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GREEN CITY: THE LIFESTYLE OF MELAKA RESIDENTS

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Abstract

Personality and Lifestyles [PL] of those practicing environmentally-aware way of life manifest in collectivistic cultures, modesty and moderation in material pursuits, and environmental mindfulness. ***Issue*****:** 10 years has passed since the vision of green city was introduced. The collective ecological PL of Melaka public is called to be evaluated to determine how far have the citizen accepted and owed allegiance in the green initiative efforts. ***Purpose*****:** This paper aims to compare the environmentally-aware collective PL of Melaka residents to residents of other states in Malaysia. ***Approach*****:** One-Way MANOVA was generated to determine the mean distribution of 10 PL items, across Malaysia States. ***Findings*****:** There were significant differences within subjects of the 10 PL items between-subjects of Malaysia States. The Post-Hoc Test indicated majority of the means of PL items for Melaka were significantly higher than other states. However, in relation to other states, Melaka fell short on the component of Voluntary Modesty, which indicators were (i) PL5, *practicing moderation in purchasing and using resources*, (ii) PL6, *feeling unconcerned if not able to afford things*, and (ii) PL7, *believing that having many assets does not lead to happiness.*

Keywords: Melaka Green City, personality and lifestyle, voluntary modesty

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INTRODUCTION

In 2010, Melaka established a vision to become a Green Technology State by 2020. The Melaka Green Technology Corporation (MGTC) oversees the ongoing efforts to achieve the vision and to adopt the United Nations Urban Environmental Accords (UN-UEA) ratings method to assess their green city performance. On August 10th, 2020, Melaka state government and MGTC signed an MoU with Micro-E Holdings, to continue the Melaka Green City Action Plan (MGCAP). The MGCAP provides a clear path for Melaka towards becoming a sustainable community as well as reflecting a holistic approach that brings together individual actions that have already started. Almost all action plans addressed in the MGCAP directly and indirectly require local communities, civil societies and public acceptance and engagement to Melaka Green City vision. 10 years has passed since the green city vision was introduced. The collective environmental personality of Melaka public is called to be evaluated to determine how far have the citizen accepted and owed allegiance in the green initiative efforts. Collective personality relates to a group's consistent behaviours across time and contexts.

In this paper, the personality of the Melaka citizen in embracing the green initiative efforts is assessed in opposition to other states in Malaysia. The first dimension of the 'Human Interdependence with the Environment' model by Abu Bakar, et al., (2017) is adopted to examine the personality and lifestyle of Melaka respondents in comparison to respondents from other Malaysia states.

LITERATURE REVIEW

Human Interdependence [HI] measures the contributions and functionality of individuals in their social and environmental contexts that in turn influence the well-being of the individuals (Abu Bakar et al., 2019a; 2019b; 2019c; Abu Bakar et al., 2020a; 2020b; 2020c). Thorough studies on HI discovered that HI contributes to 70% of Subjective Well-Being, suggesting that that imparting well-being to social and environmental surroundings is a huge source of individual well-being (Abu Bakar et al., 2015; 2016a; 2016b; 2017a; 2017b; 2017c; 2017d; 2017e; 2017f; 2018). This paper focuses on Human Interdependence with the Environment [HIE].

The dimensions of HI are identified from a review of The World Book of Happiness (Bormans, 2010) which covers ground-breaking findings of well-being research all over the world. In the attempt to focus on HIE manifestation applicable for Malaysia, summaries of recent case studies from a number selected Asian articles are presented. The potential determinants of HI along with their conditional factors are extracted from the main conclusions of the articles. There are four interconnected dimensions of HIE. This paper focuses on the first dimension of HIE which is Personality and Lifestyle.

Personality and Lifestyle is derived from the internal condition of a person which accommodates a range of personal attributes that represent lifestyles, inner-strength, willpower, wisdom, awareness, life prospects and other related attributes. In the environmental context, examples of human interdependence manifestations are collectivistic cultures, modesty and moderation in material pursuits, and environmental mindfulness. The manifestations are observed in Personality and Lifestyles [PL] of individuals. Studies on collectivism and biosphere values are concerned on individuals' way of life and worldview, relating to the environment. Case studies selected from Asian Journals dated from the year 2011 onwards highlighted potential determinants and qualities of PL (refers to Table 1).

Table 1: Conditional Factors of Personality and Lifestyle

Conditional Factors	**Potential Determinants**	**References**
Cultural orientations: horizontal individualism (non-competitive self-reliant) and vertical individualism (competitive self-reliant); horizontal collectivism (communally dependent with equality emphasised) and vertical collectivism (communally dependent with hierarchy emphasised).	Environmental attitude, consumer effectiveness (the likelihood of buying green products), environmental commitment (the will of buying green products)	(Jackson, 2017)
Collectivistic society (prioritising family and group welfare before personal contentment)	Family needs and intrapersonal relationships	(Jaafar et al., 2012)
Gender (female), and transformational leadership (leadership approach attempting to transform individuals and social system)	Collectivistic values (prioritising others over personal welfare)	(Caesar, 2016)
Gender, age, ethnic composition (the greater the composition, the higher sense of belongingness)	Personal relationships and community belongingness	(Clark et al., 2014)
Awareness and knowledge of rights (practical conscience towards action-oriented behaviours)	Consumer effective actions (conscious reaction)	(Ishak & Zabil, 2012)
Ecopsychology elements (the belief on nature as self, home, and family. separation of human and nature leads to suffering, and connection of human and nature is healing for both).	Awareness and response to environmental conditions, and collective environmental initiatives and behaviours	(Kamidin et al., 2011)
Community leadership and empowerment in negotiating with government on environmental conditions and communal recycling behaviours	Collectivistic actions (prioritising others' needs over personal interests)	(Laurens, 2012)
Awareness (consciousness and concern), knowledge (familiarity with issues and acquired information), and risk perception (perceived exposure to danger)	Altruism (selfless concern for well-being of others), and responsive behaviours	(Masud et al., 2013)
Environmental concern (individuals' stance towards the environment or the arrays of attitude determining intentions, or attitudes that influence environmental intentions) and perceived consumer effectiveness (consumers' awareness on the existing issue, and consumer's trust that their efforts would contribute to a viable solution to resolve the issue)	Willingness to invest environmentally (decision on environmental investment influenced by emotional and predictable cognitive biases that swerve from behaving rationally)	(Ming et al., 2015)
Materialistic personality, consumption behaviours (actions taken in expanding and using up resources) and sense of inferiority over personal possession (feeling insecure due to possessing less when being compared)	Moderation in consumption, modesty and voluntary modesty (personal choice to live modestly)	(Khare, 2015)
Adjustment and adaptations to individual settings (lifestyle and conditions of living space) and cultural factors of the surroundings (societal behaviours)	Collective responsible behaviour (taking cooperative environmental actions)	(Horayangkura, 2012)

PL manifests in the personal outlook and approach to life in relation to environmental consciousness. Qualities adhere to PL include (i) moral stance in collectivistic values, (ii) commitment to modest and environmental choices and (iii) environmental concerns through knowledge and awareness (Abu Bakar et al., 2020a; 2020b; 2020c) (refer to Table 2 and Table 3)

Table 2: Manifestation and Determinants of Personality and Lifestyle

Determinants	Qualities inferred through Indicators
moral stance in collectivistic values	prioritising others over personal welfare (family needs intra-personal /personal relationships, and community needs), altruistic perspective
environmental and modest choices	moderation in consumption, modesty, consumer effectiveness, willingness to invest environmentally, voluntary modesty
environmental concerns through knowledge and awareness	environmental attitude, initiatives and behaviours, environmental commitment, awareness and response to environmental conditions, collective responsible behaviour

Table 3: Indicators of Personality and Lifestyle

Definition of PL	Components	Indicators	Code
The personal orientation that portrays collectivistic worldviews, modesty and humility towards others as well as consciousness of environmental issues	Collectivistic Culture	favouring relationships with others over personal success	PL1
		choosing to disappointing self over disappointing family	PL2
		taking account others' opinions in making life decisions	PL3
		taking the pleasure of working with others	PL4
	Voluntary Modesty	practising moderation in purchasing and using resources	PL5
		feeling unconcerned if not able to afford things	PL6
		believing that having many assets does not lead to happiness	PL7
	Environmental Consciousness	being mindful about environmental destruction	PL8
		feeling affected by the environmental loss of other countries	PL9
		urging media to raise environmental awareness	PL10

The indicators were developed into statements in questionnaires to be answered by respondents across states in Malaysia.

METHOD

A sample of 4315 was pooled after the data screening process. The Malaysian respondents were given an 11-point Likert scale to respond to questionnaire items which consist of statements relating to the ten (10) PL items. One-Way Multivariate Analysis of Variance [MANOVA] was generated to determine the multivariate effect of Malaysia States on PL items. That is the difference in mean values of the 10 PL items combined between states. It is hypothesized that different states respond differently towards each of the 10 PL items. The following sections provide empirical evidence on the statistical interaction between Malaysia States and the PL items. The report of the statistical outputs in the following section pay attention to Melaka in opposition to other states.

RESULTS

One-Way MANOVA using Statistical Package for the Social Sciences [SPSS] was generated to determine the mean distribution of the dependent variables which were the 10 PL items, across the subjects of the independent variable, which was Malaysia States.

Prior to the One-Way MANOVA test, the data was screened for (i) missing cases, (ii) unengaged responses (SD ≠ 0), (iii) univariate and extreme outliers (boxplot and SD < 3.0), (iv) normality (skewness < 1.5, kurtosis < 3.0) and (v) linearity (r > 0.30). The data was also screened for (vi) multicollinearity (VIF < 3.0) and (vii) multivariate normality and influential outliers (Cook's Distance < 1.0). Since each state consists of more than 30 cases (>200 respondents), the MANOVA test was robust against violations of homogeneity of variance-covariance matrices assumption. It is also to note that the multivariate homogeneity of variance between group assumption using Levene's Test was violated ($p < .001$). Therefore, a stricter alpha level was used ($\alpha = 99.9\%$, $p = .001$) to interpret the univariate ANOVAs (Allen & Bennett, 2008).

One-Way MANOVA was conducted to determine significant differences within-subjects of PL items combined, between-subjects of Malaysia States. The deduced statistical hypothesis was:

> H_0: *There were no significant differences within subjects of the 10 PL items between-subjects of Malaysia States. That is, Malaysia States have no multivariate effects on the 10 PL items.*

The statistical output revealed that **at 99% confidence level there was a statistically significant mean differences within-subjects of PL items between-subjects of states, F (140, 43000) = 5.044, p < .00001; Pillai's Trace V = .162, partial η2 = 016. The null hypothesis was rejected.** There were significant differences within-subjects of the 10 PL items between-subjects of Malaysia States. That is, Malaysia States had statistically significant multivariate effects on the 10 PL items, and the effect size was medium.

The One-Way MANOVA outputs, in essence, suggested that residents across the states reacted differently to each of the PL items. That is, the outcome, i.e. the mean values of each of the PL items were distinct from each other due to the different state they were coming from.

Table 4 shows the mean values of PL items across states. A radar chart was generated to demonstrate the difference in means of PL items across states. The chart shows that Melaka had high mean values for PL1, PL2, PL3, PL4, PL8, PL9 and PL 9 in relation to other states. On the contrary, Melaka had moderate to low mean values for PL5, PL6 and PL7 in relation to other states. Table 4 tabulates the Tests Between-Subject Effects and Post-Hoc Comparison of Melaka Mean Values for PL items against other states.

Table 4: Descriptive Statistics: Mean Values of PL items

PL	**MEL**	PUT	KL	SEL	N9	JOH	PAH	TER	KEL	PER	PEN	KED	PERL	SAB	SAR
PL1	**9.00**	8.41	8.26	8.21	8.83	8.43	8.37	8.73	8.81	8.10	8.25	8.78	8.79	7.96	7.91
PL2	**8.94**	8.34	8.05	8.11	8.56	8.22	8.28	8.64	8.53	7.98	8.29	8.60	8.87	7.89	7.79
PL3	**8.68**	8.24	7.96	8.07	8.52	8.39	8.33	8.62	8.50	7.90	8.26	8.50	8.83	7.89	7.79
PL4	**8.86**	8.68	8.18	8.28	8.88	8.58	8.48	8.89	8.75	8.17	8.31	8.73	9.20	8.02	7.80
PL5	**8.60**	8.56	7.84	8.17	8.75	8.39	8.28	8.71	8.47	8.17	8.07	8.69	8.90	7.90	7.74
PL6	**8.36**	8.15	7.77	8.04	8.57	8.20	7.81	8.70	8.16	7.92	8.00	8.43	8.49	7.84	7.56
PL7	**8.23**	8.20	7.75	7.95	8.66	8.23	7.93	8.64	8.28	7.93	8.03	8.13	8.59	7.95	7.60
PL8	**8.69**	8.44	7.85	7.97	8.54	8.23	8.33	8.72	8.42	7.80	8.25	8.07	8.43	7.66	7.62
PL9	**8.79**	8.56	7.94	8.08	8.57	8.21	8.52	8.69	8.53	7.65	8.03	7.75	8.05	7.56	7.59
PL10	**9.13**	8.46	8.34	8.42	9.04	8.52	8.68	8.79	8.91	8.19	8.11	8.52	9.28	7.93	7.74

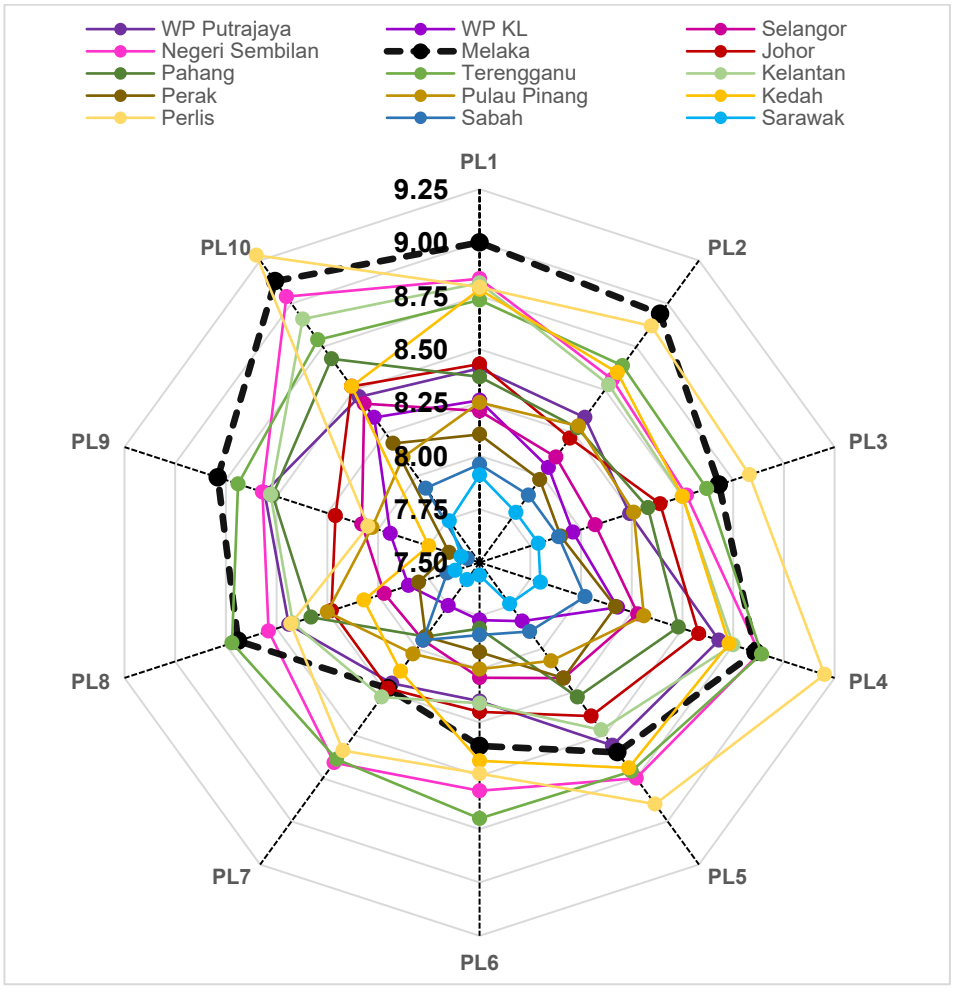

Figure 1: Radar Chart of PL Items Mean Values Across States

Table 5: Univariate ANOVAs and Post-Hoc Comparison of Melaka Mean Values

UNIVARIATE ANOVAs

DV	Type III Sum of Squares	df	Mean Square	F	Sig.	η2
PL1	475.869	14,4300	33.991	11.821	.000	.037
PL2	455.646	14,4300	32.546	11.788	.000	.037
PL3	406.177	14,4300	29.013	12.138	.000	.038
PL4	566.518	14,4300	40.466	15.754	.000	.049
PL5	475.847	14,4300	33.989	12.667	.000	.040
PL6	395.029	14,4300	28.216	9.664	.000	.031
PL7	347.541	14,4300	24.824	9.690	.000	.031
PL8	493.558	14,4300	35.254	14.009	.000	.044
PL9	652.664	14,4300	46.619	14.978	.000	.046
PL10	731.459	14,4300	52.247	16.996	.000	.052

POST-HOC TESTS: MEAN DIFFERENCE OF MELAKA AGAINST OTHER STATES

PL		PUT	KL	SEL	N9	JOH	PAH	TER	KEL	PER	PEN	KED	PERL	SAB	SAR
PL1	MD	*.590*	**.745**	**.795**	*.179*	**.573**	**.634**	*.276*	*.197*	**.908**	**.757**	*.222*	*.215*	**1.041**	**1.090**
	p	*.777*	**.001**	**.001**	*.999*	**.007**	**.004**	*.938*	*.997*	**.001**	**.001**	*.982*	*.995*	**.001**	**.001**
PL2	MD	*.596*	**.884**	**.828**	*.382*	**.712**	**.661**	*.299*	*.407*	**.954**	**.648**	*.335*	*.067*	**1.047**	**1.149**
	p	*.737*	**.001**	**.001**	*.563*	**.001**	**.001**	*.872*	*.391*	**.001**	**.004**	*.631*	*.999*	**.001**	**.001**
PL3	MD	*.432*	**.721**	**.602**	*.155*	*.287*	*.342*	*.052*	*.172*	**.781**	.416	*.178*	*-.154*	**.788**	**.891**
	p	*.951*	**.001**	**.001**	*.999*	*.688*	*.513*	*.999*	*.998*	**.001**	.225	*.995*	*.999*	**.001**	**.001**
PL4	MD	.177	**.681**	**.582**	*-.024*	*.284*	*.384*	*-.027*	*.108*	**.694**	**.546**	*.132*	*-.340*	**.837**	**1.062**
	p	.999	**.001**	**.001**	*.999*	*.757*	*.369*	*.999*	*.999*	**.001**	**.025**	*.999*	*.708*	**.001**	**.001**
PL5	MD	*.043*	**.762**	*.435*	*-.145*	*.215*	*.324*	*-.102*	*.134*	*.435*	**.529**	*-.089*	*-.291*	**.704**	**.859**
	p	*.999*	**.001**	*.066*	*.999*	*.972*	*.702*	*.999*	*.999*	*.135*	**.047**	*.999*	*.902*	**.001**	**.001**
PL6	MD	*.211*	**.589**	*.319*	*-.213*	*.161*	**.547**	*-.339*	*.195*	*.440*	*.362*	*-.076*	*-.133*	**.520**	**.793**
	p	*.999*	**.021**	*.572*	*.995*	*.999*	**.038**	*.766*	*.997*	*.171*	*.639*	*.999*	*.999*	**.025**	**.001**
PL7	MD	*.032*	*.475*	*.277*	*-.435*	*-.008*	*.300*	*-.411*	*-.055*	*.293*	*.198*	*.098*	*-.363*	*.282*	**.625**
	p	*.999*	*.104*	*.696*	*.267*	*.999*	*.777*	*.334*	*.999*	*.733*	*.994*	*.999*	*.600*	*.743*	**.001**
PL8	MD	*.252*	**.841**	**.725**	*.150*	*.458*	*.364*	*-.029*	*.272*	**.895**	*.443*	**.620**	*.266*	**1.033**	**1.076**
	p	*.999*	**.001**	**.001**	*.999*	*.054*	*.447*	*.999*	*.900*	**.001**	*.175*	**.001**	*.936*	**.001**	**.001**
PL9	MD	*.226*	**.844**	**.705**	*.217*	**.578**	*.264*	*.100*	*.262*	**1.133**	**.759**	**1.040**	**.742**	**1.230**	**1.198**
	p	*.999*	**.001**	**.001**	*.996*	**.011**	*.953*	*.999*	*.968*	**.001**	**.001**	**.001**	**.002**	**.001**	**.001**
PL10	MD	*.667*	**.789**	**.708**	*.087*	**.615**	*.447*	*.343*	*.224*	**.945**	**1.023**	**.613**	*-.145*	**1.201**	**1.389**
	p	*.646*	**.001**	**.001**	*.999*	**.004**	*.264*	*.785*	*.992*	**.001**	**.001**	**.009**	*.999*	**.001**	**.001**

Note. MD= Mean Difference; p = p/significant value at 99% confidence level

MATRIX COMPARISON: MEAN VALUES OF MELAKA AGAINST OTHER STATES

PL	Putra-jaya	K.Lum-pur	Sela-ngor	N.Sem-bilan	Johor	Pa-hang	Tereng-ganu	Kelan-tan	Perak	P.Pi-nang	Kedah	Perlis	Sabah	Sara-wak
PL1	+	+*	+*	+	+*	+*	+	+	+*	+*	+	+	+*	+*
PL2	+	+*	+*	+	+*	+*	+	+	+*	+*	+	+	+*	+*
PL3	+	+*	+*	+	+	+	+	+	+*	+*	+	—	+*	+*
PL4	+	+*	+*	—	+	+	—	+	+*	+*	+	—	+*	+*
PL5	+	+*	+	—	+	+	—	+	+	+*	—	—	+*	+*
PL6	+	+*	+	—	+	+*	—	+	+	+	—	—	+*	+*
PL7	+	+	+	—	—	+	—	—	+	+	+	—	+	+*
PL8	+	+*	+*	+	+	+	—	+	+*	+	+*	+	+	+*
PL9	+	+*	+*	+	+*	+	+	+	+*	+*	+*	+*	+*	+*
PL10	+	+*	+*	+	+*	+	+	+	+*	+*	+*	—	+*	+*

Note. +* = Melaka has significantly higher mean; + = Melaka has higher mean; — = Melaka has lower mean.

Table 5 shows that at 99% confidence interval there were statistically significant difference in all of the PL items between states and the effect sizes were all medium ($\eta 2 = .010 < .031$ to $.052 < .138$). The Post-Hoc Test exhibits the mean difference in PL items of Melaka in opposition to other states. The Post-Hoc Test on Melaka shows that majority of the mean difference of Melaka compared to other states were positive.

