Adaptive Structural Model Development for Off-campus Student Housing Preferences using SEM – PLS Analysis

Thuraiya Mohd[1], Noraini Johari[2], Suwaibatul Islamiah Abdullah Sani[3*],
Lizawati Abdullah[4], Nurulanis Ahmad @ Mohamed[5]

[1,2,3,4,5] *Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA*
Perak Branch, Seri Iskandar Campus 32610, Perak, Malaysia
*Corresponding author E-mail: thura231@perak.uitm.edu.my

Abstract

The immense number of student enrolment has created high demand for student accommodation far exceeding the available on-campus student accommodation provided by universities and colleges. Thus, some students may need to reside off-campus instead. As different groups of society have different preferences and needs, it is crucial to identify the off-campus student housing preferences who are the economically determinant group of people. This paper presents the formulation of a structural model depicting off-campus student housing preferences. The study presents data collected through a survey conducted via structured questionnaires in likert scale type of questions distributed randomly among off-campus students in selected public and private universities located within the State of Selangor. The data was analysed using the SEM – PLS. The results from analysis indicate that the four main factors to be considered relating to student housing preferences are: housing environment, location, housing quality, and housing accommodation. Findings of this research will provide a set of guidelines for off-campus student housing preferences that is significant to local authorities, housing developers, Higher Education Institutions (HEIs), students' societies, and also the local communities to be the panacea for studentification issues.

Keywords: *Structural Model, Off-Campus Housing Preference, Students Housing Preferences, SEM-PLS Analysis*

1. Introduction

The rapid expansion of Higher Educational Institutions (HEIs) has led to high concentration of tertiary students in residential areas leading to mushrooming of student housing enclaves in close proximity with university campuses. Student housing preferences have become a seriously debated issue by scholars throughout the world in recent years [1], [2], [3]. In fact, researches in these areas are diverse. Not all universities are able to provide adequate student accommodation, as the numbers of students are far greater than the available accommodations. The idea of all students living on-campus is no longer possible. Housing the off-campus students has become a challenge, as it has evolved into an underlying issue of housing in general and at present lacks any legal redress to be the panacea for studentification issues. In some way, off-campus students may often be viewed as an economically challenged group of people and therefore requires different types of accommodation to serve their preferences. As such, the authorities should highlight off-campus student housing preferences in the development of HEIs to provide safe accommodations and better quality of life.

With changing student population distributions unfolding in many cities of developed countries, many local authorities cooperate with universities and local governments to enable the development of student housing. Examples of such collaborations are Purpose-Built Student Accommodation (PBSA) in Canada, House of Multiple Occupations (HMOs) in United Kingdom and other off-campus student lounges in Germany. However, in Malaysia, student housing is still bound to the management of the universities as such, students only have the silent power to say what their preferences are. In addition, the development of off-campus student housing in partnership between the developers, universities and local governments is nowhere in sight [1], [2]. With limited sources of income and having to deal with rising rents of private rentals, off-campus students try to cut cost on housing rental expenses by living with multiple occupations to reduce the rental paid per person [3]. In doing so, they are forgoing comfort and privacy, and must accept the low standard of living. It is thus essential for the authorities to take action and provide student housing in view of rising rents and inadequacy of student hostel facilities.

The study investigated the impact of student profile variables on student housing preferences variables identified as the most significant. These are housing environment, location, housing quality, and housing accommodation. Based on results, we can conclude that gender influences the off-campus student housing preferences rather than year of study, financial resources, or mode of transportation. This result aligns with previous research by [5], [9] and [10] that gender is an important variable contributing to housing preferences, which are location, housing quality, accommodation and environment. It contradicts [1] who postulated that mode of transportation is the most influential student profile variable.

Various factors contribute towards the development of a structural model of off-campus student housing preferences. This paper presents the formulation of a structural model depicting off-campus student housing preferences. In this study, the motivation is the need to miti-

gate the negative effects of studentification and to provide safe and quality life to students and the local   neighbourhoods. It seeks to contribute through developing an off-campus student housing preferences structural model, which can later give significant inputs towards the formation of a Student Housing Guidelines in the Malaysian context.The study findings indicated that independent variables of student profile and housing preferences present the strongest relationship supporting such structural model.

