

## **Original Research Article**

### **A COMPARATIVE STUDY ON GENERATION X AND Y THAI CONSUMERS' AWARENESS AND MITIGATING BEHAVIOR TOWARDS CLIMATE CHANGE**

#### **Abstract**

Climate change is ubiquitous and perceived as the greatest challenge to all living species on earth. This phenomenon has already had devastating impacts in SE Asia, and Thailand, in particular, which is experiencing heat waves, flooding, tropical cyclones and rising sea levels, among others.

**Aims:** This exploratory study examined differences between two generations, X and Y Thai consumers, in terms of their awareness and mitigating behavior towards climate change. These two generations were chosen as they account for the two largest segments, approximately 55 percent of the Thai population.

**Sample:** A total of 421 respondents (201 Generation X and 220 Generation Y) was selected for the study, using purposive sampling.

**Methodology:** Descriptive statistics were used to analyse the data obtained via self-administered questionnaires. The four hypotheses posited in this study were tested by independent samples t-test.

**Results:** The findings revealed significant differences in environmental knowledge and interpersonal influence on awareness of climate change, with Generation Y demonstrating higher levels of awareness than Generation X. However, no significant difference between media and awareness was observed, nor was there any significant difference between generations in terms of awareness and mitigating behavior toward climate change. The study

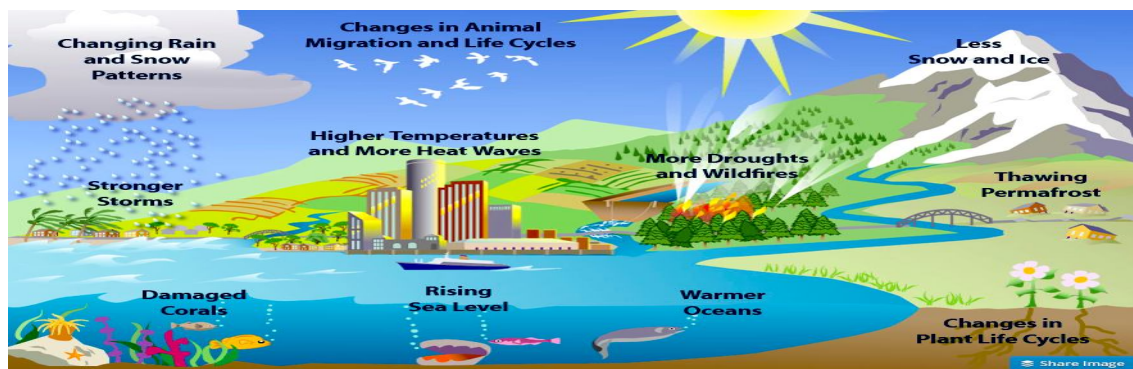
adds to the extant literature; the findings will provide policy makers, marketers, and consumer groups with empirical knowledge to help create and target optimal marketing strategies, policies and promotional programs to the two specified generations to better cope with climate change in the Thai context.

**Keywords:** environmental knowledge, interpersonal influence, awareness of climate change, mitigating behavior, social media, Generation X and Y, Thailand.

## 1. Introduction

The United Nations Framework Convention on Climate [1] defines climate change as “a change in climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability, observed over comparable periods of time”. Even though climate change can occur through natural causes such as variations in solar cycles, human activities have been the main driver of climate change, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in the atmosphere. The World Health Organization has called climate change the greatest threat to human health in the twenty first century [2]. Evidence of the impacts of climate change are well-documented and shown in Figure 1. [3].

**Figure 1:** Impacts of climate change



Source: Job One for humanity, 2021

### *1.1 The case of Thailand*

A survey conducted by the Southeast Asia Program on climate change on 817 ASEAN respondents in 2020, found that climate change ranked among the top three concerns, with approximately 54 percent seeing climate change as a “serious and immediate threat to the well-being of their country” [4] As per the Global Climate Risk Index by Germanwatch released in 2021, Thailand is placed 9th globally in terms of the degree to which countries have been affected by climate change from 2000 – 2019 [5]. Carbon emissions have also increased, with Thailand ranking among the top 20 nations globally, and Bangkok ranking as one of the world’s highest emitting cities. The Thai government’s failure to sign declarations related to halting deforestation, cutting emissions of greenhouse methane, phasing out coal power and not building new coal plants, means that the country is becoming a climate laggard, not just globally, but also regionally [6]. The Green Future Index 2022, compiled by researchers at the Massachusetts Institute of Technology also placed Thailand among the climate laggards as the country scored just 4.5/7 points and was ranked 48 out of 76 countries [7]. While there have been studies on climate change impacts and awareness in the Thai context [8-10], no studies have focused on generational differences regarding awareness and mitigating factors. Hence, the aim of this paper is to study two generations, X and Y, which make up the largest segments of the Thai population. These generations were the samples in this study for several reasons: First, they are at an age where they understand the implications of environmental problems, second, they are future custodians and policy makers of environmental management, third, they have the capacity to create a strong national movement and bring Thai people’s attention to climate change problems. The specific questions which the study aims to answer are:

