PREDICTORS OF BEHAVIOR INTENTION TO DEVELOP A GREEN UNIVERSITY: A CASE OF AN UNDERGRADUATE UNIVERSITY IN THAILAND

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ABSTRACT: The aim of this study is to identify the level and predictor of behavior intention to develop a green university in the case of an undergraduate university in Thailand. The university students and staff at Valaya Alongkorn Rajabhat University under the Royal Patronage, Thailand were selected as the participants in this study using a structured questionnaire covering the six major criteria of the UI GreenMetric World University Ranking. The best predictor factors of the dependent variable were determined by multiple logistic regression. The results showed that a positive attitude towards transportation and education were found to be the most significant predictors of intention to develop green university behavior. This finding implied that the preparation stage in which the behavior intention to develop a green university in the UI GreenMetric World University Ranking is identified should be promoted to provide the opportunity for the development of a green university.

Keywords: Behavior intention, Green University, Undergraduate University, Thailand

1. INTRODUCTION

For almost three decades, the sustainable society concept has been recognized, highlighting the significant role of higher education in providing the opportunity for generating behavior changes based on the daily life attitude of students and staff toward sustainable development [1], [2], [3]. Besides, the enhancement of concern for many environmental problems should generate knowledge and integrate sustainability performance in educational and research programs, as well as promote environmental awareness in society [4]. Hordijk [5] identified that knowledge generation by the university community was the key role of a sustainable campus with the ecological and social challenges facing societies in the future. Currently, the concept of a green university has been initiated worldwide. Universitas Indonesia (UI) developed the UI GreenMetric World University Ranking for universities to share information about their sustainability practices on the basis of Sustainability for Higher Education [6]. However, a green university initiative may be the best tool for society only when universities are well prepared for it. Hence, only 15 universities in Thailand were involved in this ranking process in 2014 [7]. There is currently a lack of research on the preparation stage for green university development in Thailand. Therefore, this study was conducted to identify the level and best predictor of behavior intention to develop a green university for the case of an undergraduate university in Thailand.

2. METHODS

2.1 Case Study Setting

Valaya Alongkorn Rajabhat University (VRU) under the Royal Patronage, Thailand was selected as a case study for this research. This university is located in the Pathum Thani province on the northern border of Bangkok. Most VRU students are enrolled in an undergraduate degree program. VRU has not yet entered the UI ranking system but strongly intends to participate in 2018. Hence, the assessment of behavior intention to develop a green university formed the preparation stage for UI GreenMetric ranking for this university.

2.2 Sample size calculation and procedure

Taro Yamane’s equation [8], presented in Eq. (1), was used to calculate the necessary sample size of VRU participants.

\[ n = \frac{N}{1 + \frac{N \times e^2}{N - 1}} \]  

\[ n = \frac{14,000}{1 + \frac{14,000 	imes 0.05^2}{14,000 - 1}} = 700 \text{ people} \]

where \( n \) is the sample size, \( N \) is the population size and \( e \) is the level of precision (0.05 for a 95% confidence level with a precision rate of ±5% and
a degree of maximum variability of 0.5). For VRU with a population of 14,000, this gives a sample size of 700, which consisted of 280 staff and 420 students recruited according to their proportion of the university population. VRU staff or students who had been working or studying at the university for at least six months were invited to fill out the questionnaire with no incentive. Simple random sampling conducted in the VRU main cafeteria for 1 week was used to collect participants for this research.

2.3 Data collection tool and analysis

The questionnaire was developed from the literature and was designed to explore the behavior intention towards a green university. There were three sections. General information about the participants was collected using eight questions making up the first section of the questionnaire. The second and third sections consisted of the 43 attitude questions and four questions on behavior intention to develop a green university, respectively, based on the UI GreenMetric categories including (1) Setting and infrastructure, (2) Energy and climate change, (3) Waste management, (4) Water management, (5) Transportation and (6) Education. Reliability tests for the attitude part gave a value of 0.7 for Conbach’s Coefficient-Alpha.

Statistical analysis of this study was performed using the SPSS software. Descriptive statistics were used to assess the level of knowledge and behavior intention to develop a green university. Association and strength of the relationship between factors were determined by Chi-squared analysis. Finally, multiple logistic regression was performed to identify the predictors of behavior intention to develop a green university.