Student Profile

Demographic background is often used as one of the independent variables to relate with the preferred housing characteristics from previous studies on housing preferences [10],[11],[12],[13],[14],[15],[16],[8],[7],[17], and [9]. The general population housing preferences studies constituting employed people as respondents also include demographics as an essential component [18] and [19]. It shows that the background of the students does represent an important measurement variable in several research on student housing; be it satisfaction, accommodation satisfaction or other related studies. Thus for this research, it is appropriate to also include student characteristics in the analytical framework as the independent variable component of off-campus student housing preferences. This independent   variable (student characteristics) including gender, year of study and transportation.

Housing Preferences

Off-campus students are all in fact the sub-market groups that have different preferences which could influence his or her   housing preferences [12]. Location is one of the variables in housing preferences as many previous research on housing had   included this as one of the housing attributes [10], [11], [12],[16],[7], [8] and [20]. Location of place to reside is often associated with transportation costs, security of jobs, moving   expenses and more time for daily activities [19]. As off-campus students are one of the sub-markets in the rental market, housing location is preferable at a convenient location. This usually means proximity to campus and other facilities [19], [12], [7] and [22]. A study by Thomsen [23] found that students who reside off-campus preferred to reside as close to the city centre as possible and   nearby their campus. Hilmy et al. [7] also stressed that location of student housing or proximity to the campus is one of the most important preferences for better housing satisfaction. Thomsen and Eikemo's[16]findings indicated that type of tenancy of the housing by students does reflect student preferences. Hilmy et al. [7] which found that students will take into consideration the length of lease/contract and often rent a house or room for   dwellings.

Housing type is one of the variables in housing preferences. There is no ideal type of housing preferred by off-campus students as they search for housing, not anticipating that the house will fulfil their different needs and preferences [24]. This is because off-campus students often apply trade-offs between satisfactions and needs due to limited sources of income [12], [16] and [25].   Despite that, this variable is necessary to ascertain whether   different housing types preferred by the off-campus students have the effect in reducing the cost of housing rental payment [12], [15], [14], [16], [7] and [17]. A study conducted by Korevaar [12] found that off-campus students preferred to share accommodation with multiple households rather than living alone, since they are able to pool incomes and minimise the payment of rental per person. This is also supported by research in Malaysia by Thuraiya et al. [9] which found that the higher the number of occupants in a house, the lower the rental paid per person.

Rental cost also influences students in choosing the housing.   Students often take into consideration various aspects of housing and will decide based on their preferences and not necessarily to fulfil their needs. Based on the reviews of students' housing preferences, it was clear that students' housing preferences are always constrained by the levels of income [12],[16],[25],[26] and [9]. Based on general housing demand, households will compare their levels of income with their total household costs [21].   As reiterated by Thuraiya et al. [9], students do not have a fixed income and tend to rely on their educational loans or personal sources of income for living costs. The limitation of sources of income by the sub-market groups (off-campus students) has significant effect to the house of multiple occupations where they tend to reside in high numbers of occupants and trade-off comfort in order to minimize the cost of rental per person [9].

Quality aspect is another important variable that requires reviews on off-campus student housing as it is one of the three main variables in the "Housing Choice Hierarchy" [12]. A decision on the selection of housing will definitely be based on the quality of the housing and may sometimes result in paying additional housing rental cost [9]. Quality of housing is also essential for housing satisfaction [16],[7] taking into consideration the number of household compositions and furnishings provided [10], [12] and [16]. Quality is associated with living space, absence of distraction, absence of house rules and regulations, ability to add personal style, facilities and amenities, within campus proximity, and etc. [16],[8].[7],[17],[13] thus it is appropriate to add perception-based questions on how off-campus students rate their housing quality in relation to the student housing.

2. Research Method

This study applies analytical survey using cross-sectional research design. The survey was conducted to develop a structural model of off-campus student housing preferences. Data collection was done through a set of structured questionnaires distributed to the   students. The sample was selected from the population using a combination between cluster sampling and stratified random sampling by identifying the total population of the selected universities. Public universities as well as private universities registered under the Ministry of Higher Education database in the State of Selangor were chosen. Full-time undergraduate students who live on and off-campus and residing in private rented units were selected as they are not likely to be employed as full-time workers. Areas which have both public and private HEIs are selected as target population. The delimitation of this research is as tabulated in Table 1.