1) Are there significant differences between Generation X and Y Thai consumers' in terms of their environmental knowledge, interpersonal influence and social media relating to awareness of climate change?

2) Are there significant differences between Generation X and Y Thai consumers in terms of awareness of climate change and mitigating behavior toward climate change?

### *1.2 Generation X and Y Consumers in Thailand*

A generation refers to all of the people born and living at about the same time regarded collectively, most of whom have similar ideas, problems and attitudes [11]. Generation X (or Gen X for short) is generally defined as people born between 1965 and 1980. Generation Y (or Gen Y for short), also known as Millennials, are the generation following Generation X and spans those born between 1981 and 1996 [12]. Statistics from the Thai Ministry of Interior revealed that the size of Generation X was almost as large as Generation Y. Generation X accounted for 27 percent while Generation Y was 28 percent, making the combination of the two generations at 55 percent, the two largest segments in the current Thai population which currently numbers 70.1 million [13].

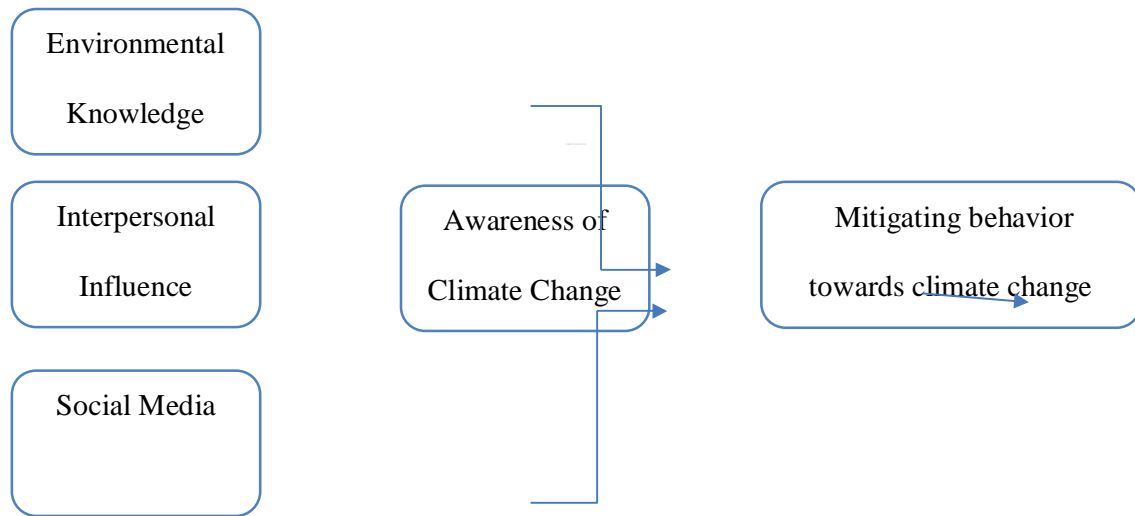
### *1.3 Variables unpinning the study*

In his book on environmental history, Hughes argued that the archival records on climate change goes back in time for thousands of years, nevertheless scientific development on climate change date from the nineteenth to the twenty first centuries. The author further writes that climate scientists now agree that global warming is occurring and is largely caused

