



A PROPOSAL FOR CONCEPTUAL FRAMEWORK OF STAKEHOLDERS' ATTITUDES AND THE FACTORS THAT INFLUENCE THEIR ACCEPTANCE TOWARDS DENGUE PREVENTION TECHNIQUES IN MALAYSIA

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Abstract

In the fight against dengue, various strategic measures have been outlined by World Health Organization needed to be improved, including the management and diagnosis of dengue cases, integrated surveillance and emergency preparedness, sustainable vector controls, implementation of future vaccine, and basic operational research. To control the vector of dengue in Malaysia, various dengue prevention techniques have been introduced to combat dengue for the sake of environmental sustainability. However, stakeholder attitudes towards these techniques must be considered to ensure their acceptance. Therefore, this study proposes a conceptual framework to identify predictive factors that are expected to influence stakeholders' attitudes towards dengue prevention techniques in Malaysia. The proposed framework is beneficial for enhancing the awareness of stakeholders of the acceptance of any techniques to combat dengue. The framework also can be a guideline and allows for ongoing research to be conducted to ensure the best techniques. In fact, this framework can be used in any study that requires an assessment of stakeholders' acceptance of any current science and technology product.

Keywords— strategic management; conceptual framework, attitude; factors influencing; dengue prevention techniques; Malaysia.

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1. INTRODUCTION

Attitude is a well-established act that determines the consistent assessment or advocacy of action in a favoured way or vice versa [1]. Eagly and Chaiken defined attitude as an assessment of individual psychological action on something in a preferred way or not [2]. Attitude is a permanent assessment of human beings or judgments of an idea [3] and also illustrates the psychological act that cannot be clearly expressed which describes a deep internal assessment of something [4]. Attitude can also be used as a guide or psycho-sociology of an individual to respond before or after doing something in describing a social phenomenon [5]. Clearly shows that attitude is the component to view the acceptance, or approval to express support for something which refers on response to a situation or matter.

A study by Amin and Hashim was the first research that proposed a conceptual framework on factors influencing the attitude of Malaysian towards genetically modified Aedes mosquitoes technique in combating dengue [6] and their work based on a study by Fishbein's Multi-Attribute Attitude Model 1963 [1]. This study has become a major reference in designing and developing a strategic conceptual framework that defines the factors that influence public attitude towards dengue prevention techniques in Malaysia. This study also used some model of attitude such as model for European society attitude towards biotechnology application [7], a study on the Mexican's acceptance towards the benefits and risks of technology [8], a study of acceptance of Malaysian society on genetically modified salmon [9], a study on the attitude of Malaysian towards biosafety [10] and a study in determining the stakeholders' attitude towards biodiesel [11].

A questionnaire study was conducted in September 2016 until September 2017 using the model developed by Amin and Hashim (2015) [6]. The results of this study have

produced several impactful articles that can be used as a basis in the study of dating. Among those publications is a study in determining the factors that influence stakeholders' acceptance of the outdoor residual spraying (ORS) technique [12], the technique of Wolbachia-infected Aedes mosquitoes (WiAM) [13, 14, 15] and the dengue vaccine [16]. It was found that the models developed in these articles show that the attitude model towards dengue control techniques is influenced by several general and specific factors, such as benefit perception, risk perception, trust in stakeholders, attitude towards nature, attitude towards technology and religiosity.

Therefore, this research formulates strategic conceptualizations based on past studies by suggesting some general and specific predictor factors in determining the attitude model of Malaysian towards dengue prevention techniques. The factors listed indicate the framework to be constructed. Even though inclusions of various dimensions increase the complexity of the framework, the researchers believe that this strategic management of conceptual framework is the answer to the dengue problem in Malaysia by researching predictor factors which are influencing on public's attitude towards these techniques.

