeview Service which includes the current non-users. From the data, it is found that 59.7 percent did not use the myFreeview TV service. Among those who did not use the service, the majority of the respondents, representing 73.5 percent, were ready to use the myFreeview Service.

76.4%

of respondents have heard about the myFreeview Service.

59.7%

of respondents did not use the myFreeview TV service.

73.5%

of respondents were ready to use the myFreeview Service.

TABLE 3: NON-myFREEVIEW USER READINESS TO ACCEPT myFREEVIEW SERVICE

Items (n = 533)	Percentage	
	Yes	No
Heard about myFreeview Service	76.4	23.6
Has watched TV via myFreeview Service	62.3	37.7
Currently Using myFreeview Service Set Top Box (n = 214)	40.3	59.7
Readiness to utilise myFreeview Service	73.5	26.5

ANALYSIS AND DISCUSSION

Descriptive Analysis (Means & Frequency Findings)

There is a high perception of uses and gratification among myFreeview Set Top Box users compared to overall respondents, and those who are not using myFreeview Set Top Box indicated that the digital quality would affect their uses and gratification.

A majority of respondents, especially non-users of the myFreeview Set Top Box, had used FTA Channels before and were satisfied with the quality of channels provided via the myFreeview Service. The majority (73.5 percent) are ready to use the myFreeview Service in future provided that factors such as price, easy access and infrastructure are improved.

The myFreeview Service should provide more channels in the future such as on education, entertainment and news. However, due to Sabah's economic status and their low preference towards online purchases, users have a low tendency to utilise product promotion channels such as WowShop or GoShop.

Overall, respondents preferred channels with a good mixture of general entertainment content, such as TV3, as well as news channels such as Berita RTM and Sukan RTM. However, channels with selected languages

such as WowShop Mandarin were not preferred by respondents.

Correlation Analysis between Independent Variables and Dependent Variable Findings

Users' experience will have a positive effect on the gratification of users in Sabah. Therefore, all channels available should have all aspects of content related to the lifestyle of users and preferably on education, entertainment and news.

Descriptive Analysis (Mean Score Comparison between FTA Users and myFreeview Set Top Box Users)

The research has demonstrated that, based on the overall data, Uses and Gratifications achieved higher mean scores if compared to FTA Users (n=533) and myFreeview users (n=214). There are several attributions to this increase in overall satisfaction. Firstly, myFreeview users were satisfied with the service quality provided, which sometimes exceeded their expectations of the myFreeview service. In the aspect of education, the Gratification value for Formal Education (Mean score = 4.16) increased to a mean score of 4.26. This shows that users' expectations were met, perhaps due to the ease of access to the service and the educational content

ANALYSIS AND DISCUSSION

offered being relevant to the current situation. This could also be linked to the fact that students are learning online at home due to the COVID-19 pandemic. This fulfils a key role and need for myFreeview.

Interaction with family based on information acquired via FTA channels also shows a high mean score (mean score = 4.23) and it increased to a mean score of 4.35, showcasing a 10 percent increase in gratification. Traditional media such as television still plays a vital role for the Sabahan community and families. This is likely due to the high value of credibility (mean score = 4.19) of FTA channels, which on myFreeview increases to a mean score of 4.23, and this clearly shows that users still believe television is a credible source.

The knowledge gained by users from FTA channels is also used in the interaction with other individuals (mean score = 3.77) and it increased further by 7 percent with myFreeview (mean score = 4.04). The data suggests that users were more confident with the information and knowledge acquired, and they acknowledged the information's validity as it originated from a trustworthy source. When socialising with others, the data shows the same relationship even though the value only increased by 6 percent (mean score = 3.77 versus 3.99),

which is the same value in percentage increase for myFreeview data.