by human activities [14]. As awareness of climate change has spread among the general public, there has also emerged the necessity to mitigate it by taking various measures such as reducing emissions of greenhouse gases. Previous studies have examined the relationship between environmental knowledge and pro-environmental behaviour [15-17]. These findings have shown that environmental knowledge is an important variable impacting pro-environmental behaviour. In previous studies, interpersonal influence has been significantly related to conservation behaviour. Normative referents are those individuals or groups who serve as a guide to behaviour. Key normative referents are one's family, close friends, work colleagues [18] and in some cases, also professionals such as doctors, teachers, and religious clergy. Hofstede argued that Thailand is considered to be a highly collectivist as well as feminine culture in which relationships and quality of life are important [19]. In previous studies, in Thailand, Arttachariya, and in Hong Kong, Lee, found that reference groups and their influence was more important than any of the other predictors of green purchasing behavior [20-21]. As for sources of information on environmental matters, in the past, traditional media, such as newspapers, television and radio, were the major communication channels through which people obtained information on environmental issues. However, the development of social media in recent years, has made it possible to increase public understanding of environmental issues by social comparison with opinion leaders or influencers who spread public messages on platforms such as Facebook, Twitter, Line and Instagram, among others. This is particularly true of younger consumers who access more mobile and web-based information than conventional television and radio channels, newspapers and magazines. Climate change mitigating behaviors are those that help to reduce greenhouse gas emissions in order to prevent the planet from warming, thereby protecting the environment. As this paper is focused on the individual, the alternatives suggested deal with individual lifestyle choices. In a review of literature relating to the contribution of consumer

behavior to environmental sustainability and greenhouse gas emissions, Williamson et al. grouped thirty solutions into four main categories: food, agriculture and land management, transportation and energy/materials [22]. In similar vein, Faber et al. in their study on behavioral change mitigation options, focused on three main factors: food/drink, mobility, and housing [23]. Based on the above discussion, Figure 2 shows the framework for this study:

**Figure 2** : Research Framework



Based on the above discussion of variables, the following hypotheses are formulated:

H<sub>a1</sub>: There is a significant difference in environmental knowledge and awareness of climate change between Generation X and Y Thai consumers

H<sub>a2</sub>: There is a significant difference in interpersonal influence and awareness of climate change between Generation X and Y Thai consumers

H<sub>a3</sub>: There is a significant difference in social media influence and awareness of climate change between Generation X and Y Thai consumers

H<sub>a4</sub> : There is a significant difference in awareness of climate change and mitigating behavior towards climate change between Generation X and Y Thai consumers

## 2. Materials and Methods

The target population of this study is Thai consumers, both male and female, born between 1965 – 1980 and 1981 – 1996, as defined by Pew Research Centre [12]. Purposive sampling was used to recruit respondents from universities, offices, malls and sports/leisure centres, so that a wide spectrum of the two generations could be obtained. Data collection commenced in December 2021 and was completed in May 2022. A self-administered questionnaire comprising five sections was used. All items were measured on a five-point Likert scale ranging from 1= strongly disagree to 5= strongly agree. An exploratory factor analysis with principal component extraction was performed to assess the construct validity of the measurement items. Cronbach alpha values indicated that most measures had good internal consistency with  $\alpha$  values above 0.7 [24]. The questionnaire was translated into Thai for ease of understanding. The Cronbach-Alpha coefficients for the five variables are shown in Table 1 below:

**Table 1:** Variables used and Cronbach Alpha results

Variable measured	Cronbach Alpha coefficients
Environmental Knowledge	.886
Interpersonal Influence	.712
Social Media	.804
Awareness of climate change	.813
Mitigating Behavior towards climate change	.810

### 3. Results

A total of 502 questionnaire were distributed, 441 were returned. Of this number, 20 were rejected because of non-response, bringing the total of usable questionnaires to 421.

Table 2 shows the profile of respondents.

**Table 2 : Demographic Characteristics of Respondents**

<b>Generation</b>	<b>Total</b>	
	<b>n</b>	<b>%</b>
Generation X	201	47.6
Generation Y	220	52.4
<b>Total</b>	<b>421</b>	<b>100</b>
<b>Total</b>		
<b>Gender (Generation X)</b>		
Male	103	51.0
Female	98	49.0
<b>Gender (Generation Y)</b>		
Male	123	55.9
Female	97	44.0
<b>Total</b>	<b>421</b>	
<b>Total</b>		

#### 3.1 Descriptive Statistics on variables

Respondents were asked to select, from a list, the top three issues of concern that affected them the most. The top three concerns related to the impact of climate change for Generation X were 1) flooding, 2) traffic jams and 3) extreme temperatures. Whereas for Generation Y, the concerns were 1) extreme temperatures, 2) air pollution and 3) depletion of the earth's resources, the latter indicating a broader and more general issue.

Table 3 below shows the responses received on the questions from the two generations in regards to the variable of environmental knowledge.