I. GENERAL FACTORS

A. Trust in Key Players

Trust in key actors refers to the public's belief towards government, professionals, and institutions that can provide information [17,18]. Public's acceptance of technology also depends on their trust in key actors [19] because of the limitations of knowledge [20]. Amin and Hashim reported that public assess the benefits and risks of GM Aedes mosquitoes' technique depending on their trust in key actors [6]. This statement is supported by previous studies which demonstrate the importance of stakeholder's trust to engage among key players in determining the perceptions of interest in the formation of a good attitude towards

biodiesel-based products [11]. Arham et al. highlighted that trust in key actors has shown a positive relation with the attitude towards the dengue's control techniques [21]. Next, further research found trust in key players had significant influence with perceived benefit and risk, which translates into a positive attitude toward ORS technique, WiAM technology, and dengue vaccine [12,13,14]

B. Attitude towards nature versus materialism

An important factor in determining public acceptance of technology whether they are in material aspects or interests of nature [22]. Recent studies have found that factors of attitudes towards nature refer to the priorities of the public whether they are off limits of environmental risk or they pursue materialistic values [23]. Amin and Hashim highlighted a negative correlation between attitude towards nature and risk perceptions which emphasizes materialistic public is willing to accept the GM Aedes mosquitoes if this technique benefits and does not violate moral aspects without thinking about nature requirements [6]. This finding was supported by Arham et al. [12,13,14,15] respondents inclined toward materialism tend to perceive more benefits and fewer risks from ORS technique and WiAM technology.

C. Attitude towards technology

Gaskell et al. have been studied this factor to see the public acceptance of biotechnology [24]. Amin et al. which examines the attitude towards GM soybean products indicate a negative predisposition towards technology. Respondents in this study consider this product to be at risks and have high moral concerns [25]. Amin and Hashim also discussed the respondents have high moral concerns on the GM Aedes mosquitoes technique because they have a negative inclination towards technology [6]. While the study of Amin et al. had shown that people who have a negative predisposition towards technology have higher risk perceptions of biodiesel products

[11]. Arham et al. indicated that respondents with higher tendency towards technology, they put higher benefit and feel less risk on the dengue vaccine [16].

D. Religiosity

Refers to the belief and adherence to the religion practiced in everyday life [26]. Religiosity concept is broad, abstract and subjective in measuring religious commitment to determine social attitudes of the society towards an issue. The past study stated that Malaysian have a strong attachment stand to their religion [25]. In the issue of attitude towards GM Aedes mosquitoes by Amin and Hashim found that religiosity was not a predictor factor in influencing stakeholder attitude towards this technique [6]. This is because they assess the risks aspect by placing high moral concerns on this technique. This indicates that this religiosity has the impact of acceptance on modern technology. Interestingly, studies conducted by Arham et al. shows the difference in determining the final model to determine the acceptance of stakeholders towards dengue control techniques. Stakeholders with a high level of religiosity only perceived the benefits of the dengue vaccine [14], while for the WiAM technology they perceived the risks, however still acknowledging the benefits [13, 14, 15]. However, the influence of perceived benefit and risk on stakeholders' attitudes toward ORS technique moderated by religiosity factor [12]. Arham et al. (2022) used a holistic approach based on an Islamic ethical-legal assessment under the *maslahah-mafsadah* (benefit-risk) concept to evaluate the feasibility of GM Aedes mosquitoes release in Malaysia, and the results indicate that GM Aedes mosquitoes could be classified as *zanniyyah* (probable) [27]. As a result, religiosity is an important factor in determining acceptance of dengue control techniques.

E. Engagement

Level of past and intended behaviour, knowledge and awareness that drives positive attitude towards something.

Engagement factor is important in determining the attitude of biotechnology applications in Malaysia [25,28]. Amin et al. have shown that engagement has a good relationship with the perceived benefits in accepting public attitudes towards biodiesel-based products [11]. However, a study by Amin and Hashim highlighted that engagement is not a predictor factor in determining attitudes towards GM Aedes mosquitoes [6]. This factor is seen as important because in the study of Arham et al. (2021) in determining the mean score for each element of engagement factor (knowledge, awareness, and understanding through past intended behavior) were moderate, shows that stakeholders not fully engage with dengue control techniques [29]. This will provide interesting research findings in determining attitudes and acceptance of benefits or risks towards dengue control techniques.

II. SPECIFIC FACTORS

A. Perceived benefit and risk

Perceived benefit and risk are the positive or negative advocacy behaviors that will be accepted from an individual for an any matter. Gaskell et al. refer to perceived benefit as an indicator of the public point of view in support of biotechnology applications [23,24]. While perceived risks refer to the anticipation of losses when it is unprofitable for them [30]. Hansen et al. found that perceived benefit and risk are difficult to conceptualize separately. These factors are too complex that some studies explain that there is an inverse relationship [31]. Fischhoff et al. have clarified that there is a consistent relationship between the level of risk perception and the benefit is seen [32]. Therefore, the perception of benefit and risk are inseparable in assessing public attitude towards dengue prevention techniques.