The Comparison Matrix indicates that majority of PL items' means for Melaka were higher than PL items' means for other states. Out of the 140 cells, 121 cells revealed that Melaka had statistically higher means of PL items than other states and 59 out of the 121 cells were statistically significant. Table 6 shows the interpretation of the results:

Table 6: Result Interpretation

Items	Statements	Interpretation
PL1	*favoring relationships with others over personal success*	Melaka had significantly higher means of PL1 than (i) Kuala Lumpur, (ii) Selangor, (iii) Johor, (iv) Pahang, (v) Perak (vi) Pulau Pinang, (vii) Sabah and (viii) Sarawak.
PL2	*choosing to disappointing self over disappointing family*	Melaka had significantly higher means of PL2 than (i) Kuala Lumpur, (ii) Selangor, (iii) Johor, (iv) Pahang, (v) Perak (vi) Pulau Pinang, (vii) Sabah and (viii) Sarawak.
PL3	*taking account others' opinions in making life decisions*	Melaka had significantly higher means of PL3 than (i) Kuala Lumpur, (ii) Selangor, (iii) Perak, (iv) Pulau Pinang, (v) Sabah and (vi) Sarawak.
PL4	*taking the pleasure of working with others*	Melaka had significantly higher means of PL4 than (i) Kuala Lumpur, (ii) Selangor, (iii) Perak, (iv) Pulau Pinang, (v) Sabah and (vi) Sarawak.
PL5	*practising moderation in purchasing and using resources*	Melaka had significantly higher means of PL5 than (i) Kuala Lumpur, (ii) Pulau Pinang, (iii) Sabah and (iv) Sarawak.
PL6	*feeling unconcerned if not able to afford things*	Melaka had significantly higher means of PL6 than (i) Kuala Lumpur, (ii) Pahang, (iii) Sabah and (iv) Sarawak.
PL7	*believing that having many assets does not lead to happiness*	Melaka had significantly higher means of PL7 than Sarawak.
PL8	*being mindful about environmental destruction*	Melaka had significantly higher means of PL8 than (i) Kuala Lumpur (ii) Selangor, (iii) Perak, (iv) Kedah and (v) Sarawak.
PL9	*feeling affected by the environmental loss of other countries*	Melaka had significantly higher means of PL9 than (i) Kuala Lumpur, (ii) Selangor, (iii) Johor, (iv) Perak, (v) Pulau Pinang, (vi) Kedah, (vii) Perlis, (viii) Sabah and (ix) Sarawak.
PL10	*urging media to raise environmental awareness*	Melaka had significantly higher means of PL10 than (i) Kuala Lumpur, (ii) Selangor, (iii) Johor, (iv) Perak, (v) Pulau Pinang, (vi) Kedah, (vii) Sabah and (viii) Sarawak.

The positive and significant higher means of most of PL items suggests that Melaka residents are agreeable on the PL items. However, in relation to other states, Melaka falls short on the component of Voluntary Modesty, which indicators were (i) PL5, *practicing moderation in purchasing and using resources*, (ii) PL6, *feeling unconcerned if not able to afford things*, and (ii) PL7, *believing that having many assets does not lead to happiness*.

DISCUSSION

The effective solution of environmental problems calls for changes in level of consumption. Voluntary modesty refers to preference to be moderate in lifestyle and consumption. In response to the growing number of subjects like 'Sustainable Living', 'Sustainable Lifestyles', and 'Sustainable Consumption' featured in environmentally-oriented research, researchers believed that voluntary modesty is a consistent solution which can be drawn from the public to solve environmental problems. However, in leading studies, Librová (1999), stresses that voluntary modesty has a wide spere of communication and by no means suggest that the public needs to live like 'hermits' to help solve environmental issues. Communities practicing voluntary modesty have shown altruistic interest and have their basis at transcendence level. The individuals in the communities have expanded from their personal boundaries and have potentially considered themselves as essential part of the universe. In other words, they are able to put their needs aside to serve something greater than themselves.

Empirical findings on community practicing voluntary modesty described them as immune to fashion influences, supports reusing other household items, second-hand shops customers, disfavor typical commodities like dishwashers, fryers and television, and constantly learning basic skills to increase self-reliance and self-sufficiency such growing their own food from scratch. It is also stressed that these communities are either have high economic status or have low earnings; some nearly in the boundary of poverty level. While the former chose to differ themselves from the consuming majority in the form of an intentional, environmentally aware and elegant lifestyle, the latter derived to modest solutions under social conditions of a rapidly changing society. While the former considered moderation as liberation from all the consumer climate and commercial pressures, the latter has stronger transcendental anchoring, social altruism and tendency to embrace older traditional lifestyle (Biswas-Diener, 2006; Elgin & Mitchell, 1977; Librová, 1999). Either way, the path to voluntary modesty is a slow process and it cannot be achieved through the form of determination or resolution.

Based on these findings, Melaka, of which respondents were mostly in the Middle 40 group (51% earning between RM 4,361 to RM 9,619) have a long way to embrace voluntary modesty in their lifestyle and consumption. Perhaps the more realistic approach for a steady rise in voluntary modesty of Melaka residents is the greater happiness experienced through pursuing non-material riches than getting and spending money. The common motivation traces from environmental concerns, but (i) sensitivity towards inequality across the world, (ii) frequent involvement in campaigning and volunteer works, (iii) meditations and (iv) fulfilling familial relationships; could also inculcate voluntary modesty in the personality and lifestyle of Melaka residents.

CONCLUSION

This paper compares the Personality and Lifestyle, the first dimension of Human Interdependence with the Environment, of Melaka residents to other states. It was found that Melaka respondents were significantly agreeable to most of the statement implying ecological lifestyle in comparison to other states. However, in relation to other states, Melaka was relatively behind in the environmentally modest lifestyle and consumption. Future studies exploring the constructs elaborated in this paper via structural causal modelling and expand the findings through moderation effects of Malaysia States in relation to local environmental policies would be fruitful.

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GREEN CITY INITIATIVES: HUMAN-NATURE INTERACTION

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Abstract

Interaction with Nature [IN] refers to the urge or preference to be close to the natural environment, attentiveness and knowledge of the natural environment, and health associated attributes in relation to surroundings. ***Issue*:** Since the vision of green city was introduced, Melaka has made great strides toward building a sustainable, green city. With the ongoing development towards reduction of carbon intensity 2020, IN of Melaka public needs to be evaluated to determine the human-nature connection with respect to the green initiative efforts. ***Purpose*:** This paper aims to compare the IN of Melaka residents to residents of other states in Malaysia. ***Approach*:** One-Way MANOVA was generated to determine the mean distribution of 10 IN items, across Malaysia States. ***Findings*:** There were significant differences within subjects of the 10 IN items between-subjects of Malaysia States. The Post-Hoc Test indicated majority of the means of IN items for Melaka were significantly higher than other states. However, in relation to other states, Melaka was slightly shy on (i) IN2, *being able to recall experiences in the natural environment*, and (ii) IN5, *being able to notice scientific details of nature*.

Keywords: Melaka Green City, interaction with nature

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INTRODUCTION

The Melaka Green City Action Plans (MGCAP) 2014 reflects Melaka's long-term commitment to pursue low-carbon growth, improve environmental quality, and strengthen economic competitiveness. The plan delivers a clear direction on what Melaka needs to do in the coming years. The MCGAP provides a set of action plans aiming at maintaining Melaka's competitiveness as a popular tourist and investment destination, keeping environmental challenges to a minimum, and establishing the state as a role model for liveability in the region. Towards becoming a green city, Melaka needs to increase climate resilience, improve natural resource management and upgrade infrastructure for low carbon growth. Green cities are liveable, drivers of economic growth, climate resilient, have low carbon footprint and practices ecological approach to urban planning. Among many challenges to the implementation of MGCAP include miscoordination between multiple government agencies, private sector, community organizations and citizens.

In this paper, the human-nature interaction of the Melaka citizen with respect to the green initiative efforts is assessed in opposition to other states in Malaysia. The second dimension of the 'Human Interdependence with the Environment' model by Abu Bakar, et al., (2017) is adopted to examine the Melaka respondents' interaction with nature in comparison to respondents from other states of Malaysia.

LITERATURE REVIEW

Measures of individuals functionality and contributions to their social and environmental contexts that in turn influence the well-being of the individuals is known as Human Interdependence [HI] (Abu Bakar et al., 2019a; 2019b; 2019c; Abu Bakar et al., 2020a; 2020b; 2020c). Detailed studies on HI found that HI predicts 70% of Subjective Well-Being, suggesting that a huge source of individual well-being exists in the course of imparting well-being to social and environment surroundings (Abu Bakar et al., 2015; 2016a; 2016b; 2017a; 2017b; 2017c; 2017d; 2017e; 2017f; 2018). This paper focuses on Human Interdependence with the Environment [HIE].

HIE dimensions are recognized from a review of The World Book of Happiness (Bormans, 2010). The book reviews leading discoveries of well-being research across the glove. In order to emphasize on HIE manifestation viable for Malaysia, a number selected Asian articles are reviewed and tabulated. HI potential determinants and conditional factors are extracted from the main inferences of the articles. HIE are found in four overlapping and interconnected dimensions. This paper focuses on the second dimension of HIE, which is Interaction with Nature.

The second dimension indicates the personal contact with close and familiar relationships which contains a range of qualities representing emotional intimacy, closeness, familiarity, display of affection, involuntary acts and many others. In the environmental context, the instances of HI manifestations include the urge or preference to be close to the natural environment, attentiveness and knowledge of the natural environment, and health associated attributes in relation to surroundings. The manifestations are observed in the voluntary as well as the involuntary Interaction with Nature [IN]. Studies on outdoor environment and contact with nature are concerned on individuals' relationship with the natural environment. Case studies selected from Asian articles emphasised potential determinants and qualities of IN (refers to Table 1).

Table 1: Conditional Factors to Interaction with Nature

Conditional Factors	Potential Determinants	References
Communal belief: The forest living quarter, subsistence source of living, spiritual realm, physical fulfilment and ancestral sentiment to be defended	Stability of social life (health and spiritual) in relation to natural setting	(Kamarul Zahari et al., 2011)
Unmaintained outdoor space: murky water that provides a place for mosquito breeding, too dense vegetation, and tall and bushy that blocked views.	Emotions and feelings (safety and security) induced in natural elements	(Maruthaveeran, 2012)
Motivation (to experience nature, to enjoy fresh air, to participate in sports, to enjoy natural beauty, to gain knowledge and to build confidence, to unwind, to rest and to gain social network); activities (appreciating nature, trekking and hill climbing, observing sunrise, observing hilltop scenery, making friends, and pampering self).	Feeling the urge to be in the nature, acquiring knowledge and ability to cope with the outdoors, and equipped physically, emotionally and intellectually for staying outdoor	(Zainol et al., 2012)
Housing value depended on a variety of park elements, conceptual or design of the park, distance to the park, views towards the park, and active areas in the park facing the house.	The inclination to be close to natural or outdoor areas, the urge to spend time in the outdoor environment	(Shukur et al., 2011)
Health condition and availability of natural environmental: Views and accessibility partly influenced conducive healing environment to outdoor natural environment facing patients' window.	Health-related condition, the need to see, hear, notice and experience in outdoor nature while being indoor for a long period of time	(Ghazali & Abbas, 2011)
Physical well-being (active living); cognitive well-being (relief emotion, comfort, relaxed, and calmness, sense of privacy, solitude, and safety); and social well-being (social interaction with neighbours, participation, friendliness)	Having pleasant experience in natural setting, feeling relieved and relaxing emotions, and feeling energetic and healthy	(Mansor et al., 2012)
Accessibility to green open space (outdoor natural environment), and corresponding social health and behaviour (physical symptoms, stress, and anxiety disorder)	Health-related condition depending on outdoor environment, and the need for sufficient contact and IN	(Khotdee et al., 2012)
Stimulation of natural elements to encourage game-playing motivation (connectedness and continuity of green areas and flexibility of spaces and diversity of natural elements)	Sense of curiosity of natural elements and feeling engaged, creative and active in natural setting	(Faizi et al., 2013)
Age, gender, health-related conditions (stamina, health issues) and facilities in outdoor areas	Physical health and capability in outdoor areas	(Inani et al., 2013)
The physical setting of outdoor space: characteristics of groundcovers, open spaces, and tree foliage.	Ability to adapt and adjust to natural surrounding	(Ngesan et al., 2013)
Uniqueness of natural features and distinct character of landscape elements such as tree trunks, water fountain, and presence of animals	Curiosity of natural features (ability to see, hear, notice details of environment)	(Mahidin & Maulan, 2012)

IN manifests in the internal and external emotions and aptitudes towards the natural environment expressed in the contact between human and the ecological nature. Qualities adhere to IN include (i) health concerns resolved through access to nature, (ii) knowledge, senses and emotions encountered in the natural environment and (iii) physical and social activities in an outdoor (Abu Bakar et al., 2020a; 2020b; 2020c) (refer to Table 2 and Table 3).

Table 2: Manifestation and Determinants of Interaction with Nature

Determinants	Qualities inferred through Indicators
health-related concerns resolved through access to the natural environment	the health-related condition, the need to see, hear, notice and experience to natural surroundings while being indoor or after being indoor for a while, having a pleasant experience in natural setting, feeling energetic and healthy in the natural environment, ability to adapt and adjust to natural surrounding
knowledge, senses and emotions encountered in the natural environment	emotions and feelings, feeling the urge to be in natural environment, ability to see, hear, notice details of environment, acquiring knowledge and ability to cope with outdoor surrounding, equipped physically, emotionally and intellectually for staying outdoor, and feeling calm and relaxed in nature, sense of curiosity of natural features and ecological elements
physical and social activities in an outdoor environment	the urge to spend time in the outdoor environment, the inclination to be close to natural or outdoor areas, social interaction in a natural setting, feeling engaged, creative and active in natural setting

Table 3 Indicators of Interaction with Nature

Definition of IN	Components	Indicators	Code
The internal and external emotions and aptitudes towards the natural environment expressed in the contact between human and the ecological nature.	Nature Attachment	outdoor environment determining own health and wellness	IN1
		being able to recall experiences in the natural environment	IN2
	Knowledge and Capability	being able to adapt to various outdoor surroundings	IN3
		being able to see and hear what others usually miss in nature	IN4
		being able to notice scientific details of nature	IN5
		being able to cope with the outdoor environment	IN6
	Inclination towards Nature	feeling the urge to spend time in the natural environment	IN7
		tending to lose concentration without contact with nature	IN8
		tending to have objects from the outdoors in personal space	IN9
		spending time planting at home	IN10

The indicators were developed into statements in questionnaires to be answered by respondents across states in Malaysia.

METHODS

A sample of 4315 was gathered after the data screening process. The Malaysian respondents were given an 11-point Likert scale to respond to questionnaire items which consist of statements relating to the ten (10) IN items. One-Way Multivariate Analysis of Variance [MANOVA] was generated to determine the multivariate effect of Malaysia States on IN items. It is hypothesized that different states respond differently towards each of the 10 IN items. The following sections provide empirical evidence on the statistical interaction

between Malaysia States and the IN items with attention to Melaka in opposition to other states.

RESULTS

One-Way MANOVA using Statistical Package for the Social Sciences [SPSS] was generated to determine the mean distribution of the dependent variables which were the 10 IN items, across the subjects of the independent variable, which was Malaysia States.

Prior to the One-Way MANOVA test, the data was screened for (i) missing cases, (ii) unengaged responses (SD ≠ 0), (iii) univariate and extreme outliers (boxplot and SD < 3.0), (iv) normality (skewness < 1.5, kurtosis < 3.0) and (v) linearity (r > 0.30). The data was also screened for (vi) multicollinearity (VIF < 3.0) and (vii) multivariate normality and influential outliers (Cook's Distance < 1.0). Since each state consists of more than 30 cases (>200 respondents), the MANOVA test was robust against violations of homogeneity of variance-covariance matrices assumption. It is also to note that the multivariate homogeneity of variance between group assumption using Levene's Test was violated ($p < .001$). Therefore, a stricter alpha level was used ($\alpha = 99.9\%$, $p = .001$) to interpret the univariate ANOVAs (Allen & Bennett, 2008).

One-Way MANOVA was conducted to determine significant differences within-subjects of IN items combined, between-subjects of Malaysia States. The deduced statistical hypothesis was:

> H_0: *There were no significant differences within subjects of the 10 IN items between-subjects of Malaysia States. That is, Malaysia States have no multivariate effects on the 10 IN items.*

The statistical output revealed that **at 99% confidence level there was a statistically significant mean differences within-subjects of IN items between-subjects of states, F (140, 43000) = 5.552, p < .00001; Pillai's Trace V = .178, partial η2 = 018. The null hypothesis was rejected.** There were significant differences within-subjects of the 10 IN items between-subjects of Malaysia States. That is, Malaysia States had statistically significant multivariate effects on the 10 IN items, and the effect size was medium.

The One-Way MANOVA outputs, in essence, suggested that residents across the states reacted differently to each of the IN items. That is, the outcome, i.e. the mean values of each of the IN items were distinct from each other due to the different state they were coming from.

Table 4 shows the mean values of IN items across states. A radar chart was generated to demonstrate the difference in means of IN items across states. The chart shows that Melaka had high mean values for IN1, IN3, IN4, IN6, IN7, IN8, IN9 and IN 9 in relation to other states. On the contrary, Melaka had

moderate to low mean values for IN2 and IN5 in relation to other states. Table 4 tabulates the Tests Between-Subject Effects and Post-Hoc Comparison of Melaka Mean Values for IN items against other states.

Table 4: Descriptive Statistics: Mean Values of IN items

IN	**MEL**	PUT	KL	SEL	N9	JOH	PAH	TER	KEL	PER	PEN	KED	PERL	SAB	SAR
IN1	9.13	7.59	8.24	8.36	9.03	8.40	8.43	8.48	8.79	8.01	8.02	8.43	8.51	7.61	7.48
IN2	8.83	7.49	8.24	8.22	8.71	8.35	8.33	8.50	8.86	7.80	8.08	8.22	9.19	7.55	7.21
IN3	8.71	7.39	7.64	7.68	8.43	8.12	8.02	8.01	8.32	7.38	7.40	7.74	8.20	7.62	7.20
IN4	8.61	7.59	7.57	7.65	8.30	8.05	7.92	8.03	8.13	7.37	7.36	7.57	8.16	7.45	7.17
IN5	7.86	7.59	7.10	7.16	8.19	7.63	7.63	7.62	7.47	7.01	7.07	7.29	7.61	7.33	7.08
IN6	8.42	7.46	7.48	7.58	8.36	8.07	7.88	8.01	8.10	7.36	7.43	7.59	8.41	7.47	7.20
IN7	8.56	7.56	7.61	7.93	8.64	8.19	7.96	8.00	8.42	7.47	7.76	7.90	8.63	7.43	7.25
IN8	8.45	7.56	7.54	7.75	8.33	7.99	7.91	8.01	8.14	7.36	7.73	7.72	8.35	7.29	7.18
IN9	8.61	7.78	7.34	7.55	8.25	7.89	7.69	7.97	8.15	7.39	7.42	7.55	8.36	7.19	7.04
IN10	8.41	7.88	7.15	7.40	8.05	7.81	7.74	7.78	8.03	7.26	7.52	7.59	7.85	7.33	7.26

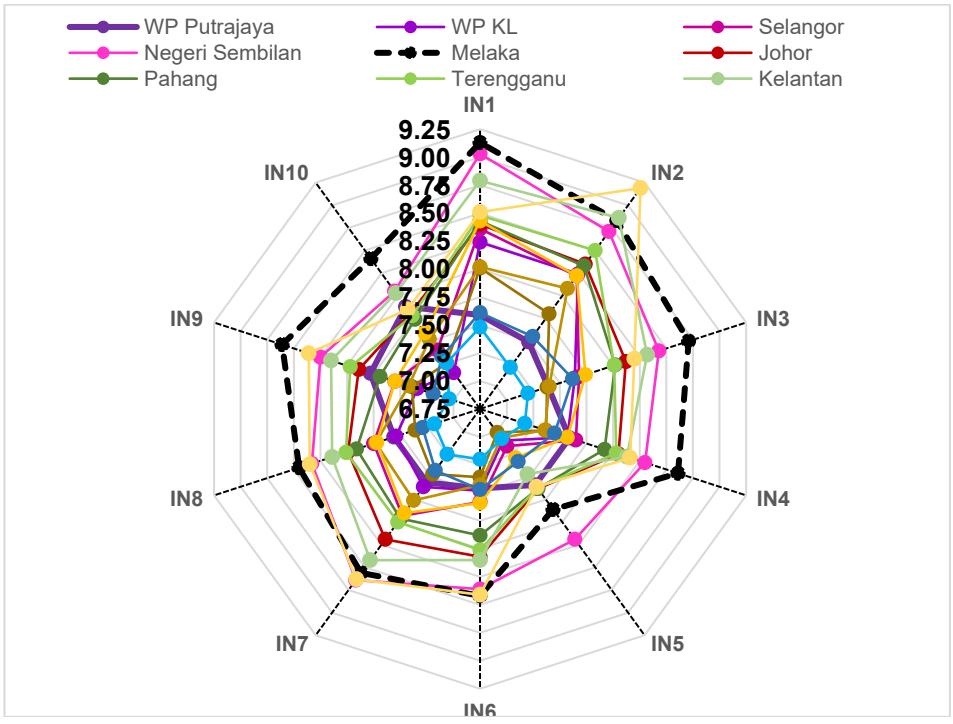

Figure 1: Radar Chart of IN Items Mean Values Across States

Table 5: Univariate ANOVAs and Post-Hoc Comparison of Melaka Mean Values

UNIVARIATE ANOVAs

DV	Type III Sum of Squares	df	Mean Square	F	Sig.	η2
IN1	832.982	14,4300	59.499	19.275	.000	.059
IN2	1044.855	14,4300	74.633	23.756	.000	.072
IN3	667.462	14,4300	47.676	17.017	.000	.052
IN4	607.713	14,4300	43.408	15.029	.000	.047
IN5	408.280	14,4300	29.163	8.551	.000	.027
IN6	602.052	14,4300	43.004	16.108	.000	.050
IN7	741.881	14,4300	52.992	16.414	.000	.051
IN8	585.079	14,4300	41.791	13.358	.000	.042
IN9	75.554	14,4300	53.611	12.760	.000	.040
IN10	449.624	14,4300	32.116	9.610	.000	.030