**Table 3 : Environmental Knowledge Variable**

**Q1.1 Climate change is evident from the extreme climatic conditions, such as heavy rainfall**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	20 (9.95%)	156 (77.61%)	12 (5.97%)	7 (3.48%)	6 (2.98%)
Generation Y	108 (49.09%)	92 (41.8%)	16 (7.27%)	4 (1.81%)	0

**Q1.2 : Threats to the earth due to climate change impacts everyone**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	38 (18.9%)	96 (47.7%)	40 (19.9%)	21 (10.44%)	6 (2.98%)
Generation Y	112 (50.9%)	76 (34.5%)	12 (5.45%)	16 (7.27%)	4 (1.81%)

**Q1.3 : Climate change is a threat to Thailand's national development**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	26 (12.93%)	64 (31.84%)	72 (35.82)	30 (14.92%)	9 (4.47%)
Generation Y	52 (23.63%)	109 (49.54%)	29 (13.18%)	24 (10.91%)	6 (2.72%)

**Q1.4 : Global temperatures have changed compared to the previous decades because of climate change**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	98 (48.75)	60 (29.85%)	10 (4.97%)	20 (9.95%)	13 (6.46%)
Generation Y	131 (59.54%)	61 (27.72%)	8 (3.63%)	16 (2.72%)	4 (1.81%)

**Q1.5 : Human activities are to blame for climate change**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	52 (25.87%)	46 (22.88%)	35 (17.41%)	40 (19.90%)	28 (13.93%)
Generation Y	87 (39.54%)	98 (44.54%)	17 (7.72%)	13 (5.90%)	5 (2.27%)

**Q1.6 : I possess adequate knowledge about climate change**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	63 (31.34)	46 (22.88)	41 (20.39%)	39 (19.40%)	12 (5.92%)
Generation Y	96 (43.63%)	88 (40.0%)	15 (6.8%)	13 (5.90%)	8 (3.63%)

**Q1.7 : I understand the negative impacts of climate change**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	76 (37.81%)	52 (25.87%)	38 (18.90%)	25 (12.43%)	10 (4.97%)
Generation Y	135 (61.36%)	45 (20.45%)	20 (9.09%)	16 (7.27%)	4 (1.81%)

The findings also showed a significant differences in the two generations on sources of interpersonal influence as shown in Table 4 below.

**Table 4 : Interpersonal Influence Variable**

**Q2.1 I tend to put great trust in information on climate change that comes from family and friends**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	101 (50.2%)	70 (34.80%)	10 (4.97%)	12 (5.97%)	8 (3.98%)
Generation Y	72 (32.72%)	55 (25.0%)	47 (21.36%)	30 (13.63%)	16 (7.27%)

**Q2.2: I tend to believe information on climate change that comes from scientists/environmental organizations**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	56 (27.86%)	43 (21.39%)	55 (27.36%)	29 (14.42%)	18 (8.95%)
Generation Y	85 (38.63%)	79 (35.90)	40 (18.18)	14 (6.36%)	2 (.90%)

The following question, as shown in Table 5, reflects respondents' access to information from the five social media platforms which are used most often by Thai people.

**Table 5 : Social Media Variable**

**Q3.1 : I obtain information on climate change through the following:**

	Facebook	Line	Instagram	Twitter	YouTube
Generation X	51 (25.37%)	63 (31.34%)	26 (12.93%)	14 (6.96%)	47 (23.38%)
Generation Y	30 (13.63%)	81 (36.81%)	58 (26.36%)	23 (10.45%)	28 (12.72%)

The findings on the questions related to awareness of climate change also bring up clear differences between the two generations as seen in Table 6 below:

**Table 6: Awareness of Climate change variable**

**Q4.1 : Climate change is something that is affecting me, or going to affect me personally**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	75 (37.3%)	54 (26.80%)	42 (20.89%)	22 (10.94%)	8 (3.98%)
Generation Y	109 (49.5%)	72 (32.72%)	16 (7.27%)	18 (8.18%)	5 (2.27%)

**Q4.2 : Climate change is something that worries me**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	46 (22.88%)	72 (35.82%)	51 (25.37%)	17 (8.45%)	15 (7.46%)
Generation Y	86 (39.09%)	91 (41.36%)	23 (10.45%)	13 (5.90%)	7 (3.18%)

**Q4.3 : The negative impacts of climate change are alarming for a country like Thailand**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	75 (37.31%)	56 (27.86%)	36 (17.91%)	20 (9.95%)	14 (6.96%)
Generation Y	102 (46.36%)	92 (41.81%)	13 (5.90%)	8 (3.63%)	5 (2.27%)

The statements from the questionnaire on mitigating behaviour and the findings are shown in