3. RESULTS AND DISCUSSION

Based on the data from the questionnaires (Table 1), more than 67% of participants were female. Most of them (50.10%) were in the age group of 18 – 20 years old. Concerning the participants’ background, most of them (68.7%) were educated in undergrad level. Sixty percent of the participants were VRU students. Most participants (38.7%) lived at home and more than 45.6% used public transportation.

| Items                  | Number | Percent |
|------------------------|--------|---------|
| Sex                    |        |         |
| Male                   | 228    | 32.6    |
| Female                 | 472    | 67.4    |

Table 1 (Continued)

| Items               | Number | Percent |
|---------------------|--------|---------|
| Age (Year)          |        |         |
| 18-20               | 351    | 50.1    |
| 21-30               | 218    | 31.1    |
| 31-40               | 102    | 14.6    |
| 41-50               | 29     | 4.1     |
| Education           |        |         |
| Bachelor            | 481    | 68.7    |
| Master              | 199    | 28.4    |
| Ph.D                | 20     | 2.9     |
| Status              |        |         |
| Student             | 420    | 60.0    |
| Staff               | 280    | 40.0    |
| House type          |        |         |
| Home                | 271    | 38.7    |
| Condominium         | 102    | 14.6    |
| University Dormitory| 47     | 6.7     |
| Rental home         | 57     | 8.1     |
| Private dormitory   | 223    | 31.9    |
| Transportation to university | 63  | 9.0 |
| Motor cycle         | 187    | 26.7    |
| Bicycle             | 49     | 7.0     |
| Public transport    | 319    | 45.6    |
| Other               | 82     | 11.7    |

Table 2 presents the participant knowledge levels in the six categories of the UI GreenMetric including infrastructure, climate change, waste management, water management, transportation and education system. The knowledge categories for the infrastructure, climate change, waste management, water management and education system categories were at moderate levels. Only the transportation category of the UI GreenMetric was at a good level.

Table 2 Level of knowledge toward a green university (n=700)

| Items               | Number | Percent |
|---------------------|--------|---------|
| Infrastructure      |        |         |
| Poor                | 85     | 12.1    |
| Moderate            | 466    | 66.6    |
| Good                | 149    | 21.3    |
Table 2 (Continued)

| Items             | Number | Percent |
|-------------------|--------|---------|
| Climate change    |        |         |
| Poor              | 49     | 7.0     |
| Moderate          | 548    | 78.3    |
| Good              | 103    | 14.7    |
| Waste management  |        |         |
| Poor              | 128    | 18.3    |
| Moderate          | 398    | 56.9    |
| Good              | 174    | 24.9    |
| Water management  |        |         |
| Poor              | 163    | 23.3    |
| Moderate          | 111    | 15.9    |
| Good              | 426    | 60.9    |
| Transportation    |        |         |
| Poor              | 123    | 17.6    |
| Moderate          | 292    | 41.7    |
| Good              | 285    | 40.7    |
| Education system  |        |         |
| Poor              | 129    | 18.4    |
| Moderate          | 291    | 41.6    |
| Good              | 280    | 40.0    |

Table 3 shows that most of the participants (52%) had a good behavior intention to develop a green university. Regarding the instances of low behavior (> 20%) in Table 4, buy environment-friendly materials, effective use of renewable energy, participate in environmental sustainability activities, be a member of an environmental and sustainability club and access the green university website were the main items for which an enhancement approach is recommended to develop a green university.

For statistical analysis, participants who were female and had a positive attitude toward the setting and infrastructure, energy and climate change, waste management, transportation and education intended to support a green university. This finding agrees with the results of Mamat et al. [9] who found that green office practices have the highest in the categories of solid waste management, water resources management and education and awareness. Multiple logistic regression analysis revealed that females were 1.4 times more likely to support a green university (Adj. OR 1.21; 95% CI: 1.00-2.01) because males were considered as the primary destroyers of the environment, whereas females were deemed as secondary users of the environment [10]. In addition, those who had a positive attitude towards transportation and education were nearly two times more likely to support a green university (Adj. OR 1.55; 95% CI: 1.09-2.18, 1.86; 95% CI: 1.33-2.59) (Table 2) because the promotion of public transport within the university should be the potential of UI green implementation [6].

It can be concluded that the identification of the level of behavior intention to develop a green university according to the UI GreenMetric World University Ranking should be performed for the preparation stage. More positive attitudes and behavior would increase the potential for green university implementation. This initiative could result in a successful strategy for encouraging world sustainability.

Table 3 Level of behavior toward a green university (n =700)

| Items                      | Number | Percent |
|----------------------------|--------|---------|
| Behavior toward green university |       |         |
| Poor                       | 371    | 53.0    |
| Good                       | 329    | 47.0    |

4. CONCLUSION

The purpose of this study was to identify the level and predictor of behavior intention to develop a green university for the case of an undergraduate university in Thailand. The students and staff at Valaya Alongkorn Rajabhat University under the Royal Patronage, Thailand were selected as the sample population for this study. A questionnaire for collecting data was developed using the six major criteria of the UI GreenMetric World University Ranking. Association and strength of the relationship between factors were determined by Chi-squared analysis and logistic regression, and determination of the best predictor factors was performed by multiple logistic regression. The results showed that a positive attitude towards transportation and education were found to be the most significant predictors of intention to develop a green university.