POST-HOC TESTS: MEAN DIFFERENCE OF MELAKA AGAINST OTHER STATES

IN		PUT	KL	SEL	N9	JOH	PAH	TER	KEL	PER	PEN	KED	PERL	SAB	SAR
IN1	MD	**1.550**	**.890**	**.77**	.100	**.730**	**.700**	*.65*	*.340*	**1.120**	**1.101**	**.700**	*.620*	**1.520**	**1.650**
	p	**.001**	**.001**	**.001**	.999	**.001**	**.002**	*.011*	*.766*	**.001**	**.001**	**.001**	*.032*	**.001**	**.001**
IN2	MD	**1.34**	*.590*	**.61**	*.130*	*.480*	*.500*	*.330*	*-.030*	**1.030**	**.750**	*.610*	*-.360*	**1.290**	**1.620**
	p	**.001**	*.034*	**.002**	*.999*	*.101*	*.130*	*.831*	*.999*	**.001**	**.001**	*.012*	*.772*	**.001**	**.001**
IN3	MD	**1.32**	**1.070**	**1.03**	.280	**.590**	**.690**	**.70**	*.390*	**1.330**	**1.310**	**.970**	*.520*	**1.090**	**1.510**
	p	**.001**	**.001**	**.001**	.941	**.003**	**.001**	**.002**	*.485*	**.001**	**.001**	**.001**	*.117*	**.001**	**.001**
IN4	MD	*1.03*	**1.040**	**.96**	.310	**.560**	**.690**	*.59*	*.480*	**1.240**	**1.260**	**1.040**	*.450*	**1.160**	**1.440**
	p	*.031*	**.001**	**.001**	.877	**.009**	**.001**	*.028*	*.167*	**.001**	**.001**	**.001**	*.310*	**.001**	**.001**
IN5	MD	*.270*	**.760**	**.70**	-.330	*.230*	.230	*.240*	*.390*	**.850**	**.790**	**.570**	*.250*	*.530*	**.780**
	p	*.999*	**.001**	**.001**	.895	*.985*	.991	*.993*	*.638*	**.001**	**.001**	**.042**	*.990*	*.050*	**.001**
IN6	MD	*.96*	**.940**	**.84**	.060	*.350*	.540	*.410*	*.320*	**1.060**	**.990**	**.830**	*.020*	**.950**	**1.220**
	p	*.045*	**.001**	**.001**	.999	*.458*	.024	*.368*	*.758*	**.001**	**.001**	**.001**	*.999*	**.001**	**.001**
IN7	MD	*.999*	**.950**	**.63**	-.080	*.370*	.600	*.560*	*.140*	**1.090**	**.800**	**.660**	*-.070*	**1.130**	**1.310**
	p	*.077*	**.001**	**.001**	.999	*.534*	.023	*.077*	*.999*	**.001**	**.001**	**.004**	*.999*	**.001**	**.001**
IN8	MD	*.890*	**.910**	**.70**	.120	*.460*	.540	*.440*	*.310*	**1.090**	**.720**	**.720**	*.100*	**1.160**	**1.270**
	p	*.179*	**.001**	**.001**	.999	*.149*	.063	*.407*	*.877*	**.001**	**.002**	**.001**	*.999*	**.001**	**.001**
IN9	MD	*.830*	**1.270**	**1.070**	.370	**.720**	**.920**	*.640*	*.470*	**1.220**	**1.190**	**1.060**	*.250*	**1.420**	**1.570**
	p	*.532*	**.001**	**.001**	.889	**.004**	**.001**	*.082*	*.519*	**.001**	**.001**	**.001**	*.996*	**.001**	**.001**
IN10	MD	*.530*	**1.25**	**1.001**	.360	**.600**	**.67**	**.620**	*.380*	**1.140**	**.890**	**.810**	*.550*	**1.070**	**1.150**
	p	*.937*	**.001**	**.001**	.805	**.013**	**.006**	**.033**	*.680*	**.001**	**.001**	**.001**	*.139*	**.001**	**.001**

Note. MD= Mean Difference; p = p/significant value at 99% confidence level

MATRIX COMPARISON: MEAN VALUES OF MELAKA AGAINST OTHER STATES

IN	Putra-jaya	K.Lum-pur	Sela-ngor	N.Sem-bilan	Johor	Pa-hang	Tereng-ganu	Kelan-tan	Perak	P.Pi-nang	Kedah	Perlis	Sabah	Sara-wak
IN1	+*	+*	+*	+	+*	+*	+	+	+*	+*	+*	+	+*	+*
IN2	+*	+	+*	+	+	+	+	—	+*	+*	+	—	+*	+*
IN3	+*	+*	+*	+	+*	+*	+*	+	+*	+*	+*	+	+*	+*
IN4	+	+*	+*	+	+*	+*	+	+	+*	+*	+*	+	+*	+*
IN5	+	+*	+*	—	+	+	+	+	+*	+*	+*	+	+	+*
IN6	+	+*	+*	+	+	+	+	+	+*	+*	+*	+	+*	+*
IN7	+	+*	+*	—	+	+	+	+	+*	+*	+*	—	+*	+*
IN8	+	+*	+*	+	+	+	+	+	+*	+*	+*	+	+*	+*
IN9	+	+*	+*	+	+*	+*	+	+	+*	+*	+*	+	+*	+*
IN10	+	+*	+*	+	+*	+*	+*	+	+*	+*	+*	+	+*	+*

Note. +* = Melaka has significantly higher mean; + = Melaka has higher mean; — = Melaka has lower mean.

Table 5 shows that at 99% confidence interval there were statistically significant difference in all of the IN items between states and the effect sizes were all medium ($\eta 2 = .010 < .031$ to $.052 < .138$). The Post-Hoc Test exhibits the mean difference in IN items of Melaka in opposition to other states. The Post-Hoc Test on Melaka shows that majority of the mean difference of Melaka compared to other states were positive.

The Comparison Matrix indicates that majority of IN items' means for Melaka were higher than IN items' means for other states. Out of the 140 cells, 135 cells revealed that Melaka had statistically higher means of IN items than other states and 82 out of the 135 cells were statistically significant. Table 6 shows the interpretation of the result.

Table 6: Result Interpretation

Items	Statements	Interpretation
IN1	*outdoor environment determining own health and wellness*	Melaka had significantly higher means of IN1 than (i) Putrajaya, (ii) Kuala Lumpur, (iii) Selangor, (iv) Johor, (v) Pahang, (vi) Perak, (vii) Pulau Pinang, (viii) Kedah, (ix) Sabah, and (x) Sarawak.
IN2	*being able to recall experiences in the natural environment*	Melaka had significantly higher means of IN2 than (i) Putrajaya, (ii) Selangor, (iii) Perak, (iv) Pulau Pinang, (v) Sabah and (vi) Sarawak.
IN3	*being able to adapt to various outdoor surroundings*	Melaka had significantly higher means of IN3 than (i) Putrajaya, (ii) Kuala Lumpur, (iii) Selangor, (iv) Johor, (v) Pahang, (vi) Terengganu, (vii) Perak, (viii) Pulau Pinang, (ix) Kedah, (x) Sabah, and (xi) Sarawak.
IN4	*being able to see and hear what others usually miss in nature*	Melaka had significantly higher means of IN4 than (i) Kuala Lumpur, (ii) Selangor, (iii) Johor, (iv) Pahang, (v) Perak, (vi) Pulau Pinang, (vii) Kedah, (viii) Sabah and (ix) Sarawak.
IN5	*being able to notice scientific details of nature*	Melaka had significantly higher means of IN5 than (i) Kuala Lumpur, (ii) Selangor, (iii) Perak, (iv) Pulau Pinang, (v) Kedah, and (vi) Sarawak.
IN6	*being able to cope with the outdoor environment*	Melaka had significantly higher means of IN6 than (i) Kuala Lumpur, (ii) Selangor, (iii) Perak, (iv) Pulau Pinang, (v) Kedah, (vi) Sabah and (vii) Sarawak.
IN7	*feeling the urge to spend time in the natural environment*	Melaka had significantly higher means of IN7 than (i) Kuala Lumpur, (ii) Selangor, (iii) Perak, (iv) Pulau Pinang, (v) Kedah, (vi) Sabah and (vii) Sarawak.
IN8	*tending to lose concentration without contact with nature*	Melaka had significantly higher means of IN8 than (i) Kuala Lumpur, (ii) Selangor, (iii) Perak, (iv) Pulau Pinang, (v) Kedah, (vi) Sabah and (vii) Sarawak.
IN9	*tending to have objects from the outdoors in personal space*	Melaka had significantly higher means of IN9 than (i) Kuala Lumpur, (ii) Selangor, (iii) Johor, (iv) Pahang, (v) Perak, (vi) Pulau Pinang, (vii) Kedah, (viii) Sabah and (ix) Sarawak.
IN10	*spending time planting at home*	Melaka had significantly higher means of IN10 than (i) Kuala Lumpur, (ii) Selangor, (iii) Johor, (iv) Pahang, (v) Terengganu, (vi) Perak, (vii) Pulau Pinang, (viii) Kedah, (ix) Sabah and (x) Sarawak.

The positive and significant higher means of majority of IN items suggests that Melaka residents are highly agreeable on IN items compared to other states. However, in relation to other states, Melaka falls slightly short on (i) IN 2, *being able to recall experiences in the natural environment* and (ii) IN5, *being able to notice scientific details of nature*.

DISCUSSION

The human-nature connection measures the interrelationships between human and nature at individual level. Connections with nature is a vital groundwork of one's ecological behaviours (Abu Bakar et al., 2018). The benefits of human-nature connection are delivered through human multisensory experiences. Sight benefits of nature are reduced anxiety, reduced stress, shorter hospital stays, lower heart rate, and increased directed attention. Nature sounds have therapeutically served to relieve stress, recover attention, decrease anxiety and agitation. The smell of nature has profound effects on human mood, behaviour, and cognition (Corraliza & Collado, 2011; Duron-Ramos et al., 2020; Franco et al., 2017). Sights, sounds and smells of botanical gardens, water, wind, forests, animals, rural landscapes, are much preferred over human-activities such as traffic, recreations, and industrial noise (Franco et al., 2017). Rural residents spend more time in the natural environment hence they tend to recall the experiences as positive (Chawla & Derr, 2012; Gifford & Nilsson, 2014). Those residing in rural areas and whose livelihoods depend on the natural resources has frequent and habitual contact with nature compared to urban dwellers. Pleasant experiences in natural surrounding boost environmental responsibilities and nature-attachment. The greater the nature connection, the greater the interest in taking care of the natural resources (Abu Bakar et al., 2020; da Silva et al., 2015).

Melaka was sought over for centuries for its strategic location in the Malacca Straits. The state is renowned globally as a historic city worthy of its UNESCO heritage status. However, due to large-scale land reclamation, among other build-ups, the urban areas of Melaka have grown in size, especially in the south. Several large-scale futuristic land reclamation projects are underway on the coast of the Malacca Straits, among which is the Melaka Gateaway. On a total of 1,366 acres, developers are creating a new land from dredged sea sand for a deep-sea port, a cruise terminal, a financial centre and a maritime industrial park. Although the green initiatives have shown applaudable outcomes, it does not change the fact that natural environment in Melaka is still ongoingly exploited to make ways for urban expansions of a 'developed city'. As a result, species are facing extinction and natural system is eroding while the advertisement promotes 'new, improved nature' in the Green City of Melaka.

The Melaka respondents lack ability to recall experiences in the natural environment especially compared to Perlis and Kelantan respondents. Like other states, Melaka respondents were withdrawn from noticing nature scientific details. In light of the current scenario, perhaps the lower scores of the two items is sourced from the diminishing natural environment to begin with. Moving forward, as well as (i) addressing the environmental threats and mitigations of the ongoing development; the state government should (ii) listen more to communities whose livelihoods are changing drastically due to the rapid development in the natural setting they used to have close contact with.

CONCLUSION

This paper compares the Interaction with Nature, the second dimension of Human Interdependence with Environment, of Melaka residents in relation to other states. It was discovered that Melaka respondents are agreeable to most of the statements implying human-nature interaction in comparison to other states. However, in relation to other states, Melaka was slightly shy from being able to recall experiences in the natural environment and being able to notice scientific details of nature. Future studies exploring the constructs elaborated in this paper via structural causal modelling and expand the findings through moderation effects of Malaysia States in relation to local environmental policies would be productive.

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THE EFFECTIVENESS OF GOVERNMENT PROGRAMMES FOR SMALL AND MEDIUM TOURISM BUSINESSES FROM AN INSTITUTIONAL PERSPECTIVE

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Abstract

It is well-known that the tourism sector has significantly contributed to economic and social development in developing countries, including Malaysia. The government has a major influence on implementing programmes to support tourism businesses. Previous researchers have proven that the implementation process of these programmes is complex and ineffective. Therefore, this paper explored the implementation of various tourism programmes and barriers to effective implementation. Using semi-structured interviews, seven respondents were selected from government agencies at different organisational levels. The findings revealed that the main barriers are found in the government organisation itself, which are lack of collaboration among agencies, insufficient resources, and lack of skilled agencies to implement effective programmes. Besides, external factors, such as low involvement among local operators, emerged as the main barriers faced by government agencies. This paper proposes the need for the government to clearly understand the objective, the functions, and the implementation process of each tourism programme.

Keywords: Government agencies; Government Programmes; Programmes Implementation; Qualitative Approach; Perhentian Island

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INTRODUCTION

Within the service industry, tourism has become a dynamic sector and is considered the most rapidly growing activity in the world's economy (Charoensukmongkol, 2016). Like other developing countries, Malaysia's tourism sector is a sub-sector in the services sector that contributes 13.7% to the country's gross domestic product (GDP) (Department of Statistics, 2016). Small and medium enterprises (SMEs) appear to be the most dominant sector, with 61.9% of business establishments in the services sector (Department of Statistics, 2016). It has been acknowledged that the government plays a significant role in creating an enabling conducive environment for SMEs (Charoensukmongkol, 2016). The government major influence to implement programmes to develop SMEs in developing countries have increased significantly over the past decade, as seen by several researchers (Doh & Kim, 2014, Lawrence & Weber, 2014; Obeng & Blundel, 2015). Doh and Kim (2014) referred to government programmes as part of government policy implementation. The implementation of programmes is essential to support the competitiveness faced by tourism business and industries (Doh & Kim, 2014, Obeng & Blundel, 2015; Wang and Ap, 2013).

The government is a major stakeholder in tourism development; however, tourism planning has been impeded by the government's shortcomings in implementing tourism programmes for SMEs (Ismet & Abuhljeelah, 2016; Khalid & Saad, 2015). Unclear authorities and responsibilities of each division and lack of supervision and monitoring at the local level are among the obstacles faced by the government in implementing the policies and programmes (Wang & Ap, 2013; Ismet & Abuhljeelah, 2016). Scholars from Malaysia also highlighted several issues related to programmes implementation, namely inadequate funding, poor coordination, frequent government change, and the unclear role of tourism stakeholders (Marzuki & Hay, 2013; Khalid & Saad, 2015; Islam, Noh, Yew & Noh, 2013). These obstacles hinder the development process and affect the effectiveness of government programmes implementation.

However, those studies have omitted how the government programmes implementation has been carried out and the effectiveness of the programme's implementation. Specifically, in Malaysia, several authors have explored the role of government in supporting SMEs development in a quantitative way (Awang, Aziz & Samsudin, 2015) and the impact of government programmes on SMEs sustainability (Jamaludin & Yusof, 2017). Nevertheless, there has been less attention given to the process and implementation of effective government programmes for tourism businesses. Besides, only a handful of studies have probed into the context of Malaysia's tourism islands, especially from the government stance.

Island tourism plays a crucial role in maintaining tourism income in Malaysia (Jamaludin & Yusof, 2017). Perhentian Island is a popular and preferred location for small- and medium-sized hotels. According to Mohamad and Mohamed (2018), this island is one of the premier tourist destinations in Terengganu and a famous spot with steady growth in the number of tourist arrivals to this island. Besides that, the main reason for choosing Perhentian Island is that activities and income for local businesses are highly dependent on tourist activities. However, the businesses here have begun facing difficulties, such as seasonality due to monsoon season, shortage of qualified staff, insufficient supplementary facilities and services, poor service quality, and high employee turnover (Mohamad & Mohamed, 2018; Jamaludin & Yusof, 2017). Looking at these constraints, government programmes could provide good input to strengthen the tourism businesses on this island. Hence, this paper explored the various types of government programmes implemented and the barriers behind effective implementation of government programmes in Perhentian Island.

LITERATURE REVIEW

Implementation of Government Programmes

In most developed and developing countries, government programmes have been used to support or stimulate SMEs (Cancino, Bonilla, & Vergara, 2015). Hoang (2016) defined government programmes as an approach used by the government to improve, promote, and provide SMEs training to progress, and the programmes are developed based on government agendas. Given the importance of SMEs to the national economies, most of these initiatives are specifically designed to suit the needs of SMEs (Blackburn, 2016; Hoang, 2016). Government programmes for SMEs consist of two types; financial and non-financial. Financial programmes refer to the financial help of various institutions and organisations for starting new SME businesses. There are many accesses to funding programmes, such as grants, loans, credit guarantees and subsidies (Doh & Kim, 2014; Hoang, 2016). Access to finance remains at the top of the list of obstacles faced by SMEs in developing countries (Beck, 2013; Doh & Kim, 2014). Non-financial programmes refer to support that excludes money, such as business advice, training programmes, and marketing programmes (Hoang, 2016; Sambajee & Dhomun, 2015).

The last few years have witnessed the increasing number of contributions that prompt studies to investigate government business support programs' effects. Most researchers have used survey evidence to assess government programmes' use and perceived effectiveness (Cancino et al., 2015; Doh & Kim, 2014; Klonowski, 2010). In Malaysia, Ismail and Othman (2014) concluded that government services programmes had a positive impact on business growth among its SMEs.

Although there is a positive impact on government programmes for SMEs, some SMEs have recorded to face difficulties in receiving government programmes. Several researchers have highlighted the lack of government support for SMEs and underutilisation of existing business support services (Cancino et al., 2015), as well as complicated and lengthy legislation process (Sambajee & Dhomun, 2015). In Malaysia, Hung, Effendi, Talib and Rani (2011) revealed that most of the existing government programmes had not been completely implemented due to the complicated application procedures, limited allocation of resources, and some activities that were only meant for new enterprises. Awang et al. (2015) found that most small businesses faced difficulties in sourcing funds from the government or financial institutions due to the high-risk business located at the islands.

Barriers behind Effective Implementation of Tourism Programmes

In numerous surveys concerning entrepreneurs, government programmes have been mentioned as a critical factor to business success (Crick & Lindsay, 2015; Doh & Kim, 2014). Nevertheless, a number of reasons have been listed to explain the failures of government programmes to support the development of SMEs. Among these factors are poor quality of support service, poor government service, and limited resources (Sambajee & Dhomun, 2016); inefficient government organisation (Wang & Ap, 2013); as well as overlapping of powers, poor coordination between tourism agencies, lack of experience among agencies, limited available programmes provided, and unclear role of tourism stakeholders (Ismet & Abuhjeeleh, 2016).

According to Doh and Kim (2014), the federal government's funding in developing countries may be limited and is allocated for the development of certain activities. Keppel et al. (2013) also claimed that the infrastructure development in Kiribati Island could not be implemented due to an ongoing land ownership issue and inadequate funding allocated from the federal government. Besides that, lack of understanding about local businesses caused the government’s failure to provide suitable programmes and relevant information for the local operators in Malaysia (Chen & Chen, 2017; Salehudin et al., 2015). The issue of lack of inter-organisation collaboration is associated with ineffective governance to develop tourism destination. This is because of overlapping areas of responsibilities, failures in making the decision, and lack of sufficient knowledge among government agencies (Khalid & Saad, 2015; Marzuki & Hay, 2013; Salehudin et al., 2013). Besides that, Waligo et al. (2013) found that the involvement of local operators appeared to be the most important participation in government programmes. Most local operators were reluctant to involve in tourism development due to many processes and rules that need to be adhered to (Komppula, 2014; Doh & Kim, 2014) and irrelevant government programmes

provided for their needs (Obeng & Blundel, 2015). Salehudin et al. (2015) found that the lack of information from government agencies was a common reason for the owners not participating in government programmes.

Island Tourism in SMEs

The tourism industry has reached the island destination with numerous primary attractions, such as marine resources, beaches, and panoramas (Nasir et al., 2017). Many islands worldwide have penetrated the dynamic international competition to attract tourists and gain a global tourism market position. Despite its importance, many islands seem to face several issues regarding the sustenance of their natural environment and local businesses (Mohamad & Mohamed, 2018). Some researchers have revealed that it is common for island tourism to experience chronic issues, such as a seasonal business, low occupancy rates, transportation difficulties, insufficient supplementary facilities and services, poor service quality, and high turnover (Awang et al., 2015; Sambajee & Dhomun, 2016; Mohamad & Mohamed, 2018). These issues demand attention from the formal institution to assist and to support the survivability of SMEs.

RESEARCH METHODOLOGY

Study Area

Perhentian Island is one of the coral reef islands situated on the east coast of Peninsular Malaysia. This island was gazetted as Marine Parks Area in 1994 under the Malaysian Fisheries Act 985 (amended 1993) to conserve and protect its marine flora and fauna from being damaged by fishing and other human activities. The Perhentian Archipelago consists of two main islands; Perhentian Kecil (small) and Perhentian Besar (large), covering a land area of 1,392.1 hectares. The Marine Park management of Perhentian Island is under the Marine Park of Department Malaysia (MPRM) that belongs to the Federal government jurisdiction. Meanwhile, land on the island belongs to the State government that decides on all land-based on development activities. The local authority (Besut District Council) is responsible for providing facilities, infrastructure, and amenities to the local community, operators, and tourists. Most of the tourism businesses in Perhentian Island are dominated by SMEs. In the year 2016, 47 small and medium accommodation businesses were established and operated in Perhentian Island (Besut District Council, 2017).

Research Approach

In order to gain detailed information on the government programmes implemented and their barriers behind the implementation, the exploration of this issue required an interview. This study used the qualitative approach via face-to-face semi-structured interviews (Silverman, 2007). This method aims to get a

first-hand explanation of various government programmes implemented and the barriers to implement that government programmes in Perhentian Island. This approach was viewed as equally appropriate, enabling the researcher to obtain in-depth views and experiences of knowledgeable individuals who are intricately involved with programmes implementation.

Purposive sampling was performed to select the best possible respondents who can provide rich information related to the case (Silverman, 2007). The respondents were profiled beforehand to ensure that they had had sufficient project experience (Silverman, 2007). The respondents' selection was based on the concept of information power related to 1) their knowledge, 2) their involvement, and 3) their experience on policies and programmes implemented in Perhentian Island. The interviews were conducted with seven respondents (R1-R7) from different government organisation levels. The respondents represented the Federal government, as well as State and local authorities. In order to ensure data saturation, the interview was continued until the respondents provided no new information.

Prior to the interview, permission was sought from the stakeholders for their consent to be interviewed. The interviews were then audio-taped to ensure accuracy, and no information was missed out. Table 1 presents the background of the study respondents.

Table 1: Details of respondents

Respondent	Position	Agencies	Working experience
R1	Administrative Officer	Ministry of Tourism and Culture (MOTAC)	6 years
R2	Assistant Officer	Department of Marine Park	4 years
R3	Senior officer	UPEN	23 years
R4	Technical officer		20 years
R5	Assistant manager	Besut District Council	6 years
R6	Technical officer		15 years
R7	Senior Officer		22years

Source: Author

Data Analyses

The gathered data were analysed by using thematic content analysis. Content analysis is a *"research technique for making applicable and valid inferences from data in their context"* (Krippendorff, 1980, p. 21). The thematic content analysis employed in this study entails locating and clustering texts into applicable themes. This is a process of data condensation, where thematic categorisation results from constant interpretation and comparison of data. A process of detailing the substance of the interview was performed by sorting the respondents' feedback into several content-related categories.