Table 1: Selected area and population of students

Area and Types of Universities (N=240,308)					
Area of Universities	**Area 1** (Shah Alam)	**Area 2** (Gombak)	**Area 3** (Serdang)	**Area 4** (Bangi)	**Total Samples**
Total population for each area	168,257	27,051	25,000	20,000	n=1000
% of Population Proportion	70%	11%	10%	9%	

The number of samples from a population was calculated using Slovin's formula. The methods are as follow:
Total population (N) = 240,308 students

Formula = n = N / (1 + N e2)
Confidence level 95% (a margin of error of 0.05) or confidence level 97% (a margin of error of 0.03)
Plug the data into the formula: n = N/ (1 + N e2)
N = Total population; e = margin of error

Calculation of sampling using Slovin's Formula:

Calculation 1		Calculation 2	
240,308	= 1106	240,308	=
1 + 240,308 (0.0009)		399	
		1 + 240,308 (0.0025)	

The total sample size in this research range from 399 to 1106. Thus, total sample size of N=1000 was sufficient with confidence level 97% and margin of error of 0.03. The data was analysed using the Structural Equation Modeling - Partial Least Square (SEM-PLS) statistical technique through three (3) step modeling. PLS has been preferred as a method of analysis as it allows estimating complex cause-effect relationship models with latent variables and deriving the results by testing its construct reliability, composite reliability and indicator reliability; discriminant validity and convergent validity analyses. PLS does not fit a common factor model to the data, rather it fits a composite model. In doing so, it maximises the amount of variance explained. In fact, just by an adjustment, PLS is capable of estimating common factor models consistently. The Smart PLS 2.0 M3 was employed as a tool to develop a structural model. Figure 1 shows that three (3) algorithm progressive steps of SEM-PLS analysis were used to identify the relationships between student profiles and housing preferences.
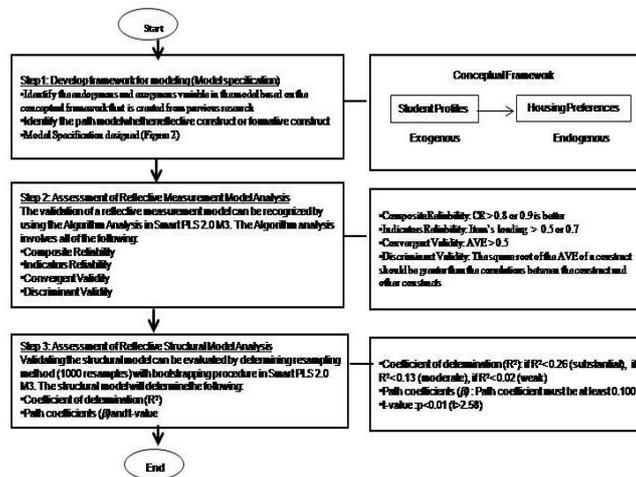

Figure 1: Algorithm Progressive steps of SEM-PLS analysis

Step 1: Develop framework for modeling off-campus student housing preferences (identify the relationships between various variables of student profiles and housing preferences).
Figure 2 shows the framework for testing of relationships between the various variables of student profiles and housing preferences; while the descriptions for each variable are as illustrated in Table 2.
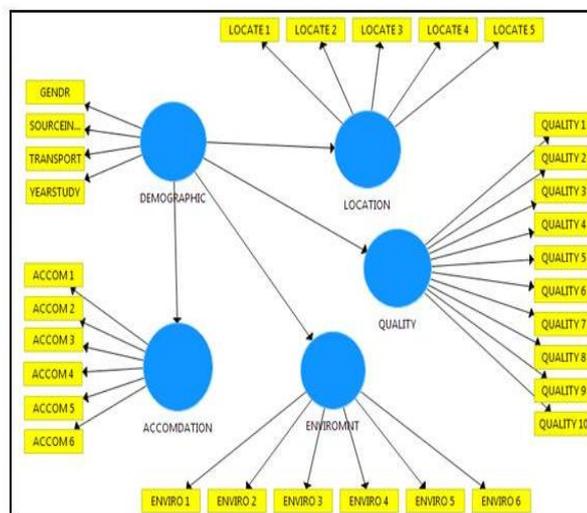