5. ACKNOWLEDGEMENTS

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Table 4 Level of behavior in the six categories of a UI green university

| Items                                                                 | Behavior                                           |
|-----------------------------------------------------------------------|----------------------------------------------------|
|                                                                       | No       | Yes      |
|                                                                       | n  | %   | n  | %   |
| **Infrastructure**                                                    |       |        |
| Participate in planting a tree in the university                      | 250 | 35.7  | 450 | 64.3 |
| Make repairs for effective use and a friendly environment             | 462 | 66.0  | 238 | 34.0 |
| Buy environment-friendly materials                                    | 604 | 86.3  | 96  | 13.7 |
| Effective use of renewable energy                                    | 594 | 84.9  | 106 | 15.1 |
| **Climate change**                                                    |       |        |
| Turn off the lights                                                   | 39  | 5.6   | 661 | 94.4 |
| Use the stairs                                                        | 20  | 2.9   | 680 | 97.1 |
| Adjust the temperature to 25°C                                        | 20  | 2.9   | 680 | 97.1 |
| Turn off the air conditioning at lunch time and after work           | 29  | 4.1   | 671 | 95.9 |
| Shut down electronic devices when…                                   | 30  | 4.3   | 670 | 95.7 |
| Participate in energy-saving project                                 | 413 | 59.0  | 287 | 41.0 |
| Participate in climate change activity                               | 458 | 65.4  | 242 | 34.6 |
| Design the office/classroom to conserve energy                       | 541 | 77.3  | 159 | 22.7 |
| **Waste management**                                                  |       |        |
| Dispose of waste into the garbage                                    | 56  | 8.0   | 644 | 92.0 |
| Replace foam box with own lunch box                                  | 337 | 48.1  | 363 | 51.9 |
| Choose a restaurant with easy biodegradable packaging                | 388 | 55.4  | 312 | 44.6 |
| Use own glass                                                        | 279 | 39.9  | 421 | 60.1 |
| Use a cloth bag or basket                                            | 175 | 25.0  | 525 | 75.0 |
| Reuse plastic bags                                                   | 46  | 6.6   | 654 | 93.4 |
| Refuse a plastic bag for few items                                   | 53  | 7.6   | 647 | 92.4 |
| Use double-sided paper                                               | 22  | 3.1   | 678 | 96.9 |
| Use recycled paper for printing                                      | 27  | 3.9   | 673 | 96.1 |
| Replace tissue paper with a re-usable napkin                         | 79  | 11.3  | 621 | 88.7 |
**Table 4 (Continued)**

| Items                                                                 | Behavior                                                   |
|-----------------------------------------------------------------------|-------------------------------------------------------------|
|                                                                       | No               | Yes       |               |               |
|                                                                       | n    | %   | n    | %   |
| Waste management (Continued)                                          |      |     |      |     |
| Separate hazardous waste                                             | 67   | 9.6 | 633  | 90.4 |
| Participate in reducing waste in the university                      | 281  | 40.1| 419  | 59.9 |
| Water management                                                      |      |     |      |     |
| Turn off the water when not in use                                   | 16   | 2.3 | 684  | 97.1 |
| Use water-saving faucet                                              | 29   | 4.1 | 671  | 95.9 |
| Participate in water-saving activity                                  | 462  | 66.0| 238  | 34.0 |
| Use water-saving lavatory                                            | 55   | 7.9 | 645  | 92.1 |
| Inform the staff of water leaks                                      | 97   | 13.9| 603  | 86.1 |
| Transportation                                                        |      |     |      |     |
| Use the sidewalk within the university                                | 32   | 4.6 | 668  | 95.4 |
| Use a bicycle within the university                                   | 302  | 43.1| 398  | 56.9 |
| Use a motorbike within the university                                 | 297  | 42.4| 403  | 57.1 |
| Use a car within the university                                       | 416  | 59.4| 284  | 40.6 |
| Participate in reducing the use of cars within the university         | 499  | 71.3| 201  | 28.7 |
| Use public transportation                                            | 136  | 19.4| 564  | 80.6 |
| Education system                                                      |      |     |      |     |
| Attend a course related to environment and sustainability             | 637  | 96.1| 27   | 3.9 |
| Participate in environmental activities                              | 514  | 73.4| 186  | 26.6 |
| Participate in environmental sustainability activities                | 698  | 99.7| 2    | 0.3 |
| Be a member of an environmental and sustainability club               | 699  | 99.9| 1    | 0.1 |
| Access the green university website                                   | 699  | 99.9| 1    | 0.1 |
Table 5. Association and predictor with behavior intention to develop a green university