RESEARCH FINDINGS

The implementation of government programmes

This section describes the findings gathered from semi-structured interviews and relies heavily on the actual narrations of the respondents. The results revealed five types of programmes implemented by the government in Perhentian Island, which are 1) funding, 2) human resources, 3) marketing, 4) consultation, and 5) infrastructure, as shown in Table 2.

Table 2: Detailed of programmes implemented in Perhentian Island

Types of programmes	Agencies to implement	Type of each programmes implemented
Funding	MOTAC in collaboration with other agencies	tourism fund, tourism special fund, tourism infrastructure fund, budget accommodation funds, tax incentive
Human resources	MOTAC; local authority; Marine park department	- Skills programmes, communication skill, management, and others for local operator - tourist boat operating course, environmental awareness workshop, and tourist guide workshop
Marketing	MOTAC; state agencies (UPEN); local authority	Main events- Visit Beautiful Terengganu (VBT) 2017, Visit Terengganu in 2016 and 2013 Activities - windsurfing challenge, long beach international activities, marine exhibition, seminar conversation of marine life,
Consultation	MOTAC	Consultancy programmes
Infrastructure	Local authority	upgrading and improving the jetty, providing infrastructure and facilities

Funding

Funding programmes are essential programmes implemented by the government for local operators in the tourism sector. MOTAC is responsible for providing several funding programmes for the local operators to develop their businesses in collaboration with several agencies.

> *"At the state level, we also provide tourism grant for tourism operators who are actively involved in MOTAC and state programmes and events..." (G3)*

The results found that these funding programmes were open to all local operators, especially those registered and actively involved with MOTAC and local authority. The implementation of funding programmes involved several procedures and processes that must be adhered to by the local operators to ensure

only eligible operators receive funding. Respondents G1 and G6 explained the procedures involved;

> *"There are a few stages for local operators to apply the funding programmes, which are 1) they should register their business with the MOTAC and Besut District Council (local authority); 2) they need to fill several forms and submit supporting documents; and 3) they must pay a processing fee of RM200 for each funding application."*

Respondent G1 further described the process involved. The application result would not be released not more than six months after submission. The process would take a long time upon glitches or problems.

Human resources

Several training programmes were provided by the federal government (MOTAC) and the local authority to enhance the operators' skills and knowledge. One respondent (G1) claimed, *"Federal government focused on the collaboration with tourism NGOs and training institutions to provide various trainings for local operators".* He also admitted,

> *"…MOTAC had collaborated with several agencies to provide training programmes… for instance, they have collaborated with SME cooperation to provide training in business skills and knowledge".*

The findings found that MOTAC had collaborated with other institutions, such as an Industrial Training Institute, UiTM, and Terengganu State Skills Development Centre, to assist operators. Meanwhile, respondent G2 also mentioned that the Marine Park Department collaborated with MOTAC to provide several training programmes related to tourist guide courses. He added:

> *"These courses are compulsory for local operators before they can obtain license to bring the tourists from the Marine Park Department… before that, local operators must register with us…"*

Marketing

MOTAC and UPEN departments are responsible for organising marketing programmes to develop the tourism industry and increase tourist arrivals. These programmes were organised to support the aim of the state government to develop Perhentian Island into a premier ecotourism destination. The implementation of these events and programmes had encouraged the involvement of local operators

to join and organise state events and programmes. Respondent G5, who had experience in handling local operators, explained,

> *"Prior to the event, we would send an invitation letter to the local operators via email, fax, or direct communication through local authorities... sometimes we personally go to the site with local authorities to get cooperation from the local people and operators in coordinating the event".*

In line with this, respondent G3 disclosed his own strategy to attract the local operators involved in state event, saying, *"actually we provided some incentives to attract the local operators to get involved in our programmes…".* The local operators used these incentives to prepare in terms of cleaning up and improving resort maintenance, providing better services and promotion of activities to attract tourist arrivals.

Consultation

These programmes fell under the MOTAC's responsibility. The purpose of consultancy programmes is to help local operators solve their business problems, share ideas, and provide opinions for business development. Respondent G1 revealed;

> *"This programme is compulsory for local operators, who had registered their businesses with MOTAC because we need to monitor their operation... this service refers to free consultation for operators to share their problems and gain more knowledge about business management…"*

Respondent G1 explained the three steps that need to be adhered to by the local operators, which are 1) Local operators need to register their businesses with the local authority (Besut District Council) and MOTAC to obtain consultation programmes; 2) Local operators need to attend meetings every three months at MOTAC office until their businesses are matured, normally after one year of business operation; and 3) Local operators need to submit their business report to monitor the progress of the business.

Infrastructure

Infrastructure is the main component that stimulates the tourism business and the image of tourism destinations. In this study, the provision of supporting infrastructure for the tourism sector is mainly under the local authorities' responsibility. This role is stipulated in the role of the local authority in Malaysia Planning Act 171, supported by state and federal governments, in terms of

funding allocation. To that extent, respondent G1 explained that *"Federal government had allocated more budget for infrastructure development and improvement of public facilities for each of tourism development area…"*

On the other hand, the local authority focused on providing and improving basic physical infrastructure development to support the local operators in their businesses in Perhentian Island. Respondent G7 claimed that *"Most of the infrastructure development in Perhentian Island involved upgrading and improving the jetty at mainland, Kuala Besut, including the three main jetties situated at Perhentian Kecil and Perhentian Besar".*

Barriers behind the effective implementation of government programmes

As part of each stage of the interview process, the respondents were asked to list barriers that they perceived that hinder effective implementation of government programmes. The results of the responses are classified into four central themes.

Limited resources

Several issues related to funding were revealed during the interviews. The Federal Government allocated the budget for infrastructure development. Due to limited budget, respondent G5 mentioned: *"they did not have enough money when we proposed to improve facilities and utilities at Perhentian Island for local community and tourist".*

The implementation of tourism infrastructure in Perhentian Island had faced difficulties due to land ownership matters. Most of the lands are owned by the local people and external investors. These investors had bought the land from the local people with higher prices to develop tourism businesses.

> *"We cannot develop or improve the infrastructure and accommodation premises to become a proper building on this island because huge pieces of lands belong to private companies and local people". (G3)*
> *"These investors are not giving their cooperation to develop their lands…even though their lands have been abandoned without any development..." (G6)*

The respondents also claimed that that location is a barrier to implementing better infrastructure for local businesses. Respondent G1 stressed, *"In a way, the problem here is the location. Perhentian Island has limited transportation and public facilities to organise huge programmes for local operators… so, most of the programmes are organised in the mainland…"*

Lack of collaboration among agencies

Lack of inter-collaboration between state agencies and the local authority was mentioned in the in-depth interviews. Several reasons were cited for the lack of collaboration between them. Respondent G5 mentioned that they only communicated with the local authorities when issues are raised. He mentioned;

> *"We only communicate when we want to get information, for example, report on the registration of local operators, current building condition, and tourism business in Perhentian Island… the local authority will just provide data for us…"*

Respondent G7 argued that there was no regular meeting with the local authority about tourism planning and asserted, *"the state government does not involve us in the decision-making process… so that is a reason why the collaboration between us is poor..."*. He added, *"... Most tourism development decisions on Perhentian Island were approved by the state without any meeting and coordinating with local authority…"*

Due to this issue with the state government, respondent G6 revealed, *"we don't have enough manpower to monitor and control the development of Perhentian Island, although this island is under the local authority administration..."*.

Low involvement among operators

Most of the respondents claimed that local operators play a crucial role in the tourism industry. However, another barrier mentioned refers to the involvement of local operators. Several respondents raised issues related to operators, as follows:

> *"It is difficult to gain support from local operators because they are less aware and are not really willing to get involved with us… only 39% (11 out 28) of the operators have responded positively towards our programmes...". (G3)*
> *"Most of the operators had problems getting involved in our programmes due to their commitment, not understanding our intention and internal problems…" (G4)*

Besides, several respondents found it difficult to cope with and involve the local operators in government programmes. Interviewees highlighted that local operators need to change their mindset, not only in terms of business changes but also to accept the new development agenda in Perhentian Island for business growth. Respondent G3 said, *"Local operators are not interested with*

new development and they are not ready to accept the new development and regulation in Perhentian Island..."

Respondent G4 alluded that despite organising numerous programmes, implementation is failed because *"almost 40% (19 out of 47 resorts) had not registered their businesses with MOTAC and local authority...so it is difficult to get cooperation from them to get involved in government programmes and events…"* Another respondent clarified;

> *"Sometimes, other problems hinder the government to develop and implement the programmes and tourism events in that island, such as social problems, unsystematic business operations, and improper premise building to cater to the tourist demands..."*

This situation resulted in low involvement among local operators in government programmes and hence, the reasons why certain programmes cannot be implemented.

Lack of experience and experts' agencies

Lack of appropriate in-house skills and knowledge within government agencies emerged as a major concern, including business management, operations and skills to communicate with local operators. Several respondents, such as G1, G3, G5, and G7, highlighted similar problems in the organisation. Respondent G4 commented that *"Actually, we had problems managing the local operators' activities and operations due to insufficient staff experience in managing the business…"*

Similarly, respondent G6 disclosed, "Yes*…one of our problems is knowledge on tourism business operation and competition among them…"* Respondent G1 added;

> *"I admit that this issue happened because we can't provide more information based on market demand… sometimes we are lacking experience in handling local operators for certain training programmes…"*

Based on these findings, five programmes were implemented for local operators in Perhentian Island. However, their implementation seemed ineffective due to several barriers faced by government agencies. This study has highlighted the four main barriers that should be addressed by government agencies to support tourism businesses.

DISCUSSION AND CONCLUSION

Table 3: Summary of the barrier behind effective implementation

Barrier behind effective implementation	Type of programmes
1. Limited resources	- Infrastructure - Funding
2. Lack of collaboration among agencies	- Marketing
3. Low involvement among operators	- Human resources
4. Lack of experience and experts' agencies	- Human resources - Consultation

The following discussion reveals the findings of the present study. This study has proven that the government plays an important role in supporting tourism businesses in Perhentian Island. Five government programmes have been implemented, namely funding, human resources, marketing, consultancy, and infrastructure programmes to support the local operators. Government programmes have functioned as an important back-up for local operators seeking help to start and grow their businesses. This result is supported in prior studies (Awang et al., 2015; Ismail & Othman, 2014). The government has placed strong support in developing the tourism sector, as Hadiyati (2015) claimed that government programmes emerge as a key instrument to unlock SMEs' economic growth in developing countries.

The present study has identified two main barriers that influenced government programmes' effective implementation, which are barriers of government organisations (limited resources, lack of inter-collaboration, and lack of experience and experts' agencies) and local operator (low involvement from local operators) that related with programmes implemented as show in Table 3. Collaboration between government organisations has been identified as the key to effective tourism programmes implementation (Marzuki & Hay, 2013). Therefore, the capability of local authority to collaborate with other organisation (state government) is important in achieving effective implementation of programmes for local operators.

Besides, it is important to highlight the limited role of the local authority in tourism development. Tourism is seen as the main responsibility of the state government, while local authority only deals with operational matters, such as specific activity arrangement that requires approval from the local authority. The findings are similar to several studies pertaining to tourism destinations in Malaysia (Khalid & Saad, 2015; Marzuki & Hay, 2013). This study found that most development and improvement of infrastructure and public facilities had been unsuccessful due to financial constraint allocated for tourism development at the local level.

Apart from barriers from the government organisation, another barrier behind this issue derived from local operators. Almost all respondents claimed similar barriers, which is low involvement among local operators in government programmes. This indicates that most local operators in Perhentian Island were not interested and refused to cooperate with the government, especially on training and events. This issue is a huge challenge for the government to implement effective programmes for them. Low involvement from the local operators is a major obstacle to implement effective programmes (Waligo et al., 2013; Salehudin et al. 2015).

This study has provided valuable insight into the government implementation of tourism programmes. The approach revealed the interactions between different government organisations' tiers to implement effective tourism programmes in Malaysia. There is a need for the policymakers to relook on the role played by each government agency to stimulate future tourism businesses. The effective implementation of government programmes through a clear mission, better programme coordination, and high working spirit among staff should strengthen the inter-organisation ties. The togetherness spirit of these government agencies in arranging tourism activities or events or programmes will significantly impact the local business operators.

Although this study has focused on the tourism development in Perhentian Island, other tourism destinations in Malaysia may face similar issues due to a similar governance structure. This study has several limitations, such as a small number of interviews with a limited group of stakeholders that only focused on government officers. The tourism industry involves a wide range of stakeholders with different roles. Therefore, future researchers can gather views from different stakeholders on related matters pertaining to the tourism industry. The use of multiple case studies will enhance the reliability and generalisability of the research findings.

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LOCATION HOUSING AFFORDABILITY INDEX: ANALYSING THE RELATIONSHIPS

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Abstract

Previous studies claimed that Malaysia is inclined towards a severely unaffordable housing price. Despite such crucial studies, the topics do not provide sufficient empirical evidence to establish a relationship between housing prices, housing and transportation expenditure in Malaysia. Therefore, this study examines the role of these variables in determining the Location Housing Affordability Index. The research had therefore identified measurement items that contribute to Location Housing Affordability Index. The primary data was obtained from urban areas in the Klang Valley using questionnaires, where a total of 363 respondents were selected using the Simple Random Sampling technique. The Partial Least Squares (PLS) method was adopted in analysing the collected data to determine the relationship. The outcome demonstrated the relationship between housing price, housing and transportation expenditure, indicating the significance of the Location Housing Affordability Index and can be a reference for housing policymakers.

***Keywords**:* Location Housing Affordability Index; Housing Price; Housing Expenditure, Transportation Expenditure

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INTRODUCTION

Housing acts as an important determinant of a family's quality of life. Therefore, owning a home is the dream of every individual. Yip et al. (2019) also assert that housing is a fundamental economic and social need for everyone to have a right to be provided. It should be as affordable and appropriate as their basic needs. Globally, house ownership ability is crucial for the housing market. Homeownership is not just to own a place to live but exceeds the fundamental necessity. For some people, it is their single largest investment within their lifetime, which will lead to increased personal well-being that creates economic stability. Ismail et al. (2020) suggested that housing affordability stress provides a meaningful measure of various household well-being elements and can be concluded that housing stress does indeed have a constructive impact on household well-being. Finding affordable, secure and appropriate housing is typically one of the biggest issues of Malaysian households today. Majid (2017) have concluded that the housing prices in Malaysia depend on various factors like population, demand and supply, location, physical characteristic, accessibility, developer of the housing complex, the cost of construction materials and the median income. Housing affordability ensures the houses provided are affordable for all groups; the high-income, middle-income or low-income groups.

RESEARCH BACKGROUND

The affordability problem concerning the housing market is one of the most controversial issues in most developed and developing countries (Sohaimi *et al.,* 2017). Housing affordability is one's financial ability to pay the costs involved in owning a home. According to Hulchanski's (1995) report on housing affordability in major cities, factors affecting buying a home can be divided into macro and micro factors. Macro factors are housing prices, location, financial loans, financial loans interest rates, monthly payments, and money or cash advance process. At the same time, micro factors are monthly income, occupation, age, consumption patterns, total dependency, monthly money surplus and much more (DiPasquale and Wheaton, 1996). Subsequently, the economic factor of a household is the focal problem for housing affordability.

Households at different stages of life have distinct mobility frequencies as economic and demographic characteristics change, resulting in different housing needs and priorities regarding housing choices. When getting older, socio-economic features (gender, age, ethnicity), life-course events, financial status, and the community environment (such as neighbourhood features and access to services) all influence one's housing location choice (Han *et al*., 2019; Osman *et al.,* 2017). Location is a major factor in housing and transportation expenditure, particularly the distance between residential neighbourhoods and employment centres.

Relation to the role of location and affordability are strongly reflective in the housing market. Likewise, Saleh et al. (2016) found a correlation between housing price and location due to workplace factor and the limited choice to reallocate affordable housing. Meanwhile, Saberi et al. (2017) further elaborated that housing affordability must include the geographic location of the house and the accessibility to transport infrastructure. Transportation expenditure is the amount of spending on transportation for each household to conduct their daily activities, such as working, recreational, and groceries (Giuliano, 1998). Meanwhile, Greenlee et al. (2016) added that transportation expenditure would be a better factor in measuring affordability and overall housing cost in terms of locality, making the trade-offs easier for movers to discern and capitalize upon. Furthermore, the measurement of housing affordability is considered flawed without considering the transportation expenses. For that matter, transportation expenditure should not be excluded from any affordable housing scheme.

Several studies agree that transportation expenditure should be included as part of housing affordability calculation (*Hassan et al., 2018*; Hartell, 2017; Litman, 2014; Isalou et al., 2014; Sabri et al., 2013). A journey to a specific place determines the distance that would significantly impact transportation expenditures. Transportation expenditure is the amount of spending on transportation for a households' mobility to do their daily activities such as working, recreational activities, and do their groceries. The amount of spending depends on their house's location, whether near the employment and commercial centres. Location affordability, therefore, is the aptitude of access to transport obtained goods and services at any given time; hence location affordability explains the pattern of residential mobility (Greenlee *et al.*, 2016).

There is a consensus among researchers suggesting that if by combining housing and transportation expenditure, it accounts for less than 45% of overall household expenditures. The housing, then, can be considered affordable. (Lipman, 2014; Mattingly & Morrissey, 2014; Center for Transit-Oriented Development and Center for Neighborhood Technology, 2006). Using this measurement will have many implications, such as identifying a suitable location for developing truly affordable housing. Simultaneously, the result could be taken as a piece of advice for future homeowners on choosing a home. The concept of location affordability adopts the approach in assuming that any consideration of housing affordability will augment by considering the transport expenditures incurred because of a location choice (Litman, 2014; Hartell, 2017).

Hence, Location Housing Affordability Index, a measurement adapted by Hassan (2018), has identified three main variables household income, housing and transportation expenses, to measure housing affordability.

This research was developed along the approach mentioned above to evaluate the relationship among the three variables and determine the level at which such a relationship could accomplish the measurement of location housing

affordability. The general objective of this research is to assess the relationship between household income, housing, transportation expenditure that would then indicate location housing affordability. The objectives are as follows.

1. To ascertain the relationship between housing price and location housing affordability.
2. To find out whether the housing expenditure has influenced location housing affordability.
3. To find out the extent to which transportation expenditure is involved in location housing affordability.

Hypothesis Development

Extensive reviews on location housing affordability suggested three independent variables: household income, housing expenditure, and transportation expenditure. Figure 1 below shows the conceptual framework for this study based on the literature reviews.

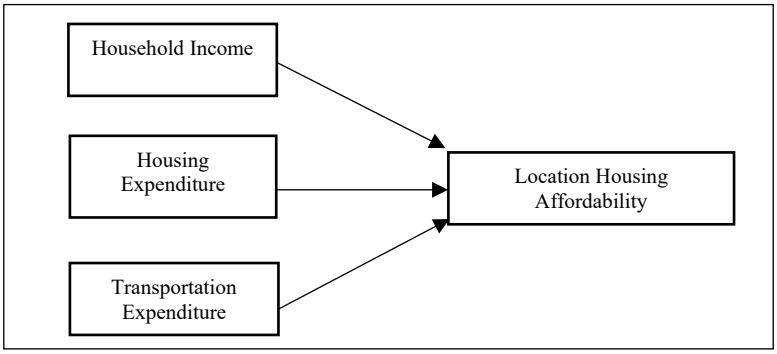

Figure 1: Conceptual Framework of Location Housing Affordability

Table 1 below shows the three (3) latent constructs and all the items applied to measure the independent variables. Concerning the latent constructed and measurement variables, the following hypotheses were thus developed:

H1: There is a positive relationship between household income and location housing affordability.
H2: There is a positive relationship between housing expenditure and location housing affordability.
H3: There is a positive relationship between transportation expenditure and location housing affordability

Table 1: Latent Construct and Measure Items

Latent Construct	Measure Items	Reference
Household Income	Age Marital status Homeowner Respondent work experience Spouse working Spouse's salary Respondent's salary	Khazanah Research Institute, (2015),); Chowdhury (2013; Bujang *et al.,* (2010); Mallach (2009); Stone (2006); Quigley and Raphael (2004); Swartz *et al.* (2002) and Whitehead (1991)
Housing Expenditure	Current residence Housing price Monthly mortgage / rent Utility bills	Khazanah Research Institute, (2015); Mattingley & Morrissey (2014); Jewkes & Delgadillo, 2010 and Mahamud and Hussein (2002)
Transportation Expenditure	Number of vehicles Vehicle payment monthly Vehicle expenses annually Expenses for toll and parking monthly Repair and maintenance monthly Distance to workplace Usage of public transit Expenses on public transit monthly Fuel usage monthly	Greenle *et al.* (2016); Mattingley & Morrissey (2014); Litman (2014) and Center for Transit-Oriented Development and Center for Neighborhood Technology (2006)

METHODOLOGY

For the research, primary information has been the source of information to determine the research hypothesis. A quantitative method was applied to answer some key questions about the factors influencing location housing affordability. Personal administered using questionnaires survey was instrumental in investigating household income, housing and transportation expenditure. Based on these three aspects, the questionnaire survey was divided into three (3) parts to systematically categorised the research. To ensure the researcher, together with the research team, could collect the completed response within a time limit, a simple random sampling was used to select the respondents. The number of respondents sampling was based on Krejcie & Morgan (1970). The total sample size was 363 respondents. This research had chosen the population from three urban areas in Klang Valley; Kerinchi, Subang Bestari and Putra Height.

The Partial Less Square (PLS) was chosen to analyze the data with the help of SMART PLS 2.0. PLS is a combination of factor analysis and regression or path analysis. It is also to facilitate the model relationship between both latent and observed variables. For this research, PLS-SEM was also used to determine the relationship between variables in location housing affordability and household income, housing expenditure, and transportation expenditure.

RESULT AND DISCUSSION

Internal Consistency Reliability

The Internal Consistency Reliability test was also utilised due to its ability to measure consistent results when the same entities were measured under different conditions. The importance of conducting the reliability test is to determine the prerequisite validity of the collected data. The action is to prevent invalidity of collected data due to its inconsistent and reliable measurement (Field, 2013). To measure the reliability test is by finding the Cronbach's alpha. Cronbach's alpha indicates the degree of internal consistency and function of the item number in the scale and the inter-correlations with each item.

When measuring items that are highly related data, the alpha value is high. The low measurement of alpha will indicate that the items do not correlate with each other. Meanwhile, some guidelines can be applied to medium-stakes tests, where the reliability of 0.70 is sometimes considered minimally acceptable, 0.80 is decent, 0.90 is quite good, and anything above 0.90 is excellent. Simultaneously, others also mentioned that the internal consistency reliability measured between 0.80 and 0.70 is highly acceptable. For this research, the reliability coefficient for each latent construct ranged from 0.82 to 0.71. Therefore, the three latent constructs were exceeding the minimum acceptable level of 0.70, and this shows that there is adequate internal consistency reliability of the measure used for this research.