Figure 2: Framework for testing of relationships between the various variables

                                            International Journal of Engineering & Technology

Table 2: List of variables in model (SEM-PLS)

No.	Variables	Description
1.	Exogenous (Independent Latent Variable)	Student profiles (DEMOGRPHIC)
		1. Gender (GENDR)
		2. Years of studies (YEARSTUDY)
		3. Sources of income (SOURCEIN)
		4. Transportation (TRANSPORT)
2.	Endogenous (Dependent Latent Variable)	Housing preferences
		1. Aspect of housing quality (QUALITY)
		2. Aspect of housing environment (ENVIRO)
		3. Aspect of location (LOCATE)
		4. Aspect accommodation (ACCOM)

Step 2: Measurement Model Analysis

Measurement Model Analysis develops a measurement model which represents the relationships between the observed data variables in the questionnaire and the latent variables [26]. The validation of a reflective measurement model can be recognized by testing its construct reliability, composite reliability and indicator reliability; discriminant validity and convergent validity.

Step 3: Structural Model Analysis

Finally, the Structural Model Analysis produces a structural model which represents the relationships between the latent variables. Validating the structural model can help the researcher to evaluate systematically whether the hypotheses expressed by the structural model are supported by the data [27]. The structural model can only be analysed after the measurement model has been validated successfully. In PLS, a structural model can be evaluated using the coefficient of determination (R^2) and path coefficients. A bootstrapping procedure was performed for 1000 samples with the purpose of analysing the t-statistics (t-values) which measure the statistical significance of path coefficients.

3. Results and Discussions

The PLS structural equation model is composed of two sub-models: the measurement model and the structural model.

3.1 Measurement Model Analysis

Table 3 summarises the results of the measurement model of the research after a few adjustments were made. The overall model consists of 31 items whereby 27 items are independent variables: five (5) items for Location; ten (10) items of Housing Quality; six (6) items for Accommodation; and six (6) items for Housing Environment. The remaining four (4) items are dependent variables (student profile): gender, year of studies, sources of income and transportation. A total of two (2) items were deleted from location aspect, and two (2) items from housing environment in order to increase the composite reliability of the independent variables. Student Profile is the dependent variable of the model that measures how the students prefer their off-campus housing aspect based on their perception. The original number of items was four (4) which was then reduced to single item measurements so as to increase the reliability of the dependent variables. Results of the model are as illustrated in Figure 3 (before deletion) and Figure 4 (final model).

Table 3: Measurement Model Results

Constructs	Items	Description	Indicator Reliability (Factors Loading)	Composite Reliability	AVE
Student profiles (DEMOGRAPHIC)	GENDER	Gender	1.000	1.000	1.000
	YEARSTUDY	Year of studies	Item delete		
	SOURCEIN	Sources of income	Item delete		
	TRANSPORT	Transportation	Item delete		
Location (LOCATE)	LOCATE1	Near to university/campus, within walking distance	0.776	0.869	0.690
	LOCATE2	Near to public transportation	0.931		
	LOCATE3	Near to facilities, amenities, shops, restaurants, banks	0.776		
	LOCATE4	Near to main accessibilities	Item delete		
	LOCATE5	Near to city centre	Item delete		
Housing Quality (QUALITY)	QUALITY1	External Quality	0.553	0.939	0.607
	QUALITY2	Internal Quality	0.669		
	QUALITY3	Wiring and Electrical Quality	0.825		
	QUALITY4	Number of Sockets	0.802		
	QUALITY5	Housing Security	0.829		
	QUALITY6	Housing Space	0.782		
	QUALITY7	Roof Quality	0.804		
	QUALITY8	Ventilation and air quality	0.828		
	QUALITY9	Sanitary Facilities	0.827		
	QUALITY10	Water Supply Quality	0.825		
Accommodation (ACCOM)	ACCOM1	Rooms with attached bathroom and hot water	0.683	0.851	0.496
	ACCOM2	Rooms with air-conditioning	0.597		
	ACCOM3	Rooms with kitchen facilities	0.821		
	ACCOM4	Rooms with laundry facilities	0.893		
	ACCOM5	Availability of internet access	0.603		
	ACCOM6	Availability of TV Cable (Astro, Unifi, etc.)	0.563		
Housing Environment (ENVIRO)	ENVIRO1	Neighborhood mainly family or adult workers	0.562	0.818	0.536
	ENVIRO2	Neighborhood mainly students	Item delete		
	ENVIRO3	Availability of parking space	0.666		
	ENVIRO4	Availability of facilities and amenities nearby	0.846		
	ENVIRO5	Safety and security	0.818		
	ENVIRO6	Not crowded	Item delete		