When comparing gratification value between FTA channels and myFreeview data that serves multiple roles, such as Searching for Information (Religious) (mean score = 4.21 versus 4.30), Searching for Information (Social) (mean score = 4.29 versus 4.30), Searching for Information (Economic) (mean score = 4.36 versus 4.44), Searching for Information (Politics) (mean score = 4.33 versus 4.42), Searching for Information (Culture) (mean score = 4.34 versus 4.40), Searching for Information (Health) (mean score = 4.40 versus 4.50) and Searching for Entertainment (mean score = 4.41 versus 4.47), the data shows an increase across all factor elements. This showcases that users do engage with FTA channels and the myFreeview service for these purposes and the increased value for each item shows a high level of satisfaction from users, fulfils their role and meets the users' expectations in terms of quality content offered for respective needs.

The highest value was the source of health information (mean score = 4.50). This is likely due to the fact that users were seeking current COVID-19 pandemic-related information in order to better understand the situation. Ranked second was the search for entertainment (mean score = 4.47).

ANALYSIS AND DISCUSSION

This could be due to users being limited to being at home during this pandemic period, thus significantly co-relating to the increased role of entertainment. The third ranked value with the mean score of 4.44 was the search for economic information, likely due to users looking for other revenue streams in order to survive day-to-day life during the pandemic period. Users will seek avenues of information that may lead to potential jobs and positions. During the pandemic period, many companies ceased to operate because of losses in revenue and this resulted in workforce retrenchment. Among the most badly affected industries were from service sectors such as Hospitality and Tourism and smaller speciality businesses barbers, stationers, etc.

These paradigm shifts in lifestyle and users' behaviour have changed the consumption patterns of FTA and myFreeview users. The situation, together with the closure of schools, has forced the students to study from home and family members to be at home for a prolonged period of time. This could be a strong reason why there is a high value towards the Uses. The Ease of Access is also another factor for increased Gratification of FTA Channels and myFreeview in Sabah.

RECOMMENDATIONS

Uses Factor

Based on the findings for the Uses factor element, Zone 5 (Beaufort, Keningau, Tenom) and Zone 7 (Tamparuli, Kundasang, Ranau) indicate lower levels of Uses. The research has reached an assumption that this may be due to the geographical area of these two (2) zones. Zone 5 is geographically located in a valley which may experience disruption or decrease in signal strength. Zone 7 may also suffer signal interference from its close proximity to Mount Kinabalu and the Crocker Mountain range (Banjaran Crocker). The researchers recommend boosting the signal strength and/or increasing the number of towers transmitting the signal.

Gratifications Factor

Based on the findings, Zone 5 (Beaufort, Keningau, Tenom) and Zone 7 (Tamparuli, Kundasang, Ranau) indicate low levels of Gratification. The research has reached an assumption that this may be due to the geographical area of this zone. Zone 5 is geographically located in a valley which may obstruct the signal strength. Another possible reason for this could be related to limited infrastructure,

RECOMMENDATIONS

i.e. electricity source and supply. One assumption is that the use of television could be considered as a lesser priority as compared to essential utilities such as lights, kitchen appliances, etc.

The researchers recommend boosting the signal strength and/or increasing the number of towers transmitting the signal. To implement this, however, the researchers recommend and seek clarification from MCMC on the digital signal technology used in this zone. Secondly, the researchers recommend an investigation of the infrastructure and facilities available in the zone, together with clarification on users' priority with regard to the Uses of television.

myFreeview Service Usage and Readiness

The research has found that only 40.3 percent of respondents are currently using the myFreeview Set Top Box and this means that there are 59.7 percent potential future users of myFreeview. The researchers therefore recommend that efforts be made by various stakeholders of myFreeview to further increase the take-up rate in Sabah. The researchers recommend tapping into the B40 users by offering a subsidised rate for the Set Top Box or instalment packages to purchase the device.