Convergent Validity and Discriminant validity

Convergent validity refers to the extent to which items truly represent the intended latent construct and share a high proportion of variance in common (Hair et al., 2006). This research estimates its convergent validity using factor loadings, average variance extracted (AVE), and composite reliability (CR). As Hair et al. (2017) suggested, the value for loadings is at least 0.5, a composite reliability value of 0.7 and the value of AVE is at least 0.5. The result shows all the item loading being above 0.5 and only one AVE value is above 0.5, which is transportation expenditure (0.53). The other two constructs recorded less than 0.5 are household income (0.48) and housing expenditure (0.46). The composite reliability value for all constructs is above 0.7. The construct for household income value is 0.86, while housing expenditure is 0.77 and transportation expenditure is 0.91. Fornell and Larcker (1981) stated that if an AVE value is less than 0.5, but the composite reliability is higher than 0.6, the convergent validity of the construct is still acceptable. Therefore, the household income and housing expenditure constructed in this research were adequate. Hence, it can be established that all three constructs had agreeable convergent validity and can measure the research concepts.

Discriminant validity compares item loadings with item cross-loading and, at the same time, a comparison of the variance extracted from the constructed shared. The intended construct loading should be on the higher side than other constructs. Simultaneously, discriminant validity can also be tested by comparing correlations of the square root of an AVE construct with other constructs. The result shows the square root of AVEs (number in bold) is considerably higher than its correlations with other constructs. The household income construct value for the square root AVE is 0.69, which is higher than the other constructs; housing expenditure is 0.63 and transportation expenditure is 0.49. The housing expenditure construct value for the square root AVE is 0.68, which is higher than the transportation expenditure construct (0.66). The transportation expenditure construct value for the square root AVE is 0.73. Hence, the constructs have adequate discriminant validity and can be used to measure the research concept.

Structural Model Specification

A model's exploratory power is usually measured using R-square (R^2). The R^2 is known as the coefficient of determination. This explains the quality of the measurement and the variance of the endogenous variable, which in this research is the dependent variable in the Location Housing Affordability Index. The measurement of R^2 is by the proportion of the variant dependent variable that is explained by the independent variables. Hair *et al*. (2017) explained further that they need to have 10% for suitable explanatory power because it can show the strength of the relationship between the dependent variable and independent variable. The analysis revealed in Table 2 and Figure 2 below demonstrates that the structural modal's dependent variable has substantial significance with an R^2 at 89%. Therefore, the dependent variable has a substantial and acceptable R^2 value.

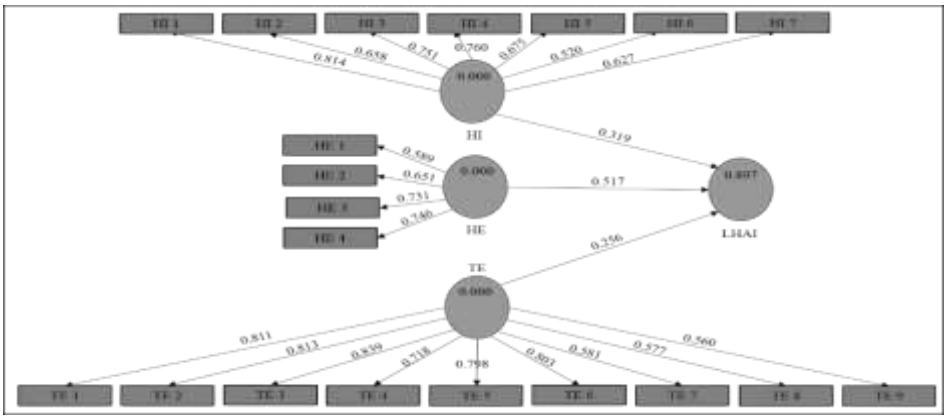

Figure 2: The Result of Path Analysis

Note: HI (Household Income); HE (Housing Expenditure); TE (Transportation Expenditure), LHAI (Location Housing Affordability Index).

Table 2: Structural Specification for Dependent Variable

Constructs	R^2	Redundancy	Communality	AVE
LHAI	0.897200	0.459320	0.735086	
HI	-	-	0.479264	0.479264
HE	-	-	0.459039	0.459039
TE	-	-	0.533598	0.533598

Note: HI (Household Income); HE (Housing Expenditure); TE (Transportation Expenditure), LHAI (Location Housing Affordability Index).
Significant level R^2: > 0.26 (Substantial), > 0.13 (Moderate), >0.02 (Weak.

Assessment of Effect Size (f^2)

The effect size for levels of Location Housing Affordability is 85.4% for household income, 46.6% for housing expenditure and transportation expenditure is 21.4%. Household income and housing expenditure have a large effect, and transportation expenditure has a moderate effect, as shown in Table 3. This shows that all the constructs for this research have met the effect size specification of the structural model.

Table 3: Assessment of Effect Size on the Structural Model

Latent Construct	Included Value	Excluded Value	f^2	Sign
	R^2 Full Model	R^2 Excluded		
HI	0.897	0.809	0.854	***
HE	0.897	0.849	0.466	***
TE	0.897	0.875	0.214	**

Note: HI (Household Income); HE (Housing Expenditure); TE (Transportation Expenditure)
*f^2 is assessed as: > 0.35 (large)***, > 0.15 (moderate)** and > 0.02 (small)**

Assessment of Predictive Relevance

Assessment of Predictive Relevance (Q^2 and q^2) is also known as the blindfolding procedure. This procedure was used to test the predictive relevance of the research approach. This procedure is considered important because by using PLS, prediction purposes require a measure of predictive capability. This procedure represents a synthesis of cross-validation and function fitting with a perspective that the prediction of observable or potential observables is much higher relevance than the estimation of what are often artificial construct parameters. This ensures the cross-validation test fits soft modelling like a hand in glove (Ramayah, 2014).

To validate this test, observing the Q^2 value was undertaken, where $Q^2 > 0$ indicates that the model has predictive relevance for a specific latent construct; however, $Q^2 < 0$ indicates a lack of predictive relevance (Hair *et al*., 2017). For this research, all the latent constructs show that their values are > 0. Therefore, the structural model is a good predictive relevance Q^2.

Additionally, to assess the Q^2 values, the q^2 value is calculated to estimate the effect size approach. This is to make sure the relatives' latent variables affect either small, medium or large. In order to assess the value of the relative measures, predictive relevance is divided into three values. The values are 0.02, 0.15 and 0.35, as stated in Hair *et al.* (2017), represent an exogenous construct (independent variable) that has a small, moderate and large predictive relevance for a specific endogenous construct (dependent variable). The result is shown in Table 4 below clearly shows that all three latent constructs have a large predictive relevance of $q^2 > 0.35$.

Table 4: The Relatives Impact of Predictive Relevance on Observed Measures of Latent Variable

Latent Construct	Q^2 *included* (a)	Q^2 (b)	Q^2 *excluded*	q^2	Sign.
HI	0.523317	0.449782	0.073535	0.94356627	***
HE	0.523317	0.47215	0.051167	0.99049054	***
TE	0.523317	0.439413	0.083904	0.92181387	***

Note: HI (Household Income); HE (Housing Expenditure); TE (Transportation Expenditure)
q^2 is assessed as: > 0.35 (large)***, > 0.15 (moderate)** and > 0.02 (small)*

Hypothesis Testing

This research interpretation of the hypothesis testing was based on the one-tailed t-statistics value of $p < 0.01$ with the degree of freedom of 433. For this research, three hypotheses were tested. The hypothesis is to make sure there is a relationship between the independent variables with the non-independent variable.

Therefore, the three hypotheses are H1: Household Income -> Location Housing Affordability Index, H2: Housing Expenditure -> Location Housing Affordability Index and H3: Transportation Expenditure -> Location Housing Affordability Index. The result in Table 5 shows that all three hypotheses supported the relationship. The relationship between household incomes has an at-value of 11.96. Housing Expenditure has the highest t-value among the three hypotheses, which is 16.19 and transportation expenditure has a t-value of 9.18, which is the lowest t-value. Nevertheless, all three hypotheses are supported at the p-value of 0.01.

Table 5: Hypothesis Testing

Hypothesis	Relationship	Std. Beta	Std. Error	t-value	Decision.
H1	HI -> LHAI	0.32	0.03	11.96 ***	Supported
H2	HE -> LHAI	0.52	0.03	16.19 ***	Supported
H3	TE -> LHAI	0.26	0.03	9.18 ***	Supported

Note: HI (Household Income); HE (Housing Expenditure); TE (Transportation Expenditure), LHAI (Location Housing Affordability Index).
(***) significant at p <0.01
If t-value is greater than 2.58 (significant at p <0.01)

Therefore, the result demonstrated a positive relationship between Location Housing Affordability Index with the three independent variables. The high value of *R2* (0.89) shows that all the variables are significant for Location Housing Affordability Index as a measuring tool. This was earlier expected as many new measurements to determine housing affordability includes all three variables as main variables to identify housing affordability (Isalou, 2014; Litman 2014, 2011; Mattingly and Morrissey, 2014; Center for Transit-Oriented Development and Center for Neighborhood Technology. 2006; Gabriel *et al.*, 2005).

Transportation expenditure inclusivity in housing affordability calculation gives more significance regarding location affordability; furthermore, it also mirrors the actual cost of living (Saberi *et al.*, 2017). The correlative result and its relationship indicate that a household does not necessarily avoid homeownership stress by moving to a suburban city. The highest coefficient parameter is the housing expenditure with 0.52, which indicates that suburban households are then exposed to higher transportation expenditure. These findings, therefore, concur with the result of research done by Vidyattma (2013). From all the above discussions, it can be concluded that the Location Housing Affordability Index could be used as a measuring tool to measure housing affordability, including transportation expenditure, especially since transportation expenditure has stronger empirical evidence towards housing affordability.

As Greenle *et al.* (2016) stated, transportation expenditure will be a better factor in measuring affordability and overall housing expenditure depending on locality. Therefore, making the trade-offs is easier for movers to discern and capitalize. Including transportation expenditure in determining housing affordability could change the development of policies that affect affordable housing that is heavily reliant on its location, transport and at the same time, the employment centre.

CONCLUSION

This research provided evidence to the growing body of knowledge concerning the relationship between housing price, housing and transportation expenditure, and location housing affordability. Results from this research lend support to the key theoretical proposals. In particular, the current research has successfully responded to all the research objectives despite some of its limitations. Additionally, the contribution to identifying and empirically proving that location does matter in housing affordability will be beneficial to future policymakers to build more affordable housing near an employment centre that could impact the vitality of households. Hence, it is noteworthy to highlight the significant function of the Location Housing Affordability Index as a measurement tool in the planning and development of future housing schemes.

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ASSESSMENT ON THE IMPLEMENTATION OF PLOT RATIO AS A DEVELOPMENT CONTROL TOOL IN GEORGE TOWN, PENANG

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Abstract

This paper investigates the changes of buildings to what extent the regulations related to plot ratio are implemented in the city of George Town, Penang, give impact on land use distribution. This study used a quantitative method by conducting field observations to identify building heights in the city of George Town, which was divided into two segments of the road. Then, GIS software was also used as one of the instruments to map the compliance analysis on study area in the city for the development control tool. The results show that quantitatively, the buildings along Jalan Dato Keramat that have been monopolised by residential activities acquire a higher building height and the maximum of plot ratio caps. There is only a small portion in Jalan Gurdwara that complies with the plot ratio limit. However, the characteristics of the area were determined by several parameters, such as building height, zoning land use activities, and building conformity. Thus, more detailed regulations regarding the changes in shape and plot ratio cap according to zoning activities on the exact location and activities are highly required.

Keywords: Plot Ratio, Development Control

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INTRODUCTION

George Town is among the greatest deal of attractions throughout the world due to its shape of land use activities, which are more focused on commercial activities with the support of industrial activities (Samat et al., 2014). The location for this study is between 4° 50' N and 5° 52' N (latitude), and 100° 10' E (longitude) and 100° 51'E, in the north-west coast of Peninsular Malaysia (Narimah & Amirul, 2019). Therefore, with all these great deals of attraction, it indirectly helps to attract more people to migrate from rural to urban areas in pursuit of a greater standard of life by facilitating services and urban activities (Deng et al., 2009). Consequently, this has led to an increase of urban population density as George Town is the capital of Penang and located in the north-eastern region. The city holds the highest future population distribution by district in the next ten years, which is 85,200 of the increment from the year 2020 to the year 2030 (Draft Penang Structure Plan 2030) compared to the other three districts in the south-west region of the island: North Seberang Perai (SPU), South Seberang Perai (SPS), and Central Seberang Perai (SPT). Recently, an urban area in the city of George Town is facing scarcity of land due to the migration and increase in population growth. Hence, new development progress by developers and private sectors have been competing to fulfil the population's high demand on the engagement of numerous community facilities and resources, including residential, educational, healthcare, entertainment, and shopping to be occupied with the highest volume of occupancy. This has resulted in various negative external impact, such as pressure on infrastructure used. The importance of land conversion and land use distribution on plot ratio approval plays an important role in controlling the development. The allocation in the maximum limit of plot ratio gives a greater purpose to every property which leads to long-term planning control. Due to the land scarcity, the land and property value are increasing due to the demand for property use in the city centre, but it requires good compliance of development towards government policies and planning standards. Besides that, Joshi & Kono (2009) explained in their research on maximum plot ratio regulation which was widely used. In their research, they stated that to control population density for reducing population externalities, a maximum limit on plot ratio (or building size) must be set. Firstly, with the implementation of a minimum plot ratio rule to raise population density for this purpose; it sets a minimum building size. Although some measures owe to the 3 complexities of the regulatory structure and the absence of reliable details for every lot of land (Gao & Asami, 2006), it is difficult to grab the actual value of limiting property use. Neither the zoning plot ratio nor the actual plot ratio correlates to the highest allowable plot ratio of lots so far as some researchers' analyses have added nothing to debates on land use limits, as they have only used the zoning plot ratio or the actual lot plot ratio as a possible property determinant. On the other hand, some of the previous research studies show 3D spatial analysis were used as the

research instruments to solve some of the issues in urban development. However, only a few studies have emphasised the issues on development plot ratio control regarding to what extent the regulations related to plot ratio are implemented in the city of George Town, Penang, give impact on land use distribution, specifically in Malaysia compared to the other countries who have at least discussed the research studies conducted that are nearly related with the research topic of this study. So, in this paper, the impacts on land use distribution with the usage of planning standard/guideline plot ratio toward monitoring the development of plot ratio controls in George Town, Penang, have been investigated with the surmount of data collection problems found in current studies. Consequently, the study of interest will focus on the research of investigating compliance analysis on plot ratio at a specific location, George Town Study Area, chosen by using GIS analysis technology through the overlay technique.

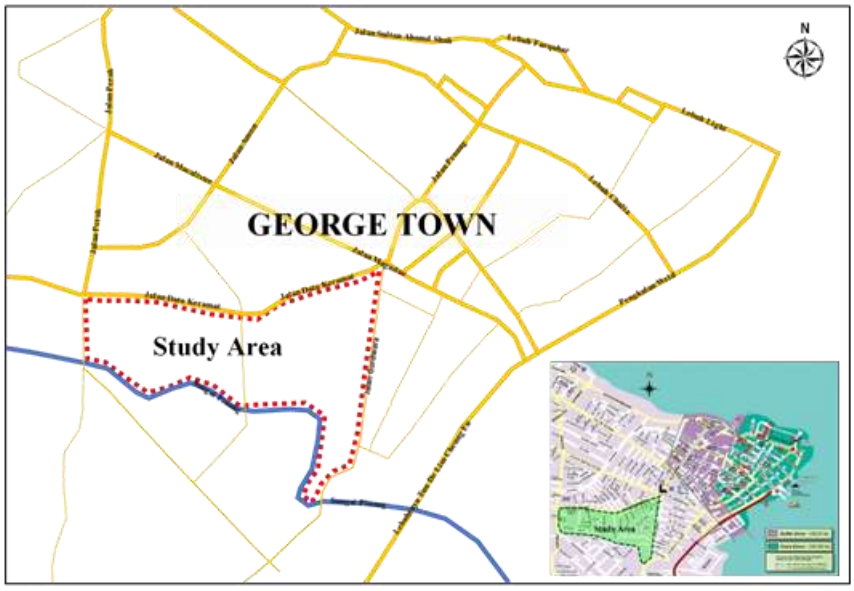

Figure 1: Study area (George Town, Penang) year 2020

PROBLEM STATEMENT

Significant problems in this research study are in equilibrium allocation of land uses, such as imbalance of building skylines in the city of George Town has led to increase population density. As stated by World Bank (2015), it indicates that the proportion of George Town's built-up area reserved for residential usage is greater than that of Kuala Lumpur and Johor Bahru (43% opposed to 31% and 30 %, respectively). Therefore, George Town has passed through speeding up urbanisation and the number of urban populations. Even though Kuala Lumpur's

urban population is the largest in Malaysia, Penang's population density is the highest in Malaysia despite its limited metropolitan region. Since the city of George Town is comparatively limited, it is impossible to account for a significant number of urban regions because of the strong growth rate and population migration due to the growing number of land use activities attraction, thus it is facing critical challenges in terms of land supply. Besides that, increasing demand in various urban amenities engagement and services encourages contact between residents and different urban facilities and services, including market force and job opportunities. As mentioned by Izuandi et al. (2019), shopping, healthcare, and entertainment conduct advancement towards new growth. On the other side, this influx of residents raises the effect on different externalities, such as road congestion, pressure on public infrastructure; sound emissions will also influence other pollutants like emission from the atmosphere. Besides that, Hamdan Abdul Majeed (2012) highlighted that George Town has been branded as a UNESCO World Heritage Site since 2008, which makes the city of George Town guaranteed on several benefits, especially in the field of tourism growth and destination marketing (Lai & Ooi, 2015). Therefore, these factors contribute to the increase in development cost and property prices. Bertaud & Brueckner (2005) mentioned in their study that the better the characteristics of the location, the higher the value of market demand. So, it can be used as the push factor for developers as well as private sectors for attracting to develop further growth in a built-up area with high density in George Town with an increase of plot ratio, for gaining their profits. On the other hand, the balance between residential or office space supply and demand needs to be established, considering that there are several vacancies and they are unable to locate the best occupants at the moment. This is attributed to the higher land valuation, attributable to the vast amount of unsold assets due to the discrepancy between the current launch rates and the availability of the household. So, it will open up the opportunity for foreign investors to invest in the city of George Town, which may be harmful to the local economy if they are monopolising the future economic market. The local authority plays a major role in fulfilling its responsibilities in the establishment and preparation of a development plan strategy by drawing up a master plan to track, coordinate, control, and plan development land use in conjunction with buildings in its specific area of authority and plot ratio approvals. These are important as the local authority acts as a controller in balancing between the population of people and the several urban services and amenities, as these wisely monitor Malaysia's development direction that would contribute to improved quality of living and the suitability to achieve long-term competitiveness in the industry.

RESEARCH QUESTION

Focus on the development control tool of plot ratio in George Town City Centre:

i. What is the constructed plot ratio allowed in George Town to control the development?
ii. How can the relation between constructed plot ratio by zoning land use activities contribute to the development control?
iii. How to analyse the zoning land use and plot ratio of George Town in defining the compliance with development control?

PURPOSE OF THE STUDY

The study on monitoring the development control in George Town area by measuring the plot ratio and land use activity. The objectives that need to be achieved in this study are:

i. To identify the plot ratio allocated in the George Town area in controlling the development.
ii. To investigate the compliance of plot ratio with the given planning standards with the physical skyline of George Town.
iii. To determine the statistical value of the existing plot ratio in the compliance and zoning analysis towards monitoring the development control in George Town.

RESEARCH METHODS

The usage of secondary data was collected from the local authority departments related to development control in George Town, Pulau Pinang, such as PLANMalaysia Pulau Pinang, Majlis Bandaraya Pulau Pinang (MBPP), and also Penang Gis (PEGIS). These secondary data helped in providing the actual plot ratio on study area through the laws used by city councils to enact construction and control land, buildings, and services usage through a program in land use and building-ratio control. The guidelines used in the design of land use of a region are laid out in the comprehensive spatial planning of the community, which involves the zoning system and the decision on the development scale in the form of a plot ratio. This is done by using the method implemented by Izuandi & Jamalunlaili (2020) to find the result for plinth area and level of the building during observation finalise the built-up area for every lot. Finally, the statistical value of existing plot ratio for development control of study area in George Town, Penang, could be determined after analysing and interpreting data using the technique applied to the plot ratio by calculating the mathematical relationship between the total floor area of the building and that of land area as shown below. Thus, the findings from the tabulated data could be examined for any future suggestions and recommendations.

$$\text{Plot Ratio} = \frac{\text{Total Floor Area}}{\text{Land Area}}$$

FINDINGS

i.The Implementation of Plot Ratio as a Development Control Tool

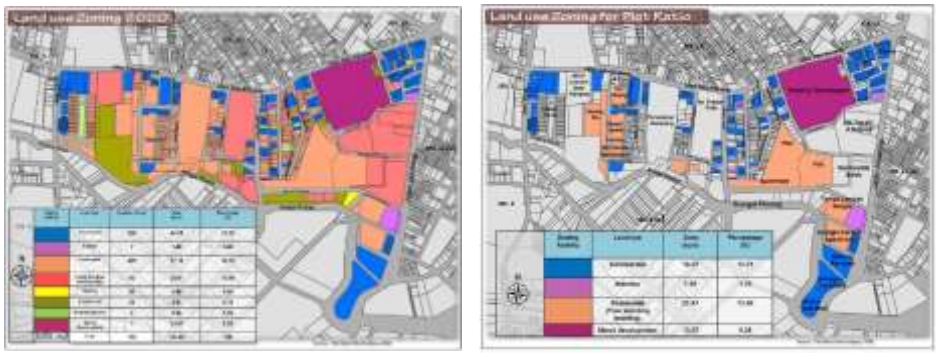

Figure 2: Methodology Flowchart Process

With a total area of 157.83 acres of the whole land use zoning in the study area, 35.29% (55.7 acre; Commercial: 19.27, Industry: 1.89, Residential Free-Standing Building, Mixed Development: 13.07) of the land is land use of plot ratio for the study area. The area on the left is the land use area for Institution/Public Communities, Infrastructure and Utilities and Recreational Land/Open Space which have different ways of measuring the density of urban areas by using residential and population densities (Lehmann, S., 2019).