Table adapted from Hair et al. 2014
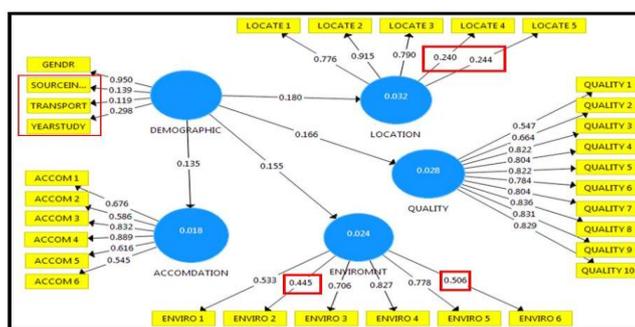*AVE: Average Variance Extracted; HTMT: Heterotrait-Monotrait Ratio;

Figure 3: Measurement Model 1

Prior to items being deleted from the model due to factor loadings of below 0.5
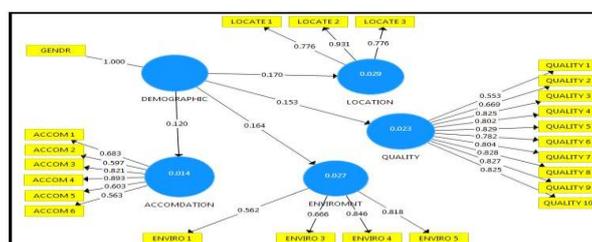

Figure 4: Measurement Model 2

Post several items deleted from the model due to factor loadings below 0.5
The reliability of the measurement model can be valued through Composite Reliability where values' ranging from 0.7 or greater is considered as acceptable [28] and [29]. Table 3 specifies that the composite reliability of the model measurement values ranged from 0.818-1.000. It shows that the composite reliability for all variables exceeded the value of 0.7 as suggested by researchers [28] and [29]. Thus, the results indicate that all the variables have satisfactory internal consistency reliability and the values prove that it is acceptable to measure the instruments consistently.
The primary purpose of validity test is to measure the theory's fitness of the design test [30]. It can be divided into two tests which are convergent validity and discriminant validity. Convergent validity can be assessed by looking at the results of the measurement model's factor loading, composite reliability and its average variance extracted (AVE) [31]. Table 3 shows that the factor loading of each item in the construct exceeded the endorsed value of 0.5 as stated by researchers [27]. Subsequently, Table 3 further approves the validity of the model by indicating the value of composite reliability of the model of 0.818-1.000. This surpassed the recommended value of 0.7 [31]. The model's average variance extracted (AVE) values also exceeded the researchers' [28],[29],[31],[32] expected value of 0.5 with a range of 0.536-1.000. This reflects the overall amount of variance in the items for the latent construct. Based on the result of analyses, it can be concluded that the measurement model possessed adequate convergent validity and is acceptable for this model.
The discriminant validity test can be indicated by the weak correlation between items in a different construct [33]. This test can be identified by examining the status of the model discriminant validity. As suggested by the researchers [34], it is best to assess the discriminant validity in PLS-SEM. This is performed by looking at the HTMT criterion value to confirm that the items across the construct measure different constructs in the model. It is identified by looking at the fact that the confident interval value of HTMT statistic must not comprise the value of 1 for an entire combination of the construct and by assessing the value of HTMT below 0.90 [31]as presented in Table 4. Consequently, Table 4 shows the value of HTMT of the entire construct is less than 0.90 which indicates minimal discriminant validity for the model. Therefore, there are no collinearity issues between the constructs in the conceptual model.