The research also found that there is a 73.5 percent acceptance rate among respondents who have yet to use the myFreeview service, thus narrowing the focus on the B40 target group where users are ready for cheaper options of entertainment. Meanwhile, the M40 group has an equal chance to accept myFreeview, especially if the process is simplified and does not incur high costs. It is therefore recommended to explore this opportunity with more aggressive promotion of myFreeview to users in Sabah. One method is to simplify the steps to acquire the myFreeview Set Top Box. Secondly, TV3 is the most preferred channel among users in Sabah. Therefore, it is recommended that TV3 be the main FTA channel to drive uptake by positioning the service as part of Public Service Announcements (PSAs) to the community and as part of the Digital Technology effort in upgrading access to users. Based on the users' preference finding, the researchers also recommend that other channels offer content which are similar to TV3. A general entertainment channel offering various genres of programmes for the audience, especially on education and entertainment, could also be a huge pull factor for more take-ups if this is done in this area.

RECOMMENDATIONS

The data also indicated that WowShop Mandarin is the lowest-rated channel on myFreeview. This is most likely due to the positioning of the channel as a home-shopping channel while users' priorities during the COVID-19 pandemic have shifted more towards information seeking and entertainment purposes. The researchers also suggest creating Sabah-centred content to appeal to more localised regional audiences as this can add a local touch which is more relevant and relatable to Sabah audiences, similar to TVS in Sarawak.

The data in this research indicates that the highest level of those watching programmes on the FTA channels is through other services, excluding myFreeview. The highest level is via Astro Njoi, the medium level of watching is via TVRO and the lowest is via Unifi TV. These are applicable to areas with good Internet connection, such as Kota Kinabalu, Putatan, Papar, Tawau, Sandakan and Beaufort, while TVRO users might be in remote areas such as Tongod and Nabawan. This preference is likely due to the fact that

Astro has offered the Njoi Set Top Box since 2012. Therefore, users are more familiar with this technology and it involves a one-time payment to acquire the decoder and no subsequent monthly subscription. This is likely the reason the Njoi Set Top Box appeals to users with financial constraints, but still consume entertainment programmes. TVRO is ranked second due to its higher initial investment for installation but has no monthly commitment. TVRO is more likely to be used in more remote areas due to lack of access to digital signals. Unifi has the lowest level of watching audience likely due to the infrastructure limitations in certain areas.

40.3%

of respondents are currently using the myFreeview Set Top Box and this means that there are

59.7%

potential future users of myFreeview.

RECOMMENDATIONS

The research recommends investigating the local infrastructure and facilities available as well as their consistency in transmitting digital signals for each region, such as Zone 5 (Beaufort, Keningau, Tenom, Nabawan, Sipitang and Tambunan), Zone 4 (Tongod) and Zone 7 (Ranau, Kundasang and Tamparuli). In order to increase the Gratification level, the researchers suggest boosting the signal strength at these three affected zones. There is low signal intensity in areas located between the Crocker Range that separates the tower in Kota Kinabalu and the Maliau Basin/Danum Valley, obstructing signals from the tower in Tawau. The researchers suggest that the myFreeview Service provider explore the option of adding two (2) additional towers in order to improve coverage in the proposed locations of Nabawan, to cover Keningau, Tenom, up to Tambunan, as well as Telupid, to cover Ranau, Beluran and Tongod. However, this suggestion is subject to the suitability of the locations based on other factors such as electrical supply and accessible roads.