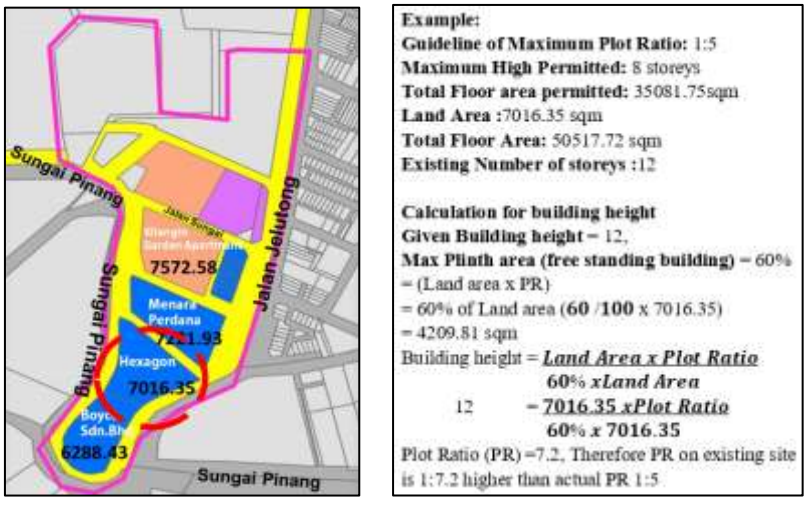

Figure 3: Example of Existing Plot Ratio Calculation and Site Area

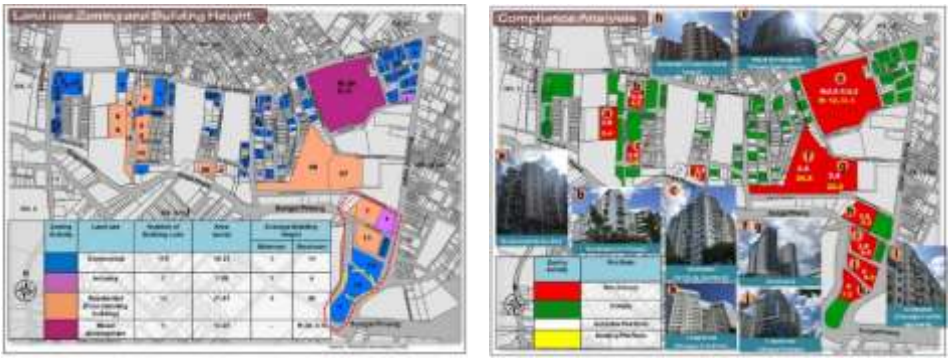

Figure 4: Compliance Analysis on Land use, Building Height and Plot Ratio.

Table 1: Statistical Number on Comparison of Plot Ratio Analysis

Zoning Land Use Activity	Number of Building Lots	Area (Acre)	Guideline of Maximum Plot Ratio	Guideline of Maximum High Permitted	Existing Average Plot Ratio		Existing Average Building Height		Non-Comply		Comply	
					Min	Max	Min	Max	Area	%	Area	%
Commercial	175	19.27	1:5	Shop House: 5 Free Standing Building: 8	0.6	8.4	1	14	3.52	6.32	15.75	28.28
Industry	7	1.89	1:5	8	0.6	2.4	1	4	-	-	1.89	3.39
Mixed Development	1	13.07	1:5 Residential: 1:2.8 Commercial 1:2.2	Residential: 5 Commercial: 4	-	R:12 C:3	-	R:20, C:5	13.07	23.46	-	-
Residential (Free Standing Building)	12	21.47	1:2.8	6	2.4	28.8	1	48	18.47	33.16	3.0	5.39
Total	195	**55.7**							**35.06**	62.94	**20.64**	37.06

*R=Residential, C=Commercial

Table 1 shows the comparison of plot ratio analysis of existing plot ratio compliance analysis with the current land use. There are four types of land use zoning involved in plot ratio analysis, which are commercial, industry, mixed development, and residential for only free-standing buildings (FSB). Since the guidelines of plot ratio have already been identified from the planning standards and guidelines of PLANMalaysia Pulau Pinang, the existing plot ratio value that has been calculated based on mathematical calculation formula, measured, recorded are achieved. To sum it up, through the relationship of guideline plot ratio and existing plot ratio, the compliance analysis could be recognised. Ironically, from the compliance plot ratio analysis with the comparison of land use zoning, it can be overly seen that the residential land use zoning area holds the highest percentage area in that study area as well as the highest non-compliant land use zoning of plot ratio. According to Azalina et al.(2017), they stated that the high plot ratio cap on residential zones are because of the factors influenced by the owner of the land or that the person who applied for planning permission

are willing to pay for the development charge due to the three reasons identified, which are conversion of land use zones, excess of floor area of the plot ratio, and excess of units above the average density residential development. Besides that, it is also supported by Kono & Kaneko (2010), who came out to add with consideration for applicants to fulfil and provide public facilities and amenities in the land use in terms of view, recreational, and breezeways as mentioned by Abdullah et. al. (2020). The ease which people can get to important destinations using public transportation is referred to as accessibility and facilities, thus these are the attractive factors for residents to gain benefits on their property investment and also as an alternative approach for developers granting a planning permission. Hence, from the previous research study, it can be concluded that these are the main reasons on the possibility of push factors for the residential zone holding the highest value of non-compliant plot ratio in the study area. Additionally, the other factors that cause the highest non-compliance by residential area is because of the modification of the guidelines for the increase in development density from 87 units per acre to 128 units per acre on February 1, 2017 date of the enforcement for the application of these guidelines. According to news published in November 2016 by the iProperty.com.my News Team, they clarified that the authorisation of the allocation to increase the density was announced by the Chairman of the State Housing, Town and Country Committee Jagdeep Singh at the compilation, while back then before it was increased to 87 units per acre in 2010, the upper limit was 30 units per acre. Apparently, these 87 units per acre were initially supposed to be for transit-oriented planning nodes only, but developers started asking for the entire 87 units, no matter where. So, now with the allocation to increase the density to 128 units per acre, this obviously opens up opportunities for developers to apply for the maximum l28 units just for their sake of profits. The question here is whether it is fair for the developer to seek approval to submit for maximum density when many of them have been constructing homes that most ordinary Penangites could not afford.

ii.The Building Conformity towards the rule of Plot Ratio

The buildings in the study area are all following the requirements design criteria and recommendations set out in the city's spatial plan by MBPP local authority, which focuses on George Town region as a hub for linear trade and utilities. Approximately, only two types of zoning land use building plots observed are non-compliant with the rules required, which consist of residential and mixed land use development while the commercial land use all complied with the requirements in this observation segment. Therefore, this may lead to the excess of residential and mixed-use activities along Jalan Dato Keramat due to the higher intensity of development area. Such activities will lead to negative externalities, such as shortage in public services, obstruction in traffic, and carbon emissions that will influence citizens. Jalan Dato Keramat is among the worst affected

traffic congestion areas between the Lebuhraya Thean Teik to Lebuhraya Tun Dr Lim Chong Eu along the way towards George Town city centre.

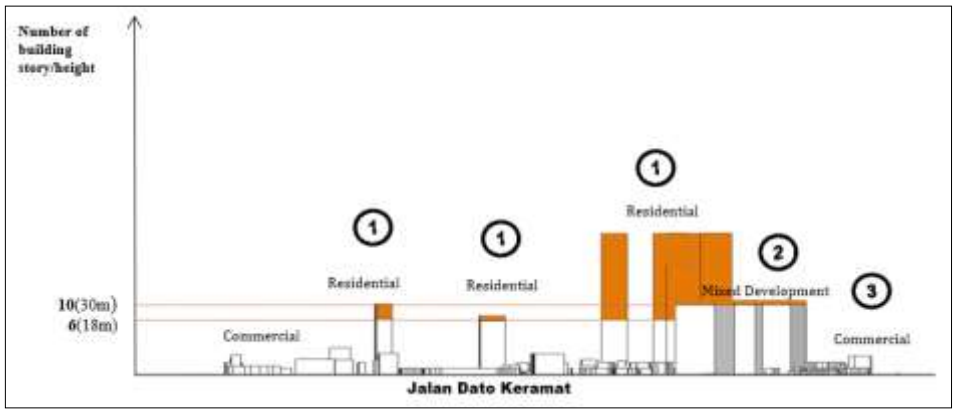

Figure 5: Skyline Simulation in Segment A

In addition, from the figure 5 of skyline simulation at segment A, it also can be seen that the imbalance of building skyline along Jalan Dato Keramat is caused by monopoly of the residential activities that acquire a higher of building height and the maximum of plot ratio caps. Moreover, the non-compliance of guidelines by mixed land use also contributes to the increase in population density as well as increasing the demand for the limited value of real estate. This causes property prices to become very expensive because increase of development costs and property prices affected by the cost of development fee charged by the developers from the local authority due to planning permission approval.

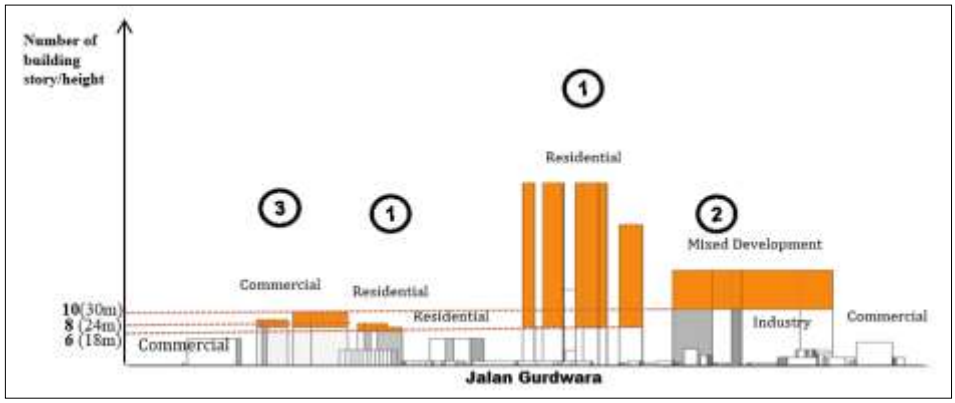

Figure 6: Skyline Simulation in Segment B

Based on the field observations pictured in figure 6, three types of zoning land use building plots observed are non-compliant with the rules required which consist of commercial, residential, and mixed-land use development.

Land use distribution commercial activity in segment B were majority focused from south to north of the study area to city of George Town area. Moreover, rapid growth was observed at the centre of the study area to city of George Town area due to the higher intensity and floor space of the residential land use zoning allocation while the industry land use complied with the requirements. In addition to that, along Jalan Gurdwara, it is observed that commercial activities there are supported with the residential activities and mixed land use activities. Generally, it shows that a greater non-compliance building of plot ratio cap may cause the expanding on the growth in the city of George Town due to land use distribution, where it may lead towards the urban expansion because of the increase in number of population and traffic condition. As a result, this may contribute to the density and development trend.

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CONCLUSION

Controlling the maximum plot ratio does not affect the economic viability of any future property market growth. If an alternative method is properly recorded in the planning tools, replacing with an effective policy and guidelines of plot ratio would not be harmful to the property market, instead it will bring mutual interest not only to the developers, but also to all residents for long-term harmony and sustainability of development planning. Therefore, it is recommended that plot ratios in the city and suburban areas should not be abandoned. Plot ratios have also been studied in suburban areas and it has been found that they have a role to play in protecting the integrity of the neighbourhood as well as the role and function of the city to accommodate the demands of land use activities. A more guideline-driven approach is needed followed by more processes of collective approvals. It will require a collection of fairly conservative and appropriate options in the scheme to back it up. There would also be a need for specific output criteria to support in maintaining flexibility to dispense suitable solutions. New guidelines can be drawn up with a modification of the zoning land use scheme as it currently allows appropriate solutions at present. For residential areas, it is recommended, as a priority, that residential plot ratios and density planning guidelines should be allocated a plot ratio which is equivalent with the commercial and mixed development capacity in the city areas. This takes into

account the location and activities that demand characteristics needed to take into consideration, such as building appearance and neighbourhood characters. The recommendations will be integrated into the system to give them substantive force.

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COVID-19: B40 HOUSEHOLD'S FINANCIAL AND CONSUMPTION DURING THE IMPLEMENTATION OF MOVEMENT CONTROL ORDER (MCO)

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Abstract

The outbreak of COVID-19 caused the Malaysian Government to take steps to implement the Movement Control Order (MCO). According to Bank Negara Malaysia, the implementation of MCO will have an impact on national incomes, with Malaysia's estimated economic growth in 2020. The effect of MCO not only affects the macro level, but also at the micro level, particularly those groups of households with the lowest income of 40%. (B40). The B40 income group is a group of households that are expected to face high economic risk and directly affect their patterns of consumption during the implementation of the MCO. This study contributes to the empiric study related to COVID-19 and the implementation of MCO in the B40 group. This study analysed the pattern of financial and consumption of B40 households in Malaysia during the implementation of MCO. The findings show that the financial situation of the B40 household has changed the patterns of daily consumption following the implementation of the MCO.

***Keywords**:* COVID-19; Movement Control Order (MCO); B40 household; consumption

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INTRODUCTION

The Movement Control Order (MCO) entered into force in Malaysia on 18 March 2020. Although people are depressed, especially those involved in small and medium businesses, the government must extend the MCO period to avoid the risk that the public will be infected with COVID-19 due to sporadic cases or that the public will not be aware that they are infected with the virus. The implementation of MCO has had an impact on household consumption. According to the MCO impact study on households released by the Department of Statistics Malaysia (2020), average consumer spending, excluding financial expenditure, decreased by RM1,923 (48%) to RM2,110 under MCO. In Malaysia, the household group is categorised into different income groups: bottom 40% (B40), middle 40% (M40) and top 20% (T20). The revenue-based dividing line was used to determine these three groups where the B40 group consists of households earning RM4,360 and below. Meanwhile, households in the M40 and T20 groups are earning RM4,361 – RM9,619 and RM9, 620 and above respectively (Household Expenditure Survey Report 2016). Based on the Department of Statistics Malaysia (2020), the B40 group is the group with the smallest pattern of change in consumption compared to the M40 and T20 groups. This means that the B40 group continues to use it as usual even though MCO is implemented without a reduction in use.

The B40 group is already burdened by rising living costs and the COVID-19 pandemic has added to their anxiety over economic issues such as job security and the development of education for their children. COVID-19 and the implementation of MCO will have an impact on their lives, particularly in the financial and consumer sectors. In terms of income class, the B40 group did not show a significant 41% difference in the pattern of income consumption compared to the T20 group (59%) and the M40 group (48%). This situation shows that the B40 group continues to make the same expenditure and consumption before and after the MCO has been implemented compared to the T20 and M40 groups. Based on the 11th Malaysia Plan Mid-Term Review Report (RMK11), 60% of B40 household income is spent on basic needs and utilities. For example, for every RM10 they earn, RM6 is spent on needs. So, how can the B40 group lead a normal life during the MCO if their income is affected and they cannot afford to spend on basic goods? Moreover, given that the Malaysian labour market is dominated by almost 60% of low and medium skills jobs, workers from B40 households are also at risk of losing their jobs and sources of income, and this situation will affect their spending and consumption during the implementation of MCOs. This article therefore discusses and contributes to an empirical study of B40 household financial and consumption analysis during the implementation of the MCO in Malaysia.

LITERATURE REVIEW

Consumption is the state of expenditure of individuals for the purchase of goods over a given period. According to Mankiw (2000), consumption is a situation in which household goods or services purchased consist of non-durable goods that constitute short-term goods, such as food and clothing, and durable goods that constitute a long-lived product, such as vehicles, televisions, mobile gadgets, mobile phones, etc. Household expenditure is the value of household expenditure on the purchase of several necessities each year. Human behaviour and any changes in consumption patterns have a powerful impact on the environment (Ramli et al. 2019; Kamal et. al., 2020). According to Zainudin et al. (2016), decisions on household expenditure are particularly important for the preservation of the global environment. The money earned by households will be used to purchase food, finance transport utilities, pay children's school fees, pay house rental, and purchase motor vehicles. These items are purchased by the household to meet the requirement, and this spending is referred to as consumption (Yusof et. al., 2019 & Othman et al. 2020). Domestic purchases, on the other hand, are not all categorised as consumption. When a family purchases a new home, it is classified as an investment. Then there are some of their expenditures that are not classified as consumption, such as paying premiums and sending money to parents (or to studying children), because they are investments made in the economy over the product or service.

In the context of Malaysia, the implementation of the Eleventh Malaysian Plan demonstrates efforts to improve the living standards of the lowest 40% income group (B40) (MEA, 2019). According to Ghazali (2017), an estimated 64.77% of B40 households rely on single sources of income, making them vulnerable to shock and stress risks that could theoretically impact their livelihoods. If B40 households continue to be in their current socio-economic condition, the social cost of the country would be increased by reducing the number of skilled workers needed and thus having an impact on economic growth (Siwar et al. 2015 & Rashid et al. 2020). The government must therefore implement policies to improve B40 household income. However, as Malaysia continues to expand, B40 households should not be side-lined from enjoying the opportunities that result from the region's growth. It is important to address B40 households, irrespective of ethnicity, particularly poor and low-income households in urban and rural areas, as well as vulnerable households and ambitions. As a result, the role of the Government is not limited to supporting the planning process, but also to implementing and monitoring the process (Mayan, 2017).

METHODOLOGY

This study is based on the quantitative study and the non-probability sampling used for the purpose of sampling. The distribution of questionnaires was carried out online (Google form) for the whole of Malaysia between 1 April 2020 and 30 May 2020. Prior to the official distribution of the questionnaires on 1 April, a pilot test was carried out for 10 respondents. For this study, the study population is the B40 income group registered in the Department of Statistics of Malaysia (2020) which was categorised as households earning RM4361 and below. According to Krejcie & Morgan (1970), if the total population is more than 100,000, researchers need a total of 384 samples for analysis and it is sufficient to describe the characteristics of the population. In this study, the population of B40 households in Malaysia is 2.78 million, and therefore the study requires at least 384 respondents. However, this study used 504 of the B40 households as a sample study. Descriptive analysis was used to describe the profile of respondents, the financial analysis, and the consumption of B40 respondents. In this study, multiple regressions involve explanatory variables consisting of dependent components and include explanatory variables such as housing loans (X1), personal loans (X2), vehicle loans (X3), credit card payments (X4), business loans (X5), education loans (X6), individual debts (X7) and house rent payments (X8) and the variable criterion (Y) of income of B40 respondents.

$$\widehat{Y} = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + \mu$$

Where,

$\hat{Y}$ = dependent variables / income variables

b = regression coefficient for each explanatory variable / independent variable

EMPIRICAL RESULT

Profile of Respondent

The profiles of the study respondents are shown in Table 1. As far as demographics and geography are concerned, the study involved a total of 504 B40 respondents. Most respondents were male (55.2%) and female (44.5%). All respondents are households that reside in Malaysia during the MCO implementation period. The states of Selangor and Penang reported the highest percentage of respondents, 25% and 15.3% respectively. The Federal Territory of Putrajaya has the lowest percentage of 0.8% and this percentage corresponds to the small number of B40 in that state. According to the breakdown by region, 65.3% of respondents live in cities, while the rest live in rural areas. Malays make up the largest percentage of the population, followed by India and China. There are some respondents in this survey who are not from one of the three major races,

but their percentage is low, at only 6.5%. The percentages by race in this study correspond to Malaysian Statistics records, which show that B40 is made up of Malay, Indian, and Chinese people. As far as the highest level of education is concerned, there are three levels of education with a high percentage of more than 20%, namely bachelor's degree, diploma, and SPM with a total percentage of 71.4%.

Table 1: Profiles of Respondent
n = 504

Gender	**%**	**Race**	**%**
Male	55.2	Malay	72.8
Female	44.8	Chinese	9.5
State		Indian	11.1
Perlis	1.4	Others	6.5
Kedah	8.9	**Education Qualification**	
Penang	15.3	Doctor of Philosophy (PhD)	3.8
Perak	8.3	Master	10.9
Selangor	25.0	Bachelor's Degree	27.0
Johore	7.9	Diploma	20.4
Negeri Sembilan	1.8	STPM/Certificate	6.5
Melaka	1.4	SPM/MCE	24.4
Pahang	3.2	PMR/SRP	4.4
Terengganu	2.8	UPSR/Completed Standard 6	1.0
Kelantan	6.3	No education background	1.6
Sabah	5.4	**Employment Sector**	
Sarawak	2.8	Government Sector	24.6
W.P. Labuan	0.4	Private Sector	47.4
W.P. Putrajaya	0.8	Self-Employed	28.0
W.P. Kuala Lumpur	8.3	**Salary Earning**	
Area		Hourly / daily / weekly based	13.7
Urban	65.3	Monthly based	66.9
Rural	34.7	Salary according to demand	19.4
Age Range		**Monthly Income Range**	
18 – 25 years	11.1	RM580 and below	7.5
26 – 30 years	18.5	RM580 – RM980	9.5
31-40 years	41.7	RM981 – RM2614	41.7
41-60 years	26.2	RM2615 – RM4360	41.3
61 years and above	2.5		

Source: Researcher analysis, 2020

This situation shows that most of the respondents had completed high school and had a household income of B40. Economic analysis shows that 47.4% of respondents work in the private sector and that only 24.6% in the government sector and 28.0% of respondents are self-employed. In addition, involvement in

the employment sector will determine the form of salary earnings. Table 1 shows that there are three forms of salary earnings of study respondents, namely based on hours/day/weekly, monthly and on the request/work performed. Of the three categories, a majority of 66% earn monthly salaries.

Financial Analysis

Financial analysis involves the impact of the implementation of MCO in terms of financial and savings resources, the availability of savings, the ability to recover financial resources, the planning to restore financial resources, and action taken in the event of future emergencies such as MCO. Figure 1 shows the impact of MCO implementation on the financial source and the savings of respondents. Most of the respondents argued that the implementation of MCO had an impact on their financial and savings sources. 31.3% indicated that the implementation of the MCO did not affect their work and salary.

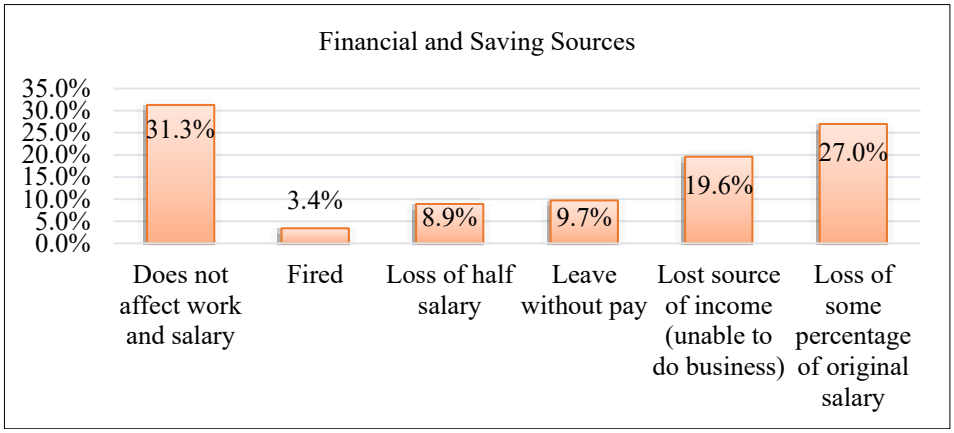

Figure 1: Impact of the implementation of MCO on financial and savings resources
Source: Researcher analysis, 2020

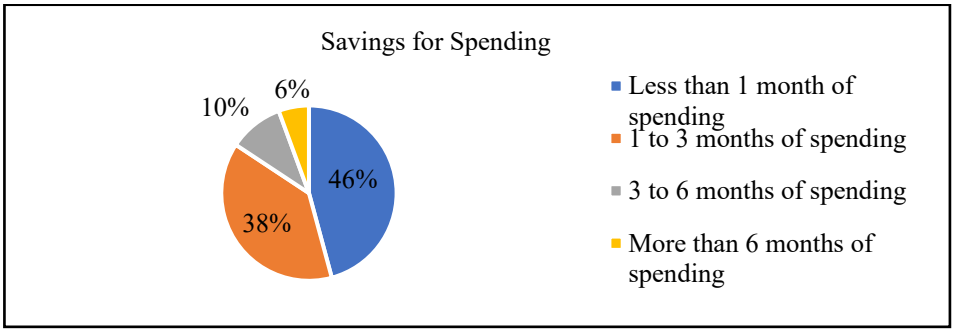

Figure 2: Savings for expenditure in the next six (6) months (June - December 2020)
Source: Researcher analysis, 2020

Based on the analysis, the respondents experienced a loss of the original salary percentage and a loss of income at a percentage of 27% and 19.6%, respectively. Respondents who claimed that their salaries were reduced from around 10% to 20% because employers from private companies could not afford to pay full salaries. This occurred because all the activities of the company or organisation could not be carried out during MCO and must be put on hold, except for the essential enterprises. Respondents who lose their sources of income are those who have small businesses that cannot carry out business activities during the implementation of MCO and have an impact on their income and consumption during the MCO period. Analysis of respondents' expenditure savings shows that 45.8% of respondents had savings of less than 1 month of expenditure as shown in Figure 2. In addition, a high percentage also indicates a situation in which 38.5% of respondents had savings of only 1 to 3 months. Most respondents have less than six months' worth of savings in this situation. If the MCO is in place for more than six months, it will have an impact on the use of respondents, necessitating government assistance. Only 5.6% of respondents have enough money to last more than six months. Because the characteristics of the B40 group are involved in low-income economic activities, which affects their consumption and savings, the respondents' savings analysis does not reveal an abnormal situation (Chamhuri et. al., 2019).