Table 4: Heterotrait-Monotrait Ratio HTMT (Discriminant validity of variables)

Variables	1	2	3	4	5
1.ACCOMDATION	0.704				
2.DEMOGRAPHIC	0.120	1.000			
3.ENVIROMENT	0.541	0.164	0.732		
4.LOCATION	0.293	0.170	0.348	0.831	
5.QUALITY	0.422	0.153	0.542	0.403	0.862

3.2 Structural Model Analysis

Table 5 and Figure 5 show the variance explaining R^2 in the dependent variables and the path coefficients (β) for the model. Consistent with Chin [35], bootstrapping (1000 resamples) was applied to produce standard errors and t-statistics. This permits us to measure the

statistical significance of the path coefficients. The R^2 for the values range from 0.014 to 0.029. The procedure indicates path coefficients in the range of 0.120 to 0.170. Thus, these results indicate that there is a significant relationship between gender with housing preferences (aspect of housing quality, aspect of housing environment, aspect of location, and aspect of accommodation).

The analysis model results conclude that all latent variables in housing preferences possessed adequate validity and reliability. There exists a relationship between latent variables and the indicators (observed variables) for each latent variable. This infers relationships between gender with three (3) attributes in the aspect of location which is 1) near to university/campus, within walking distance attribute, 2) near to public transportation (bus station, rail station) attribute; and 3) near to facilities, amenities, shops, restaurants, banks. Interestingly, all attributes in the aspect of housing quality and aspect of housing accommodation have relationships with each other.

The relationship between gender and attributes of housing environment revealed only four (4) attributes were accepted in the results measurement. Lastly, the relationships between gender and attributes of housing environment to be recorded, only four (4) attributes were accepted in the measurement result.

In order to choose the best fitness and also the best nest, another 'for loop' will be form. This will need to latest best fitness to the lower than the value of the best fitness. So that the value of best fitness will be the value of the latest best fitness and the value of the best nest will be the new value of the latest best nest.

For the stopping criterion, the 'for loop' were formed in the instruction to obtain the best nest and the best finest. The output of iteration, best nest and also the best fitness were later created. And the iteration will increase until the total iteration equal to 100.

Table 5: Structural model results

| Path	Description	R^2	Path Coefficient (β)	t-value	Relationship
DEMOGRAPHIC →ACCOMDATION	Relationships between student profiles (gender) and accommodation	0.014	0.120	2.655	Yes
DEMOGRAPHIC →ENVIROMNT	Relationships between student profiles (gender) and environment	0.027	0.164	4.993	Yes
DEMOGRAPHIC →LOCATION	Relationships between student profiles (gender) and location	0.029	0.170	4.900	Yes
DEMOGRAPHIC →QUALITY	Relationships between student profiles (gender) and housing quality	0.023	0.153	4.426	Yes
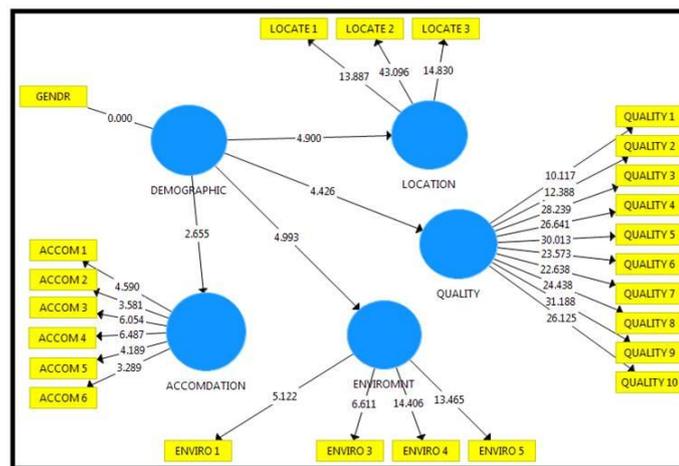
Figure 5: Structural model of off-campus student housing preferences