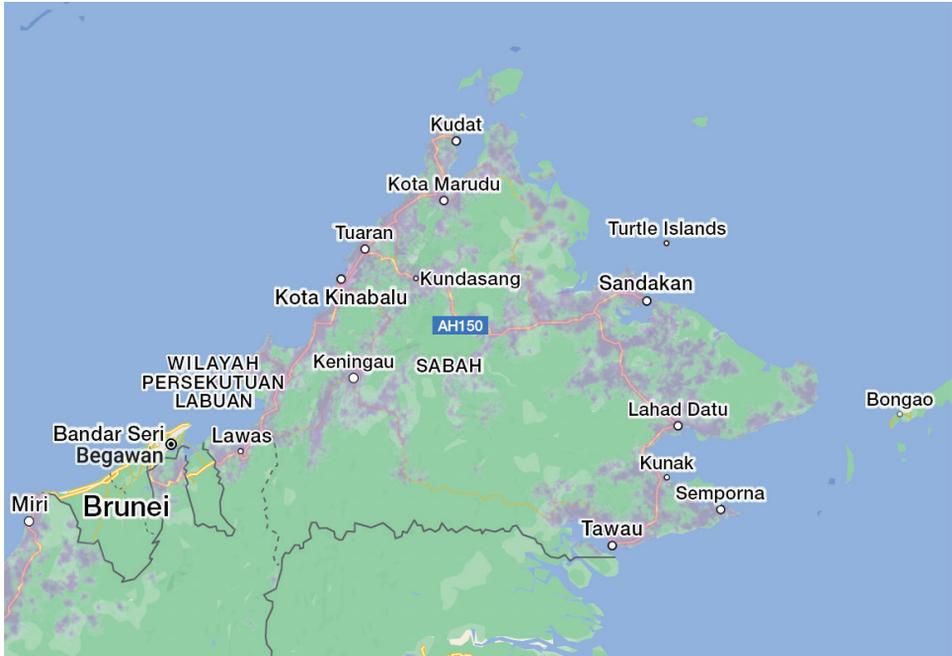
Overall, myFreeview provides a higher level of satisfaction to users compared to normal FTA channels. This finding

is also in line with other countries such as Taiwan (Li, 2014); Italy (Turk et al., 2016); South Africa (Mbatha & Lesame, 2014), despite the challenges faced by the lower income groups to gain access to Set Top Boxes; and Spain (Candel, 2007), due to the lack of infrastructure.

It is recommended that related agencies consider providing an extended service such as the installation of more towers to allow signal reception in remote areas, as well as providing access to Set Top Boxes via special promotions with affordable prices and offering subsidies. Also, the state government may provide the support needed to the affected groups as well as instalment packages for people to own the Set Top Box. In order to encourage and increase the interest of the users, related agencies may work closely with respective government agencies, such as Jabatan Hal Ehwal Orang Asli or the Ministry of Rural Development, to provide portable Set Top Box installation or alternatively, the installation of a Permanent Set Top Box at a public area to enable greater signal reception for access within the community in certain areas such as Nabawan and Tongod.

RECOMMENDATIONS

DIAGRAM 2: COVERAGE AREA OF myFREEVIEW SERVICE IN SABAH (SOURCE: [HTTPS://JENDELA.MY/MAP/](https://jendela.my/map/))



CONCLUSION

From the findings, it is prominent that the myFreeview Service, when compared to common FTA users via Astro and Unifi, scored the highest. The findings indicate that the high quality of channels provided via myFreeview TV significantly contributes to the satisfaction of users. The data also indicates that the majority of current FTA users are aware of the myFreeview TV Service and they are ready to switch from FTA to the myFreeview service, especially with a cheaper solution and quality viewing experience. However, it is recommended for myFreeview to provide more options on channels, such as on education, and sports, as well as more local content which can give more emphasis to local dialects, similar to TVS in Sarawak.

CONCLUSION

Based on the findings, the researchers suggest that in order to improve the acceptance and accessibility of the myFreeview Service, priority should be given to the B40 group as the target group of future users. In line with this recommendation, the researchers suggest that the Set Top Box should be promoted through collaboration with a few agencies, including the Sabah State Government, and the Sabah Foundation, as well as the Ministry of Rural Development, to provide a subsidy or a minimum monthly instalment package to users. With better financial support, the State Government and the Ministry of Rural Development will be able to ensure sustainability of usage. Apart from that, these agencies may provide better facilities to support the usage of the myFreeview Service with an adequate supply of electricity, or even a generator and television set for public use, especially for communities in remote areas.

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