Table 2 shows that the analysis of the savings held by the respondent's shows that it is for the purchase of basic goods, namely the purchase of food supplies, the payment of utility bills, medicines, and the spending of petrol. However, spending on things like investment and entertainment spending has a lower percentage. This situation shows that B40 households are planning to use their savings to meet basic daily needs. In addition, donations or contributions show 31.9%, which means that the B40 respondents are very focused on welfare issues to help the community. For this section, respondents can give more than one answer based on their purchases and payments, therefore the total percentage cannot be added up to 100%. Respondents also provide some feedback on the issue of their financial ability to recover from the COVID-19 pandemic and the implementation of the MCO. Based on Figure 3, most respondents stated that their finances had recovered within 1 to 6 months. There are 21.4% of respondents who say they need more than 6 months to recover financially. However, for 5.4% of respondents, who stated that their finances could not recover, the situation is quite different. According to the findings, the respondents' financial status is important for 1 to 6 months or more. During this time, certain parties should provide support or an incentive to assist the respondent. Deferment of monthly payments (moratorium), tax exemptions, and financial and non-financial assistance are all examples of incentives. Based on a multi-response, 72.4% reacted to work after the MCO ended and 56.7%

respondents planned to add to their source of income to make a living. Some respondents wish to request assistance from families, government and NGOs and obtain credit, but the proportion is small. 85.1% said they would save money. Some participants plan to diversify their economic resources or their income (52.2%) and spend according to their priorities. This situation indicates that respondents are more likely than others to concentrate on savings, income, and cost management aspects because of the implementation of MCO.

Table 2: Sufficient savings for purchases and payments

Purchases and payments	**%**
Buying food supplies	96.2
Buying medicine supplies	61.9
Pay off debt	0.6
Make savings	17.3
Make an investment	3.6
Entertainment spending	3.6
Buying / paying insurance	17.3
Pay utility bills	66.1
Pay medical expenses	14.1
Gasoline spending	49.4
Online purchase	25.2
Giving donations / contributions	31.9

Source: Researcher analysis, 2020

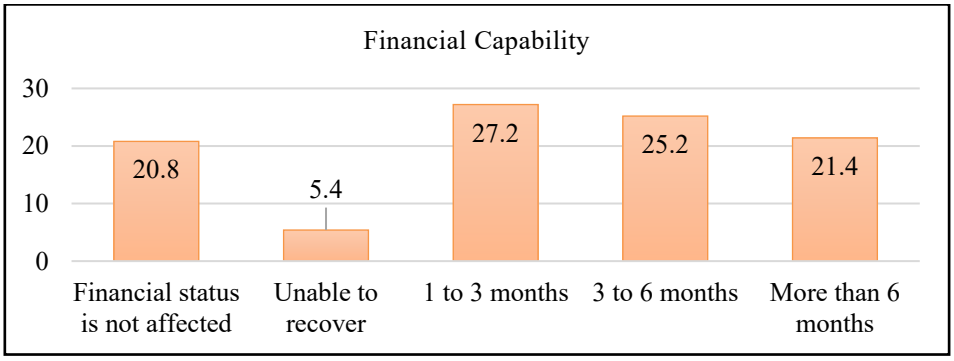

Figure 3: Financial ability to recover.
Source: Researcher analysis, 2020

Consumption Analysis

Based on Table 4, it shows that the monthly expenses of the respondents depend on the repayment of the loan, individual debt payments and house rent. As the respondent's income falls within B40 household groups, households with lower incomes must support their current income with additional loans and debts to survive on their various types of commitments. Although they work in the private

sector, their income is lower due to lower levels of education, as shown by 24% of respondents at the SPM level. There are 8.3% of respondents who say that they are burdened with any responsibility. In terms of loan liability, the highest percentage of vehicle loans compared to other loans was 43.7%. Apart from vehicle loans, private loans and housing loans also showed a high percentage of 38.3% and 28.8% respectively. Business loans are the lowest percentage because a minority of respondents are self-employed and apply for business loans. In addition, the analysis of respondents' consumption and expenditure involving food supply and purchase frequency showed that 43.8% of respondents had food supplies during MCO for 1 to 2 weeks, and 19.8% indicated that they had a food supply resistance of less than one week. This means that if the MCO continues, they will have to go out to increase their food supplies. Ownership of this food supply is influenced by the frequency of food purchases by respondents. The implementation of MCO will inevitably change the percentage of food purchase patterns and food stock storage patterns. The pre-and post-MCO purchase pattern analysis shows the same trend where respondents prefer to purchase food once every two weeks, followed by daily purchases. There are individuals who make purchases once a month, but the percentage is low both before and after MCO. There is, however, a change in the percentage of pre-and post-MCO purchases over four periods.

Table 4: Monthly Expenses

Type of liability	**%**	**Type of liability**	**%**
Housing loan	28.8	Business loans	3.4
Personal loan	38.3	Education loans	18.3
Vehicle loans	43.7	Individual debt	13.7
Credit card loans	8.9	House rental	10.7
		No loans/liability	8.3

Source: Researcher analysis, 2020

Analysis of income and consumption B40

The study identified the types of expenditure components that affect the income of B40 households. The determination of consumption factors affecting B40 income was analysed using a multiple regression analysis. The value of R^2 is 0.757 which indicates that 75.7% (r = 0.87) of the change in the criterion variable (income) is due to the change in the explanatory variables). Based on Table 5, the significant results show that multiple regression models made up of criterion variables and predictor variables can be generalised to their population. In addition, there are six standard regression coefficients for predictor variables, namely housing loan [(b =-0.685), personal loan (b =-0.230), vehicle loan (b =-0.297), credit card payments (b =-0.297), individual debt (b =-0.442) and house rental payments (b =-0.494)]. Since all predictor variable data is dummy, the

value of each coefficient is in the form of a difference between having and not having dependents. For example, the remaining income difference between those who have a housing loan and those who do not have the loan is 0.685 per RM1 of income.

Table 5: Regression Model

Model	**Unstandardised Coefficients**		***t***	**Sig.**
	b	Standard Error		
Constant	4.779	1.042	4.584	0.000*
Housing loan	-0.685	0.095	-7.242	0.000*
Personal loan	-0.230	0.089	-2.572	0.010**
Vehicle loans	-0.297	0.087	-3.414	0.000*
Credit card payment	-0.225	0.095	-2.368	0.010**
Business loans	-0.253	0.249	-1.014	0.311
Education loans	-0.124	0.120	-1.032	0.302
Individual debt	-0.442	0.134	-3.286	0.000*
Rental house payment	-0.494	0.135	3.653	0.000*
R		0.870		
R square		0.757		
Adjusted R Square		0.754		
F		11.751		
Sig.		0.000		

* Significant at 5%, ** Significant at 1%
Dependent Variable = Income; Independent Variable = monthly expenses

POLICY IMPLICATIONS AND RECOMMENDATION

There are few actions taken by the government to overcome the impact of this pandemic, particularly on the economy, which focus on two policies: first, a moratorium on financial policy and fiscal policy. For fiscal policy, instead of BPN, the government has also issued a Moratorium where all housing loans and car loans can be deferred for six months. This is also part of government initiatives aimed at reducing the burden on those affected and enabling the borrower to have a better financial plan and provide some relief to those struggling with the liquidity crisis. For monetary policy, as a result of the reduction in savings and income of the B40 group, there are few policies that the government can enforce to increase the savings of the B40 group in the future (Ismail et. al., 2019). First, to provide emergency savings plans for B40 groups providing low monthly payments as part of this initiative to encourage more participants for B40 groups. This emergency savings plan will allow them to withdraw their money during the economic downturn or the financial crisis.

CONCLUSION

In conclusion, the B40 group in Malaysia is the lowest income group to which the government should pay attention. The economic activities of the public and

the B40 group are the most affected during the period of the COVID-19 pandemic and the implementation of MCO in Malaysia. The key findings of this study showed that more than 70% of respondents representing the B40 population suffer from decreasing income or job losses. More worryingly, only 5.6% of respondents save expenses for more than six months. This can cause more urban poverty-related problems such as rising homeless people, increased crime rates and disorders in mental health. The role of the government in supporting these people is therefore very important. We believe that the government's PRIHATIN stimulus package can help Malaysia's B40 group survive in the pandemic of COVID-19 and stimulate economic activity through household consumption expenditure.

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COMPONENTS OF RIVER SUSTAINABILITY THROUGH COMMUNITY'S EXPERIENCES IN RIVERSIDE NEIGHBOURHOOD

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Abstract

Communities of a riverside neighbourhood are essential in developing rivers into a sustainable environmental feature. However, their lack of awareness towards flooding and river pollution interferes with the river's sustainability. The disconnection with nature impairs sustainability; consequently, the river's value degrades. The awareness can be improved upon by focusing on riverside neighbourhoods. The residents would have some level of awareness due to living sustainably with the river environment. Therefore, this study aimed to explore the living experiences of a riverside neighbourhood's residents from a social perspective. Data were obtained through semi-structured questionnaires given to 121 residents, a focus group discussion and personal interviews. The questionnaires' responses were exported and analysed using Principal Component Analysis in SPSS to identify significant components that were pertinent to the aim. Six components were found and were clarified into three themes: 'river issues', 'river management' and 'river neighbourhood as a shared environment'. It has been found that exposure to river issues resulted in the residents exercising their resources to overcome those issues, and the cooperation between the residents and the stakeholder was essential in maintaining and achieving a sustainable river environment. The residents' connection with their neighbourhood was exemplified through their familiarity and neighbourliness. In conclusion, insight into the residents' experiences would provide a better understanding of river neighbourhoods, which stakeholders could consider in decision-making and planning to ensure the connection with nature is sustained.

***Keywords**:* Community, riverside neighbourhood, living experience

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INTRODUCTION

Anthropogenic activities have contributed to various environmental problems, including river degradation. Excessive domestic discharge due to human development has caused river systems to fail in neutralising pollutants before subsequent waste is discharged (Weil et al., 2018). Consequently, it causes river pollution, and the impact is experienced by the people, especially those that live close to rivers.

Despite the impact on people, many river studies are only focused on rivers' fluvial systems (Eze & Knight, 2018; Lanzoni et al., 2018), disaster management (Deng & Xu, 2018; Jiang et al., 2018; Rufat et al., 2015), and riparian ecosystems (Solins et al., 2018) that address flood measures. Focus on social aspects is still lacking. There have been studies since 2006 that focused on social benefits, but discussions on the benefits are still in infancy (Everard and Moggridgem 2012). As a social environment, the river still receives little attention (Åberg & Tapsell, 2013), and so do the communities that live by it.

A recent study by Kumar et al. (2018) showed that there is still a need to consider human aspects in river studies. Riverside communities seemed to be apathetic towards the persistent river issues (Chan, 2012). Their apathy exacerbates the situation because when some of them use the rivers as disposal channels, they will be the most affected because of their proximity. There seems to be no appreciation for their river, which is as an entity in their neighbourhood. This study is essential in establishing better river environments that begin with the riverside communities because of these issues. Thereby, this study aimed to explore the living experience of a riverside community from the social perspective.

RESEARCH PROBLEM

Rivers are a versatile entity that can function as a place for human settlement, recreation and many others. Despite its association with humans since 2000BC (Mann, 1973), public awareness of the importance of rivers still lacks. Anthropogenic activities are still polluting the rivers in many countries, including Malaysia. Rivers are essential, and without them, Malaysia would not have its glorious history (Md. Yassin et al., 2010). Despite the historical significance, river pollution is still a severe issue in this country. One of the most recent instances of pollution happened to Johor's Kim Kim River in 2019. The pollution, which put the surrounding communities' health at stake, was found to be due to chemical wastes disposed of by parties that acted irresponsibly and illegally. Also, the risk of rivers becoming a dumping ground for waste is exacerbated by the increase in urbanisation. The seemingly lost sense of sustainability worries people, especially those that live near rivers. They will be the first to experience the adverse effects and benefits of river development. Hence, it is imperative to

consider riverside communities during river planning, as they are the primary users of rivers.

The living experiences of a riverside neighbourhood have provided its communities with exposure to water-related risks such as river pollution and flood. Since the adverse effects hit their home, the residents felt the need to protect their environment as their lives would be affected. Their lives refer to the social norms that they practised, which enabled them to face disturbance together. In other words, they share the same fate (Norris et al., 2008). A wide range of meaning and interpretation of sustainability has dominated various fields (Harun, 2017). In the context of this study, sustainability is reflected through their daily practices of the residents. They treasure the river as they well understood the risk they will face should the river be taken care of improperly. The small acts, when collectively practised, can potentially alleviate river degradation. The lack of considering their living experience in the planning of river development results in mismatched outcomes.

Mismatches can be avoided, and more holistic plannings can be ensured in upcoming river developments should the voice of those communities are taken into account. The inclusion of riverside communities in river planning is in agreement with Sustainable Development Goals 11 (SDG11), which highlights their contribution towards sustainability due to their knowledge of the rivers that are their home. It is hoped that with their involvement, water sources can be improved, and the sources' importance, which is highlighted in SDG6, can be brought to attention. In conclusion, riverside communities are essential to the betterment of their rivers as they can aid in creating sustainable river environments based on their life experience in the neighbourhood.

RESEARCH BACKGROUND

Previous studies regarding rivers in Malaysia were mainly focused on addressing river governance (Chan, 2005), river management (Elfithri et al., 2011), riparian ecosystems (Omar & Sohaili, 2015) and waterfront designs (Md. Yassin et al., 2017), and not many of them highlighted the social aspect of riverside communities. The absence of attention was probably because riverside communities are often made of slums. Nevertheless, those communities are still crucial as they often interact with their environment.

This study considered riverside communities as crucial in developing rivers into a sustainable environmental feature, as the communities are knowledgeable on what is needed to accommodate their lives. They live closest to rivers and are the most exposed to river issues (Chiang, 2018), and these facts make them the most resourceful about their well-being. However, for this study to be purposeful, the considered riverside community had to be the one that legally owned its land.

METHOD

Semi-structured questionnaires were given to a community of 121 residents who lived in Skudai River's vicinity in Kg. Pertanian, Kulai, Johor. Each questionnaire consisted of 28 questions divided into four sections: river issues, river management, community's roles, and residents' neighbourliness. These four sections were deduced from the literature of river studies, in which communities are the end-users. The five-point Likert scale that ranged from 'Strongly disagree' to 'Strongly agree' was used in the questionnaires, with added space for them to express any concern or opinion regarding the section. These responses help describe the intricacies of lived experience, which often fails to be captured (Boyer et al., 2016). For now, qualitative data remains another topic to be studied.

The pilot study showed that the scale made it easier for the respondents to answer because the choices were straightforward. They also seemed more convinced with their responses because of the scale. The questionnaires' answers were inputted in Excel and then exported into SPSS for Principal Component Analysis. The data reduction technique was employed to help capture significant components that were pertinent to the objective. Results from the rotated component matrix are explained in the discussion section.

Site Selection

This study was conducted in Kg. Pertanian, Kulai, Johor, in which lies the Skudai River. Kg. Pertanian is surrounded by multiple lands, which include domestic, industrial and residential lands. Figure 1 illustrates the setting of the site.

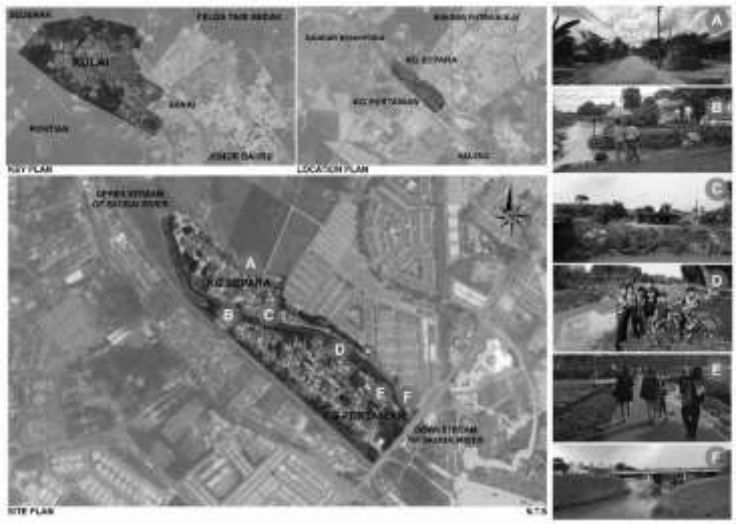

Figure 1: The site of study and its surrounding

The residents of Kg. Pertanian were under the careful supervision of the Department of Irrigation and Drainage (DID) because of the proximity. The distance of the main road that connected the office of the department and Kg. Pertanian was only 1.4 km (an 18-minute walk). Because of the DID's efforts, the residents had substantial exposure to the Skudai River. Unlike slums, the community in Kg. Pertanian legally owned the land that they resided on, as they had a land grant.

At first, site visits were carried out frequently at random times to gain familiarity. Secondly, meetings with the head of the village and the residents were conducted to establish rapport. Finally, cooperation was gained to conduct data collection. They were found to be resourceful regarding their neighbourhood, and their resourcefulness could be attributable to their lengthy residency. It should be noted that resourcefulness is essential in establishing a sustainable neighbourhood for riverside communities.

RESULTS AND DISCUSSION

Table 1 illustrates the rotated component matrix, which only retained six components of the riverside community: 1) river issues, 2) river management, 3) river environment, 4) community attachment, 5) participation and awareness, and 6) river development. Each component had factors, and each factor had a value known as factor loading. Factors with factor loadings above 0.7 were considered strong, while those with factor loadings of 0.5-0.7 were considered weak. Those below 0.5 were insignificant, and therefore, were allowed to be disregarded. These components are further discussed in the following sections.

Table 1: Strong factors in each component

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
River pollution	.897					
Flood experience	.866					
Health problem	.839					
Maintenance	.825					
River sustainability		.786				
Satisfaction		.759				
Community & agency		.750				
Concreted river		.736				
Community commitment		.710				
Familiarity with houses			.856			
Adaptation to changes			.780			

Neighbourliness	.774			
Familiarity with river	.728			
Public apathy		.803		
Sense of attachment		.759		
Community awareness			.858	
Community participation			.826	
Natural river				-.701
Man-made infrastructure				.579

The first discussion section is on component number 1, which is river issues. It is separated from component number 2, which is river management and the second discussion section. Component number 2 is considered as the response to the river issues. Component numbers 3 to 6 are discussed together in the third discussion section, which details the uses of the neighbourhood as a shared environment.

River Issues

The residents faced four river issues. The first issue was river pollution (0.897) due to the discharge from domestic uses. They claimed that the discharge came from upstream industries and flowed through the neighbourhood's river. It was out of their control because the source of the river pollution was external, and they had to face the consequences. The second issue was flooding (0.866), which happened every time there was heavy rain before 2006. The water body was not adequate in containing the heavy rainfall, resulting in flooding in the neighbourhood. The worst flood was in 2004, with a water level of approximately 3 meters reaching their rooftops. The residents had to evacuate their neighbourhood and went to a neighbouring community hall. Floods kept happening until the river was widened and deepened, and since the modification, no flood has occurred, which shows that the modification was successful. The third issue was health problems due to river pollution (0.839), and the fourth issue was maintenance (0.825). An example of maintenance was grass cutting at the riverbank, which the stakeholder entirely handled. The complete management by the stakeholder caused the community to be reliant on the stakeholder. The community believed that the stakeholder was contracted for maintenance and operated with their SOP.

Despite these issues, the people continued to reside in the neighbourhood. A study by Fattah et al. (2020) found that the residents of a neighbourhood stay because of tenure ownership and perception of neighbourhood quality. However, the riverside community's residence is related to the community's ability to cope with disturbances. The ability refers to the community's resource or capability due to the stakeholder's involvement at times

of need. The exposure to the river issues highlights the community's reliance on the stakeholder and their efforts, which has eased the community's living. This finding is parallel to that of Magis (2010), which shows that a community that faces challenges develops resources to cope with the situations. Despite that, the residents remarked that the norms in their neighbourhood were what made them appreciate their life. Social interaction became the essence of their adaptability because it made the neighbourhood harmonious. The interaction aspect is explained in the subsection of 'Riverside Neighbourhood as a Shared Environment'. This section only explains the concerns of the community and their impact of river issues on the residents' lives.

River Management

River management, which is the second component, involved maintenance and awareness programmes. Stakeholder's involvement with the neighbourhood was found to benefit the residents by enhancing their awareness and knowledge of their river. The residents also felt satisfied with the stakeholder's services (0.759). The satisfaction is evident from their commitment (0.710) to the programmes organised by the stakeholder. Cooperation between the two actors has defined their relationship (0.750), which is necessary for overall river management to be successful, according to Chan (2012).

Grass cutting is a type of maintenance essential to be addressed because its inconsistency commonly fails river management (Harun et al., 2017). The residents showed that they cared about nature and believed that the process did not compromise the value of the river (0.786). In other words, they were confident that the sustainability of the river was guaranteed, and the action was only to ensure the neatness of the neighbourhood and not to degrade the river's value. Besides being aesthetically neat, cut grass also symbolises harmony, as Asakawa et al. (2004) highlighted that aesthetically pleasing scenery connects human with nature. The connection between the community and the river is important in achieving sustainability.

However, this result shows a conflict of preference because the residents also believed that a concrete river could solve the river issues (0.736). The residents' preference for a concreted river was potentially driven by the frequent floodings and the fact that a concreted river can channel floodwater. Despite their preference, the stakeholder only widened and deepened the river because they were appropriate for the neighbourhood. The stakeholder's actions show that the stakeholder only did what was necessary to prevent flooding from happening again. The residents' inaction was due to their incapability of adequately maintaining their river, which resulted in reliance on the stakeholder. These findings showed that the stakeholder's ability to act accordingly to the residents' needs influenced their lives in the neighbourhood.