4. Conclusion

This paper has presented the structural model of off-campus student housing preferences employing SEM - PLS Analysis. Overall, this study has achieved a better understanding of off-campus student housing preferences based on university case studies in the State of Selangor in Malaysia. The structural model reveals that there were four (4) significant factors to be considered relating to student housing preferences that are: 1) housing environment 2) location, 3) housing quality, and 4) housing accommodation. Based on the results of this study, it was concluded that most students prefer their housing enclaves with better safety and located nearby facilities (near to university and public transportation) and amenities such as shops and banks. Off-campus students also value high security and air quality aspects while female students prefer housing that provides laundry facilities and kitchens.

This study has implications for housing practice in the country whereby the research output will come in handy to housing policymakers, local authorities, developers, HEIs, students' bodies, and local communities in their respective endeavours as per off-campus student housing experiences. It is hoped that these implications will contribute towards improving demand-oriented housing provision to suit the market. It will be a win-win situation for all stakeholders. All studies have certain limitations which provide future opportunities for new research. Thus, this study has a few more aspects to explore. Therefore as a recommendation, the researchers suggest a similar study to be carried out all over the states of Malaysia, in order to enlarge the scope of study and obtain a broader perspective and wider view of the off-campus student housing preferences from various locations in Malaysia especially within the educational hubs. Such a wider scope of study will provide a more accurate picture of the off-campus student housing preferences and will complement these research findings which are only for the State of Selangor, Malaysia.

Acknowledgement

References

[1] Poria, Y. and Oppewal, H. *Student Preferences for Room Attributes at University Halls of Residence: An Application of the Willingness to Pay Technique.* Tourism and Hospitality Research, Vol 4 No. 2, pp.116-129. (2002)

[2] Pike, C.R. The Differential Effects of on-and Off Campus Student Living Arrangements on Students' Openness to   Diversity. NASPA Journal. Vol.46 No. 4. pp-629-645. (2009)

[3] Turley, R.N.L. and Woodtke, G. College Residence and   Academic Performance: Who Benefits from Living on   Campus? Urban Education. Vol. 45 No. 4. pp. 506-532 (2010)

[4] Brandon, A., Hirt, J.B. and Cameron, T. Where You Live Influences Who You Know: Diffrences in Student Interaction Based on Residence Hall Design. The Journal of College and University Student Housing. Vol. 35 No 2. pp-62-79 (2008)

[5] Cross. J.E., Zimmerman, D. and O'Grady. M.A. Residence Hall Room Type and Alcohol Use among College Students Living on Campus. Environment and Behaviour. Vol 41 No 4.(2009)

[6] Araujo, P.D. and Murray, J. Estimating the Effects of   Dormitory Living on Student Performance. Economic   Bulletins. Vol 30 No 1.pp-866-878 (2010)

[7] Hilmy, M., Hafazah, A.K., Ishak, C.A., Puziah, A. *Students' Perception of Residential Satisfaction in the Level of Off-Campus Environment.* Procedia - Social and Behavioral   Sciences Vol. 105, pp. 684-696. (2013)

[8] Khozaei, F. T., &Ramayah, A. S. *A shorter version of   Student Accommodation Preferences Index (SAPI).*   (American Transactions on Engineering & Applied   Sciences.(2012)

[9] Thuraiya M., Kamsiah S., MohamadHaizam M. S., Wan Nor Hishamuddin, Norhaslina J. &Ilyana B. *Housing Rental Expenses of Non-Resident Students in UiTM.* (UiTM   Publication, 2014)

[10] Morgan, D. & McDowell, L. *Patterns of residence: costs and options in student housing.* Guildford [Eng.]: Society for   Research into Higher Education. (1979).

[11] Rugg, J., Rhodes, D., and Wilcox, S. *Unfair Shares: A report on the impact of extending the Shared Accommodation Rate of Housing Benefit.* (London: Crisis, 2011)

[12] Korevaar, D. N. *Proximity, Pocketbooks and Preferences: A study of University of Calgary Off-Campus renters.* (Calgary, Alberta, Canada, 2004)

[13] Universities United Kingdom. *Studentification: A guide to opportunities, challenges and practice.* (United Kingdom: Universities UK, 2006).