Table 7 below:

**Table 7 : Mitigating Behaviour towards Climate Change Variable**

**Q5.1 : I will certainly reduce my energy consumption if it helps protect the environment**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	51 (25.37%)	32 (15.92%)	21 (10.44%)	63 (31.34%)	34 (16.91%)
Generation Y	70 (31.81%)	56 (25.45%)	29 (13.18%)	26 (11.81%)	39 (17.72%)

**Q5.2 : I am willing to use public transportation rather than driving in order to protect the environment**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	20 (9.95%)	18 (8.95%)	52 (25.87%)	65 (32.33%)	46 (22.88%)
Generation Y	31 (14.09%)	25 (11.36%)	50 (22.72%)	72 (32.72%)	42 (19.09%)

**Q5.3 : I am willing to reduce my consumption of meat if I can mitigate the impacts of climate change**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	25 (12.43%)	42 (20.89%)	71 (35.32%)	46 (22.88%)	17 (8.45%)
Generation Y	35 (15.90%)	56 (25.45%)	66 (30.0%)	51 (23.18%)	12 (5.45%)

**Q5.4 : I am willing to take action to reduce climate change only if the Thai government can provide me with incentives for doing so.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Generation X	81 (40.29%)	70 (34.82%)	22 (10.94%)	21 (10.44%)	7 (3.48%)
Generation Y	55 (25.0%)	46 (20.90%)	25 (11.36%)	60 (27.27%)	34 (15.45%)

**3.2: Hypotheses Test Results**

The four hypotheses posited in the study were analysed using independent samples t-test. The results are shown in Table 8 below:

	<b>Gender</b>	<b>n</b>	$\bar{x}$	<b>S.D.</b>	<b>t</b>	<b>p</b>
Environmental Knowledge	Gen X	201	4.02	.604	-2.863	.004**
	Gen Y	220	4.48	.529		
Interpersonal Influence	Gen X	201	3.15	.784	2.671	.003**
	Gen Y	220	3.93	.913		
Social Media	Gen X	201	3.52	.677	-.492	.623
	Gen Y	220	3.55	.715		
Awareness of Climate Change	Gen X	201	4.25	.591	.773	.440
	Gen Y	220	4.41	.752		
Mitigating Behavior towards climate change	Gen X	201	3.30	.694	.528	.598
	Gen Y	220	3.51	.723		

**Table 8:** Mean, Standard Deviation, and t-Statistics of Variables Classified by Generation

*Remark: 4.50-5.00=Strongly Agree*

*3.50-4.49=Agree*

*2.50-3.49=Neutral*

*1.50-2.49=Disagree*

*1.00-1.49=Strongly Disagree*

*Remark \*\* Significant at .01 level*

Independent-sample t-tests were conducted to test whether any differences occurred in the specified variables identified in the study. The results are presented in Table 8. Hypotheses H<sub>a1</sub>- H<sub>a3</sub> tested differences in environmental knowledge, interpersonal influence, social media influence and awareness of climate change of Generation X and Y consumers in Thailand. The results indicated that there were significant differences in environmental knowledge: t (= -2.86, p<.01) and interpersonal influence: t (=2.67, p<.01), lending support for H<sub>a1</sub> and H<sub>a2</sub>. However, no significant differences were observed in the two generations in terms of social media influence and awareness of climate change, hence H<sub>a3</sub> was not supported. H<sub>a4</sub> tested differences in awareness of climate change and mitigating behavior toward climate change between Generation X and Y consumers in Thailand. No significant generational differences were observed, hence H<sub>a4</sub> was also not supported.

#### 4. Discussion

The above findings show that knowledge related to climate change fall along generational lines. From the responses, Generation Y Thais are more knowledgeable about climate change than those in generation X. To the question, “I possess adequate knowledge about climate change, 83.63% of Generation Y respondents indicated strongly agree and agree answers, as