B. Perceived moral concern

Perceived moral concern has a close relationship with the perception of the benefit and risk [30]. Gaskell et al. stated

that perceptions of moral aspects are important and act veto in the study of biotechnology applications among European societies [23,24]. It can be understood that the perception of moral concern over something is a positive value. Acceptation on something is improving when something is no moral issues and more beneficial than risky. The perceived moral concern is a deceptive factor that determines the rejection of some GM products because its production violates the law of nature [34]. Amin et al. suggested that perceived moral concern is a major predictor factor in determining risk perceptions of GM foods in Malaysia [28]. Findings explored by Amin and Hashim highlighted that this factor correlates the general and specific factors in the form of attitude towards GM Aedes mosquitoes [6].

C. Risk assessment and management

This factor is important to evaluate public's acceptance in the report on risk assessment of dengue techniques, adverse effects that may be encountered by the application of these techniques and the provision of measures to combat dengue. This risk assessment report refers to the potential characterization of the adverse effects that may arise from a matter [35]. Malaysian communities have the adequacy of risk assessment and management at a moderate level towards biosafety [10]. As such, it is important to assess all the adverse effects that will be encountered in answering an issue relating to safety. Applying these techniques also needs to emphasize safety aspects that cover the safety of social, economic and environmental aspects.

D. Adequacy of regulatory aspects and informed consent

This factor should cover the aspects of dengue-related laws, monitoring of dengue control activities, encouraging research on dengue, empowering data on dengue, policy-setting, and provision in improving dengue control. Therefore, government agencies; non-government organizations, private and industrial sectors need to take a role in setting up adequacy of regulatory [36], so

that the results are open for public notification [37]. Public notification will lead to informed consent by the community whether they are agreed or not in the decision-making process. Pardo et al. suggested that informed consent is particularly important in terms of biotechnology [7] because the community will support any technology after getting relevant information [38]. Therefore, informed consent is a key factor in showing the community's advocacy of these dengue techniques.

III. DENGUE PREVENTION TECHNIQUES

Dengue is a dangerous infectious disease caused by a flavivirus (DENV) from *Aedes* mosquito [39]. Dengue has become epidemic throughout tropical and subtropical countries [40] and also has major health problems in Malaysia [16,41]. Dengue is a dengue-borne vector, transmitted through a bite that easily infects and spreads it on a large scale [42]. Consequently, control over of dengue vectors is one of the most effective preventions to control dengue virus [41]. Therefore, various dengue prevention techniques have been introduced to control dengue in Malaysia.

Frequently used in environmental controls are fogging techniques either using thermal spray (SRT) or Ultra Low Volume (ULV) spray to reduce the adult *Aedes* mosquito population [41,43]. Meanwhile, the ORS technique is a new method introduced by the Ministry of Health Malaysia where insecticide spraying on the outer wall of the house or building premises. It is also used to kill adult *Aedes* mosquito that stays onto the wall [43]. However, the effectiveness of this ORS technique depends on the features of the wall surface, geographical area, rainfall, humidity, and temperature. While wall painting with insect paint has the same characteristic as the ORS method. The study showed insect repaint paint on wood and cement which had resulted in the death rate on *Aedes* mosquitoes increased [43]. The research models of Arham et al. discovered

that stakeholders have positive responses for the implementation of the ORS as a suitable technique to control dengue in Malaysia in a study to determine the acceptance of the ORS technique [12,44].

Furthermore, autocidal traps are also one of the techniques to trap larvae and female *Aedes* mosquitoes [43]. These autocidal traps are cheap, environmentally friendly, user-friendly, durable and safe for use with minimum maintenance. Biological control involves the use of Bti and *Wolbachia* bacteria that useful to inhibit the growth of *Aedes* mosquito. Bti bacteria are used to damage the larvae and to kill them [43,45]. While *Wolbachia* bacteria incorporated into the male *Aedes* mosquito is also one of the biological controls or known as WiAM technology. *Wolbachia* bacteria produce male *Aedes* mosquito that has genetic defects that can be disturbing the life cycle of *Aedes* mosquito [40]. This biological control technology does not give any effect to the environment or other living things. The findings of Arham et al. confirmed that stakeholders' attitudes toward WiAM technology were positive [13, 14, 15].