[14] Carr, H., Cowan, D., & Hunter, C. *Policing the Housing   Crisis.* Critical Social Policy, 27. pp. 100 – 127.(2007)

[15] Amole, D. *Residential Satisfaction in Students' Housing.* Journal of Environmental Psychology. Academic Press.   Nigeria. (2009)

[16] Thomsen, J., &Eikemo, T. *Aspects of student housing   satisfaction: a quantitative study.* (2010)

[17] Allis, N. &Ismet, B. H. *Phenomena of Spatial Bounded Choice: Students Behaviour Related to Rental Housing in Bandung as Case Study.* Procedia - Social and Behavioral Sciences Vol. 36 pp. 187–195.(2012)

[18] Soheil S., Abdul Razak J., & Ahmad Nazri M. L. Spatial Analysis of Studentification Impacts on Kuala Lumpur Local Communities. (CIPD Monograph No. 14, Universiti Teknologi Malaysia, 2012)

[19] Tan, T. H. *Housing satisfaction in medium- and high-cost housing: The case of Greater Kuala Lumpur, Malaysia.* Habitat International Vol. 36 Issue 1. pp. 108 - 116.(2012).

[20] Steinacker, A. *The Economic Effect of Urban Colleges on their Surrounding Communities.* (Urban Studies, Vol. 42, No.7) pp. 1161-1175. (2005).

[21] Tan, T. H. *Housing satisfaction in medium- and high-cost housing: The case of Greater Kuala Lumpur, Malaysia.* Habitat International Vol. 36 Issue 1. pp. 108 - 116.(2012).

[22] Ong, S. E., Petrova, M., &Spieler, A. C. Demand for   University Student Housing: An Empirical Analysis. Journal of Housing Research, 22(2), 141-164(2013).

[23] Thomsen, J. Student Housing – Student Homes? Aspects of Student Housing Satisfaction. Un-published Thesis for the Ph.D. degree, Department of Architectural Design and   Management, Faculty of Architecture and Fine Art,   Norwegian University of Science and Technology, Trondheim. (2008).

[24] Bourne, L.S. *The Geography of Housing.* (London: Edward Arnold, 1981).

[25] Smith D. P., Holt L. *Studentification and 'apprentice'   gentrifiers within Britain's provincial towns and cities: extending the meaning of gentrification.* Environment and Planning A, 39(1). pp. 142–161.2007)

[26] Lou, H., Luo, W. and Strong, D. "*Perceived critical mass effect on groupware acceptance*", European Journal of   Information Systems, Vol. 9 No. 2, pp. 91-103.(2000)

[27] Urbach, N., &Ahlemann, F. *Structural equation modeling in information systems research using Partial Least Square.* Journal of Information Technology Theory and Application 11(2), 5-40.(2010)

[28] Nunnally, *Nunnally Psychometric Testing.*(Lawrence   Erlbaum, New York, NY).(1978)

[29] Fornell, C., & Larcker, D.F.. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*, 39-50.(1981)

[30] Sekaran, U. & Bougie, R.. Research Methods for Business: A Skill- Building Approach. New York: John Wiley & Sons, Inc.(2013)

[31] Hair, J.F., Hult, G.T., Ringle, C. M., &Sarstedt, M.*A primer on partial least squares structural equation modelling (PLS-SEM),* 60-78.(2014)

[32] Barclay, D., Higgins, C., & Thompson, R. The Partial Least Squares (PLS) approach to causal modeling: Personal computer adoption and use as an illustration. *Technology Study, 2* (2), 285-309.(1995)

[33] Christy M.K.Cheung, Matthew K.O.Lee A Theoretical Model of Intentional Social Action in Online Social   Networks.(2010).

[34] Henseler, J., Ringle, C.M., &arstrdt. M. (2014). A new   criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43, 115-135.

[35] Chin, W.W. *The Partial Least Square Approach to Structural Equation Modeling.* In Marcoulides (Ed.). *Modern Methods for Business Research.* Mahwah: Lawrence Erlbaum Associates. (1998).