| Factor                  | Number | Good (%) | Bad (%) | OR    | 95% CI       | Adjusted OR | 95% CI       |
|-------------------------|--------|----------|---------|-------|--------------|-------------|--------------|
| Sex                     |        |          |         |       |              |             |              |
| Male                    | 228    | 58.8%    | 41.2%   | 1.00  |              | 1.00        |              |
| Female                  | 472    | 50.2%    | 49.8%   | 1.41  | 1.02-1.94    | 1.42        | 1.00-2.02    |
| Age (Year)              |        |          |         |       |              |             |              |
| 18-30                   | 569    | 53.4%    | 46.6%   | 1.00  |              | 1.00        |              |
| 30-50                   | 131    | 51.1%    | 48.9%   | 1.09  | 0.74-1.60    | 1.17        | 0.72-1.91    |
| Education               |        |          |         |       |              |             |              |
| Bachelor                | 481    | 52.6%    | 47.4%   | 1.00  |              | 1.00        |              |
| More than bachelor      | 219    | 53.9%    | 46.1%   | 0.95  | 0.68-1.30    | 1.11        | 0.61-2.01    |
| Status                  |        |          |         |       |              |             |              |
| Student                 | 420    | 52.6%    | 47.4%   | 1.00  |              | 1.00        |              |
| Staff                   | 280    | 53.6%    | 46.4%   | 0.96  | 0.71-1.30    | 0.77        | 0.42-1.42    |
| House type              |        |          |         |       |              |             |              |
| Home/Condominium        | 373    | 55.8%    | 373     | 1.00  |              | 1.00        |              |
| Dormitory/rental        | 327    | 49.8%    | 327     | 1.26  | 0.94-1.70    | 1.22        | 0.88-1.68    |
| Transportation to university |  |  |  |  |  |  |  |
| Public                  | 319    | 54.9%    | 319     | 1.00  |              | 1.00        |              |
| Own                     | 381    | 51.4%    | 381     | 1.14  | 0.85-1.54    | 1.20        | 0.82-1.73    |
| Transportation in university |  |  |  |  |  |  |  |
| Public                  | 192    | 53.1%    | 319     | 1.00  |              | 1.00        |              |
| Own                     | 508    | 53.0%    | 47.0%   | 1.00  | 0.72-1.40    | 0.93        | 0.61-1.41    |
| Knowledge of Green University |  |  |  |  |  |  |  |
| Infrastructure          |        |          |         |       |              |             |              |
| Low                     | 551    | 55.5%    | 44.5%   | 1.00  |              | 1.00        |              |
| High                    | 149    | 43.6%    | 56.4%   | 1.61  | 1.12-2.32    | 1.27        | 0.86-1.88    |
| Climate change          |        |          |         |       |              |             |              |
| Low                     | 597    | 54.8%    | 45.2%   | 1.00  |              | 1.00        |              |
| High                    | 103    | 42.7%    | 57.3%   | 1.62  | 1.06-2.47    | 1.13        | 0.71-1.80    |
| Waste management        |        |          |         |       |              |             |              |
| Low                     | 526    | 56.1%    | 43.9%   | 1.00  |              | 1.00        |              |
| High                    | 174    | 53.0%    | 47.0%   | 1.54  | 1.16-2.32    | 1.22        | 0.82-1.82    |
| Water management        |        |          |         |       |              |             |              |
| Low                     | 274    | 55.5%    | 44.5%   | 1.00  |              | 1.00        |              |
| High                    | 426    | 51.4%    | 48.6%   | 1.17  | 0.86-1.59    | 0.85        | 0.60-1.19    |
| Transportation          |        |          |         |       |              |             |              |
| Low                     | 415    | 59.3%    | 40.7%   | 1.00  |              | 1.00        |              |
| High                    | 285    | 43.9%    | 56.1%   | 1.86  | 1.37-2.52    | 1.55        | 1.09-2.18    |
| Education system        |        |          |         |       |              |             |              |
| Low                     | 420    | 60.2%    | 39.8%   | 1.00  |              | 1.00        |              |
| High                    | 280    | 42.1%    | 57.9%   | 2.08  | 1.53-2.82    | 1.86        | 1.33-2.59    |
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