Genetic modifications of *Aedes* mosquitoes (GMM) are the latest techniques for dengue control [6,43]. Gene "tetracycline-repressible dominant lethality" of the baculovirus is inserted into the larvae of the male *Aedes* mosquitoes. When the male *Aedes* mosquitoes were matured, they are released. When these mosquitoes mate with a wild female *Aedes* mosquito, their offspring produced from mating results will die before they reach maturity [43,46]. However, the implementation of this technique has been argued by the Malaysian community because that project neglected public's consent [9]. Currently, there is no effective vaccine in Malaysia [47]. Scientists are currently working on the appropriate vaccine as there are concerns to ensure the safe use of this vaccine to overcome all type of the dengue virus [9,43]. The application of vaccines in the future also requires community consent before being carried out.

However, studies on dengue vaccine acceptance have been conducted, and the findings revealed that Malaysian stakeholders were hopeful about the dengue vaccine, with a positive attitude and perceived benefits as important predictor of intention to accept the vaccine [16].

The implementation of dengue prevention techniques is essential for controlling dengue, but the attitude of public acceptance should be emphasized by assessing the predictor factors that make them support or reject these techniques. Consequently, strategic management by introducing a conceptual framework of public's attitudes is an important study for governments, NGOs, industry, professionals, academics, and scientists involved with the application of these techniques by taking advantage of the effects of predictor factors on the attitudes of the public to these techniques. The findings of this study can also be used as a reference for them to focus on continuous research, with the implementation of relevant policies based on the relationship of predictor factors to the attitudes of the public to these techniques. In fact, the relationship between predictor factors and community attitudes can be used as a guideline in developing more effective risk and regulatory communication strategy

before implementing these techniques, considering the community's response. If this study shows the techniques studied are not acceptable to the community due to higher risk perceptions than interest perceptions, the authorities may encourage information disclosure about the advantages of the technique or take action to discontinue techniques to avoid any loss.

IV. RECOMMENDATIONS OF CONCEPTUAL FRAMEWORK

Figure 1 illustrates the conceptual framework of the research model that contains three (3) major constructs in answering the question of public attitude towards dengue prevention techniques. The first construct is called general factors that contains five components which are i) trust in key actors; ii) attitude towards nature; iii) attitude towards technology; iv) religiosity; and v) engagement. The second construct consists of six components of specific factors which are i) perceived benefit; ii) perceived risk; iii) perceived moral concern; iv) risk assessment and management; v) adequacy of regulatory; and vi) informed consent. While the final and the main construct of this study refers to attitude towards dengue prevention techniques implemented in Malaysia.

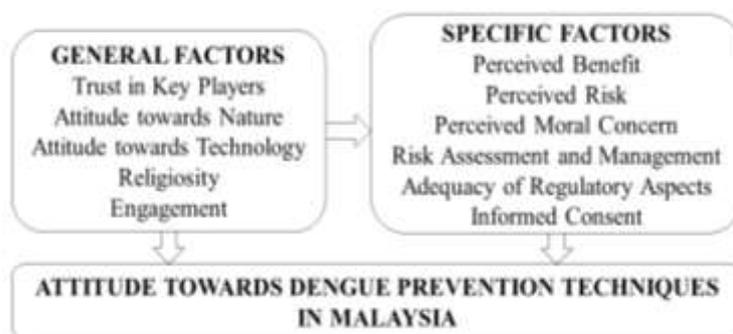


Fig. 1. Conceptual framework to dengue prevention techniques in Malaysia

Based from this conceptual framework, the following propositions are made:

P1 There is a significant relationship between general and specific factors.

P2 There is a significant relationship between general factors and attitude

towards dengue prevention techniques.

P3 There is a significant relationship between specific factors and attitude towards dengue prevention techniques.

P4 Specific factors is a mediator between general factors and attitude towards dengue prevention techniques.

2. CONCLUSION

This writing has contributed to the development of the literature on the establishment of a strategic conceptual framework in answering the questions of factors influencing public attitude towards dengue prevention techniques in Malaysia. A future study is recommended to use this conceptual framework by expanding the idea through the conduct of quantitative studies based on predictor factors. Even studies related to attitude determination can also make this strategic conceptual framework as based in any future study. To preserve the environment from dengue diseases, this study has provided a clear view of the predictor factors in determining the strategic conceptual framework of attitude towards dengue prevention techniques.

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