compared to just 54.22 % of Generation X. These findings concur with previous studies, in which, younger people were more likely to have greater environmental knowledge than older generations [25-27]. The differences could be accounted by a stronger focus and exposure to issues regarding climate change in the education of the younger generation. Previous studies have shown that younger generations are more likely to engage in climate-related contents on online posts and discussions than older generations [27]. In a study conducted on 300 undergraduate students' awareness of climate change in two Nigerian universities, 74.9 percent of respondents agreed that they obtained information from parents and guardians as compared to 90.6 percent who agreed that they obtained information from the internet and 77.1 percent from seminars and workshops on climate change that they had attended [28]. Moreover, in a study conducted on adolescents in Yogyakarta, Indonesia, on assessment of climate change, the authors found that the majority of respondents obtained information from family members [29]. Generation Y received more information on climate change from social media platforms such as Line, Instagram and Twitter, compared to Generation X. In both generations, Line was the social media platform from which respondents received the highest amount of information on climate change. Leesanguansuk, in a report in the Bangkok Post, on generational use of social media platforms revealed that Line, YouTube, Facebook, Messenger and Pantip are most popular social media platforms for Baby boomers and Gen X users, while Gen Y and Z use YouTube, Line, Facebook, Messenger and Instagram, the most [30]. A recent study by Nielsen on three generations and social media consumption in Thailand, showed that 73 percent of Generation X accessed online platforms everyday as compared to 90% of Generation Y [31]. This findings concurs with previous research which argues that younger adults have been early adopters of social media and are more likely than older adults to be online constantly. It was also found that younger, more than older social media users, said they were motivated to learn more about climate change

from online contents [27]. In many previous studies it was found that respondents were aware of climate change. In a study on undergraduate students in two universities in Nigeria, the authors argued that the respondents were aware of climate change and its impacts [28]. However, in a study conducted on school and undergraduate students in Pune, India, it was revealed that respondents were aware of climate change but not aware of the problems and associated solutions [32]. From the findings above, it is evident that Generation Y respondents have higher agreement levels about the reality of climate change than those belonging to Generation X. Some authors have argued that this may be because younger people have more time in their lives to experience these changes compared to the older generations [33]. This was also demonstrated in a study on 28 EU countries which showed that those aged 15 -24 were more concerned about climate change than those who were 55 and older [34]. The descriptive statistical results in the current study indicate a dissonance between awareness and mitigating behaviour across both generations of respondents. The widespread awareness of climate change found in this study is not coupled with the proportionate willingness to take mitigating action, even among the younger Generation Y consumers. Both generations were unwilling to make changes in their lifestyles related to energy consumption, transportation and meat consumption. For example, in answering the question, “I will certainly reduce my energy consumption if it helps to protect the environment”, 48 percent of Generation X and 39.9 percent of Generation Y indicated disagree and strongly disagree. In similar vein, the answers provided for the question, “I am willing to use public transportation rather than drive, in order to protect the environment”, showed that 55.21 percent of Generation X and 51.81 percent of Generation Y indicated their unwillingness, as their responses fell under disagree and strongly disagree. This finding concurs with many previous studies which showed attitude-behaviour gaps, in other words, higher personal behaviour costs, such as not driving to work or reducing energy and meat

consumption do not lead to higher levels of mitigating behaviour towards climate change [35-37]. This study has discovered links between environmental knowledge, climate change awareness and mitigating behavior. Kittipongvises and Mino argued that if scientific knowledge on climate change can be transformed into personal concern for the environment then Thai people are more likely to display mitigating behavior [38].

## **5. Conclusion and Implications**

The level of environmental knowledge and awareness of climate change is lower among the Generation X respondents, in this study. It was also found that interpersonal influence for this generation came more from family/friends than scientists and environmental organizations. This indicates that, instead of using a 'one-size fits all' approach, policy makers and marketers should use specific referents/influencers and unique strategies and messages on climate change to suit the distinct cohorts. The majority of respondents of both generations use the social media platform Line. This platform can be the means to encourage Thais to discuss various types of mitigating behaviour as well as to correct any misinformation on climate change issues. Finally, the study found that respondents belonging to Generation X (75.11%) and Generation Y (45.9%) wanted Thai government incentives to motivate them towards eco-friendly behaviour. Hence, tax incentives, discount schemes, awards and financial subsidies can be some of the means whereby the government can encourage increased individual and community mitigation actions in the Thai context.

### **5.1 Further Research**

The results of this study must be used with caution as the sample is composed of only Gen X and Y respondents, all of whom live in Bangkok. Subsequent research should replicate these findings to other generations as well as in other cities in Thailand. There are many other internal and external variables, such as socio-economic, lifestyles, and other psychological factors, which have not been included in this study. These can be further examined to gain a better understanding of climate change and subsequent mitigating alternatives. A qualitative research method is also suggested to gain in-depth information about Thai generational cohorts and a deeper understanding behind their reasoning and motivations when it comes to climate change. Finally, researchers may conduct studies in other ASEAN countries so as to heighten awareness of other systems, cultures, and patterns of behavior related to climate change.

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