Riverside Neighbourhood as a Shared Environment

The third component is the neighbourhood's environment, which included the residents' familiarity, ability to adapt to change, and neighbourliness. It was found that the residents were familiar with neighbours' houses (0.856) and the river (0.728) because they have been staying there for extended periods, 21 years on average. Their neighbourliness (0.774) was formed through the relationships established throughout their length of stay. It is shown through the interactions that often happened at communal spaces such as the community hall, the mosque and riverside walkways. These spaces can be considered important social spaces as Ujang (2016) stated that places where interactions often occur could be considered as such. Their interactions bonded them through their participation (0.826) in communal activities in the spaces they shared. Because they were safeguarding their home, a bond within their neighbourhood was fostered, and a common understanding among them was instilled. This result is parallel to the findings in Ling and Chiang (2018) 's study, in which it is stated that residents that know each other for a long time contribute to their capability to unite and create an understanding of their neighbourhood. Without being cohesive towards a positive value, sustainability is difficult to achieve. It requires collective action to ensure that the general river environment is sustainable. Furthermore, the results show that they were able to adapt to changes (0.780); for example, physical river changes such as the modified water body, which now can prevent flooding. Their adaptability was due to the shared experiences and the beneficial changes. The shared experiences throughout their stay led to the fourth component, attachment.

The fourth component is attachment, which is related to the community's feeling towards river development and public apathy. It was found to be closely related to the built environment, which one has grown familiar with and develops memories. The residents were connected to their neighbourhood because it is where they shared an environment for everyday-life interactions. As mentioned before, their interactions bonded them and created a common understanding. This understanding was put to the test when a discussion with the community turned chaotic as they expressively disagreed when asked if their river was closed or removed. The disagreement shows that they preferred the river as it was because that was what they were most familiar with, indicating they were emotionally attached to it (0.759). This finding was supported by Norris et al. (2008) 's finding, which stated that the attachment they feel to a place implies an emotional connection between the residents and their surrounding. It offers the opportunity to reduce public apathy (0.803) because there are users that care about the environment.

The fifth component is the community's participation and awareness, which have been mentioned in previous paragraphs. It was discovered that these two are tied as one component based on the communal activities. For example,

the community have annual activities such as Maulidur Rasul and Independence Day Celebrations, which allowed them to gather and unite. Their awareness of the upcoming activities (0.858) ensured their participation (0.826). These activities took place at the mosque, court, community hall and riverside. These places were public and were shared among them. Their participation led to conversations as an act of interaction that included the sharing of emotions. It has allowed them to be socially connected (Nemeth & Olivier, 2017). They also developed a sense of attachment to their neighbourhood through the sharing of emotions, as previously discussed. This finding shows that the bond was between the residents and the neighbourhood they shared throughout their lives.

The sixth component is about river development, which was more pertinent to stakeholder's management, and thus, it was out of the community's capability. Because of this, the residents showed little concern for it. The little concern was also because of the residents' view on the development itself, which was often associated with heavy construction (0.579). This view was somewhat right; as highlighted by Chan (2012), river development concerns the physical aspects of man-made infrastructures, such as constructions for flood measures. Interestingly, it contradicts the natural river (-0.701). This result confirms the second component, which portrays different preferences between the concrete and natural rivers. The finding tells that the changes that benefited them were welcomed in their neighbourhood as they had experienced floods. This further emphasises the importance of their environment-sharing experiences in the riverside neighbourhood. Therefore, incorporating the residents' experiences into decision-making processes is potentially helpful in understanding their needs and preferences for a sustainable river environment.

CONCLUSION

The community's experiences in the riverside neighbourhood can be understood through six numbered components, as illustrated in Figure 2. They are further reduced into three subjects, as discussed previously.

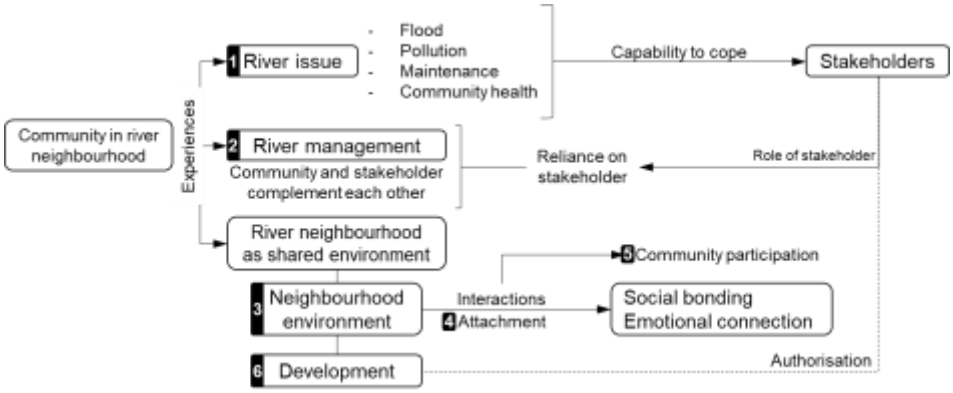

Figure 2: Triangulation of the six components in understanding the experiences of a riverside neighbourhood

This study has shown that river issues moulded the resources that the community needed to face disturbances. The stakeholder, who had authority over the river, played a role in providing resources to the community. The river issues acted as a challenge for the community to develop the capability through exercising their resources. Their river management further proved that both actors' cooperation was necessary for river sustainability. The residents' experiences defined how they perceived the river management, which led to their reliance on the stakeholder for the benefits. It means that the influence from their experience is manifested in their neighbourhood environment. It comprised of their familiarity and neighbourliness that were derived from the social interaction they had. The collectively shared norm encouraged them to have a sense of appreciation that would make them feel attached to their home. The appreciation strengthened their connection with nature, and this connection is imperative to sustainability.

This study may act as guidance for the Department of Irrigation and Drainage (DID) and possibly provide some insight to the Ministry of Housing and Local Government in the future planning of community housing, particularly for riverside communities. The values practised by the riverside community can be considered in policy-making as that community is the closest to the river. The proximity makes the residents more considerate towards the river as it affects their everyday lives. The inclusiveness in decision-making emphasises the importance of the combination of the 'top and bottom' approach. Despite the constant change in the community's view, this study serves as a base for understanding riverside communities' experiences in their neighbourhoods.

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SPATIAL DEMOGRAPHIC DATA FOR PLANNING AND RESEARCH

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Abstract

In Malaysia, spatial demographic studies are lacking due to data paucity. This exploratory study illustrates the relevance of spatial demographic data for development and business planning at the local level. Data for this study came from Malaysian population censuses, vital statistics reports and social statistics bulletins. Bivariate analyses were performed to present some examples of the potential use of spatial demographic data for more target-oriented planning. Data show that the population in several densely populated districts continues to grow rapidly. Hence, development planning should aim to forestall the exacer-bation of the regional imbalance. Localities with high birth rate and rapid population ageing must be prepared to cope with the changing demographic scenario. The wide variations in pupil-teacher ratio across districts indicate the need for resource reallocation. The under-reporting of births and deaths in the remote areas may result in misallocation of health and educational resources. Comparisons of indictors from different data sources demonstrate data inconsistency and deficiency. This study aims to present a strong case for collecting and disseminating small area statistics to enhance spatial demographic research for socio-economic development, infrastructural, regional and business planning.

Keywords: Spatial demographic data, sub-national levels, state, district, births, older people

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INTRODUCTION

The vast literature on the inter-relationships between population and development testifies the importance of population factors in development planning. The 2030 Development Agenda on Sustainable Development Goals calls for leaving no one behind and targeting those who are left furthest behind. It is crucial to have disaggregated data for small geographical areas and pockets of marginalised population for a more targeted service delivery, as well as allocation of resources to bring about a more balanced regional growth. For instance, the B40 income group must be indentified and located for the delivery of the financial assistance. Small area statistics are also essential for business planning by the private sector (Noordini Che'Man & Harry Timmerman, 2016).

Data impacts development through better policy making and public service delivery, enhances research and facilitates the private sector to contribute to economic growth. Reliable and timely data allow policymakers, planners, administrators, companies and the public to make better, timely and more informed decisions, and enhance accountability. The public sector is increasingly using data to formulate, monitor and evaluate policies to improve public service delivery. Researchers use data to undertake empirical analysis to inform policy. The private sector uses data for product development, market analysis, and evidence-based decision-making or assessment (Ministry of Health, 2018; World Bank, 2017).

While the five-year development plans, the National Physical Plans and the National Urbanization Policy provide a framework for development planning at the national level, all the states have formulated and implemented the state structure plans or master plans to deal with the regional and local issues. All mega projects are also required to have a social impact assessment. All these master plans and assessments would require spatial demographic data.

There is a rather sizable literature on Malaysia's demographic dynamics at the national level (Arshat et al., 1988; Chander et al., 1977; Cheong & Lim, 1982; Leete, 1996, 2007; Lim, 1983; National Population and Family Development Board, 2016, 2018; Saw, 2007; Sidhu & Jones, 1981; Tey et al., 2015, 2020). Although space is a crucial element in demographic studies and a good knowledge of spatial demography is crucial for planning (de Castro, 2007), demographic analysis at the sub-national levels is deficient due to data paucity. The few spatial demographic analyses reveal wide differentials in the demographic dynamics and socio-economic and health outcomes across the districts (Diah Intan 2020; Abd Majid, N et al,n 2019; Siti Uzairiah Mohd Tobi, 2018; Md Bohari, et al., 2019; Abdul Rashid, M. F., 2017; Hazrin, H., 2013; Masron, T., 2012; Abdul Rahman & Zakaria, 2012; Azreena et al., 2016; Hutchinson, 2008; Ibrahim Ngah, 2010; Khalid Zanudin et al., 2019; Ling et al., 2014; Mohamad Fadhli Rashid et al., 2019; Nuzlinda & Syerrina, 2012; Tey, Tan, & Arshat, 1985).

In keeping with the increasing demand for small area statistics (SAS), the Department of Statistics Malaysia (DOSM) has been publishing SAS, such as the decennial population censuses, annual vital statistics, data bank, social statistics, wholesale and retail trade, as well as other statistics by state and district. DOSM initiated the publication of My Local Statistics in 2019. Despite these efforts, there is still a need to expand the collection and dissemination of SAS to enhance spatial demographic analysis. For planning purposes, the data must be disaggregated by gender, age and socio-economic characteristics.

This study is exploratory and illustrative to stimulate spatial demographic analysis and more effective use of demographic data for development planning and business planning. This study also aims to highlight the deficiency in spatial data so that measures can be taken to fill the gaps. It covers selected aspects of the population, including population density, population growth and distribution or concentration, fertility and mortality, pupil-teacher ratio in the secondary school, and population ageing. The data for this study came from the published reports of the population censuses, vital statistics reports and state or district social statistics reports. Simple tabulations, scatter-plots and maps were used to present the findings.

FINDINGS

Population Density and Rate of Population Growth

Malaysia has a population density of about 100 people per square kilometre in 2010, ranging from 19 people per square kilometre in Sarawak to 6,891 in the Federal Territory of Kuala Lumpur. In Peninsular Malaysia, besides Kuala Lumpur, Timur Laut and Petaling are the two most densely populated districts (with a population density of 4,330 and 3,012, respectively). On the other hand, Gua Musang, Jerantut, Lipis, and Ulu Perak have the lowest population density of around 13 to 17 people per square kilometre.

Between 2000 and 2015, the rate of population growth ranged from 1.2 per cent per annum in Perak to 2.6 per cent in Selangor. The variation in the rate of population growth was even more striking across the districts, ranging from -1.0 per cent in Jempol to a high percentage of 6 per cent in Sepang during the intercensal period from 2000 to 2010. Figure 1 shows that a few densely populated districts have a high rate of population growth. The rapid growth will result in further population concentration and aggravation of regional inequality.

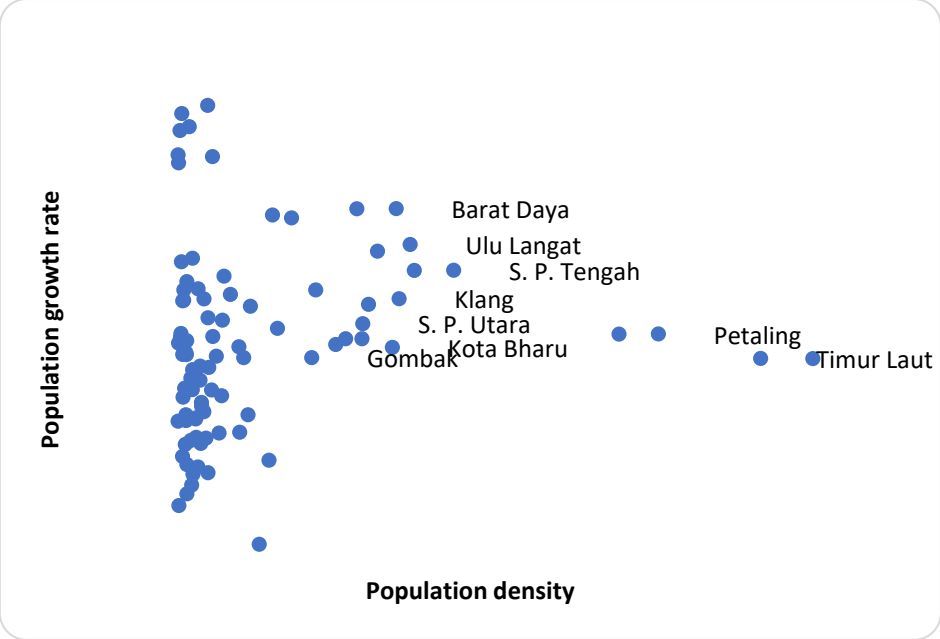

Figure 1: Population density and rate of population growth, by district
Note: Excluding Wilayah Persekutuan Kuala Lumpur (population density 7,089 persons per square km, with an annual rate of population growth of 2.8%)
Source: DOSM (2011): Population Distribution by Local Authority Areas and Mukims, 2010; Population Censuses, 2000, 2010

The population of Petaling district increased almost five folds from 360 thousand in 1980 to 1.77 million in 2010, at a rate of 5.3 per cent per annum. Consequently, Petaling had overtaken Kuala Lumpur as the most populous district. The population of Johor Bahru increased more than three folds between 1980 and 2010, making it the third most populous district. Ulu Langat, which was the ninth most populous district in 1980, witnessed the most rapid population growth at 6.2 per cent per annum over this period, to leapfrog into the fourth place in 2010. With a population growth rate of 3.7 per cent per annum over the three decades, Klang remained the fifth most populous district in 2010. Even though Kinta remained the sixth most populous district in 2010, its population grew much slower than many other districts.

More than a third (34.4 per cent) of the national population now lives in the ten most populous districts: Petaling, Kuala Lumpur, Johore Bahru, Ulu Langat, Klang, Kinta, Gombak, Kuching, Seremban, and Timur Laut. The National Physical Plan projected a population of 10.37 million, 2.42 million, 2.40 million, and 1.38 million for Greater Kuala Lumpur (including Petaling Jaya), Georgetown, Johor Bahru, and Kuantan, respectively in 2020. The combined total population of 16.57 million in these four conurbations will make up about 70 per

cent of the urban population or 60.4 per cent of the total population in Peninsular Malaysia (Federal Department of Town and Country Planning, 2010).

There are several reasons for the phenomenal population growth in these districts. Petaling and the other four districts in the Klang Valley have attracted migrants from all over the country to take up jobs in administration, commercial, financial, industrial, educational, and service sectors. The various economic policies and programmes require relocation to the cities, leading to dramatic population redistribution over the last few decades.

Eight districts had experienced depopulation between 1970 and 2010. These districts included Sabak Bernam, Temerloh, Julau, Betong, Dalat, Sri Aman, and Hilir Perak. Sabak Bernam and Temerloh had a deficit of more than 50,000 people between 1980 and 2010 at a rate of -2.7 per cent and -1.0 per cent per annum, respectively. During the 1991-2000 inter-censal period, the population of Sabah Bernam decreased 6.6 per cent per annum, while that of Temerloh decreased 3.6 per cent annually. There was a reversal in Temerloh during the ensuing decade, as the population grew at 1.7 per cent per annum. Julat and Betong (both in Sarawak), had a different demographic trend. The population of Julat decreased by half between 2000 and 2010. On the other hand, the population of Betong has been increasing since 1991 after registering a sharp decline between 1980 and 1991.

Births and Deaths

The fertiltiy rate and mortality rate in Malaysia have fallen to a low level. The total fertility rate has fallen below the replacement level since 2012. Non-Bumiputeras are now having ultra-low fertility of about 1.2 children per woman. Nevertheless, wide variations in the fertility and mortality rates persist across regions and sub-groups of the population. The government agencies require information on the number of births in small geographical areas for short-term and medium-term planning to provide health care and educational services and facilities, and other infrastructures. Information on the number of births and children is also essential for business planning, such as infant and child products, childcare centres, kindergartens, and other services.

The crude birth rate (CBR) ranged from 4.5 per thousand population in Kinabatangan to 26.4 in Kuala Terengganu, while the crude death rate (CDR) ranged from 1.0 per thousand population in Kinabatangan to 9.1 in Kanowit (see Tables 1 and 2). Four of the six districts with the highest CBR are in Terengganu. Kinabatangan has registered the lowest CBR and CDR in the country. The extremely low CBR and CDR in Kinabatangan is likely due to under-registration, as the district has a very high proportion of non-citizens.

The proportion of the older population aged 60 and above is directly related to CDR at the district level. The strong positive association between these two variables indicates that CDR is affected by the population's age structure.

The ultra-low CDR in some districts could be due to under-registration or misreporting, especially in the remote areas in Sabah and Sarawak. There is a need for an evaluation of the extent of under-reporting in these remote areas.

The child-woman ratio for each district was estimated using data from the population censuses. Assuming that the child-woman ratio is a fairly good indicator of fertility, there is evidence of under-and over-reporting of births in some districts. Attention should be given to districts and small areas where the birth rate is incredibly low or high. Nonetheless, the extremely low fertility and mortality rates in these districts may be due to misclassification of births and deaths by the place of registration rather than the usual place of residence.

Table 1: Districts with the highest and lowest crude birth rate, 2017

		CBR	**Rank**	**Child-women ratio**	**Rank**
Highest	Putrajaya	28.8	1	454	22
	Kuala Terengganu	26.4	2	335	97
	Marang	26.0	3	402	48
	Julau	24.7	4	360	73
	Besut	24.5	5	470	15
	Setiu	24.0	6	567	3
	Tumpat	22.9	7	351	81
	Pasir Puteh	22.7	8	412	41
	Pasir Mas	21.7	9	346	86
	Tanah Merah	21.7	10	436	29
Lowest	Kinabatangan	4.5	144	316	115
	Putatan	5.6	143	470	16
	Pakan	6.4	142	170	140
	Bagan Datuk	8.3	141	271	130
	Timur Laut	8.4	140	213	138
	Belaga	8.6	139	399	49
	Kampar	9.0	138	182	139
	Tongod	9.2	137	166	142
	Beluran	10.2	136	422	36
	Sandakan	10.4	135	218	137

Source: DOSM: Vital Statistics Report, 2018

Table 2: Districts with the highest and lowest crude death rate, 2017

		CDR	**% aged 65+**	**Median age**
Highest	Kanowit	9.1	15.6	30
	Sabak Bernam	8.8	11.9	26
	Kuala Pilah	8.7	14.5	30
	Pendang	8.7	12.6	27
	Dalat	8.6	12.6	27
	Kuala Kangsar	8.5	14.2	28

	Rembau	8.4	12.8	29
	Jelebu	8.3	13.8	29
	Baling	7.9	10.8	24
	Kampar	7.8	14.5	30
Lowest	Kinabatangan	1.0	1.3	23
	Samarahan	2.1	5.0	22
	Kunak	2.1	2.9	24
	Belaga	2.4	6.3	24
	Tongod	2.4	3.3	18
	Labuan	2.5	4.0	25
	Bintulu	2.6	4.7	24
	Beluran	2.6	3.0	21
	Lahad Datu	2.6	2.9	27
	Putrajaya	2.6	1.4	25

Source: DOSM: Vital Statistics Report, 2018

While the rates are commonly used in demographic analyses, the actual numbers may be more relevant for planning purposes. Educational planners need to know the number of school-going children to plan the human resources and school facilities to cater to new school entrants as newborns reach the school-going age. The vital statistics report depicts that a large number of births in some districts. Petaling registered the largest number of births at 30,044, followed by Johor Bahru, Kuala Lumpur, Ulu Langat, and Klang (see Table 3).

Table 3: Ten districts with the highest number of births, 2017

Districts	**Number**	**CBR**	**Districts**	**Number**	**CBR**
Malaysia	508685	15.9	Gombak	14035	17.5
Petaling	30044	14.2	Kota Bharu	12316	21.0
Johor Bahru	25750	16.5	Kinta	10297	12.5
Kuala Lumpur	24732	13.8	Seremban	9616	15.7
Ulu Langat	21684	16.1	Kuantan	9128	17.7
Klang	16574	16.6			

Source: DOSM: Vital Statistics Report, 2018

Pupil-teacher ratio

The pupil-teacher ratio is an indicator of the distribution of human resources in the education sector. This section uses the pupil-teacher ratio in secondary schools for illustrative purposes. In 2013, the pupil-teacher ratio in secondary school ranged from 9.7 in Putrajaya to 15.1 in Selangor. The spatial differential in the pupil-teacher ratio was even wider across districts, ranging from 7.4 in Maran to around 16 in Klang and Gombak, Ulu Langat and Bau (see Table 4). Districts with high population density and rapid population growth tended to have a higher pupil-teacher ratio. The large number of births in Klang, Gombak and

Ulu Langat would strain the educational facilities. Hence, more teachers are required in states or districts with a high pupil-teacher ratio to achieve the standard of 10:1 in developed countries.

Table 4: States or districts with the highest and lowest pupil-teacher ratio in secondary schools, 2013

		Highest		**Lowest**
State	Selangor	15.1	Putrajaya	9.7
	Sabah	13.7	Labuan	10.5
	Pulau Pinang	13.6	Perlis	11
	Sarawak	13.6	Pahang	11.2
	Kedah	13.3	Terengganu	11.8
District	Klang	16.1	Maran	7.4
	Gombak	16.0	Putrajaya	9.7
	Ulu Langat	16.0	Beaufort	9.9
	Bau	15.6	Port Dickson	10.1
	Patatan	15.3	Kuala Pilah	10.1

Source: DOSM: State/District Social Statistics, Malaysia, 2013

Note: More recent data on pupil-teacher ratio are not available.

Population Ageing

Consequent to the continuing fertility decline and gain in life expectancy, the Malaysian population is ageing rapidly. Malaysia will become an ageing nation in 2030 when 15 per cent of the population will be aged 60 and over. In 2010, two districts and 98 mukims had an aging population (see Figure 2). Based on the population projection, the number of districts and mukims with an ageing population has probably increased to about 12 and more than 200, respectively, today.

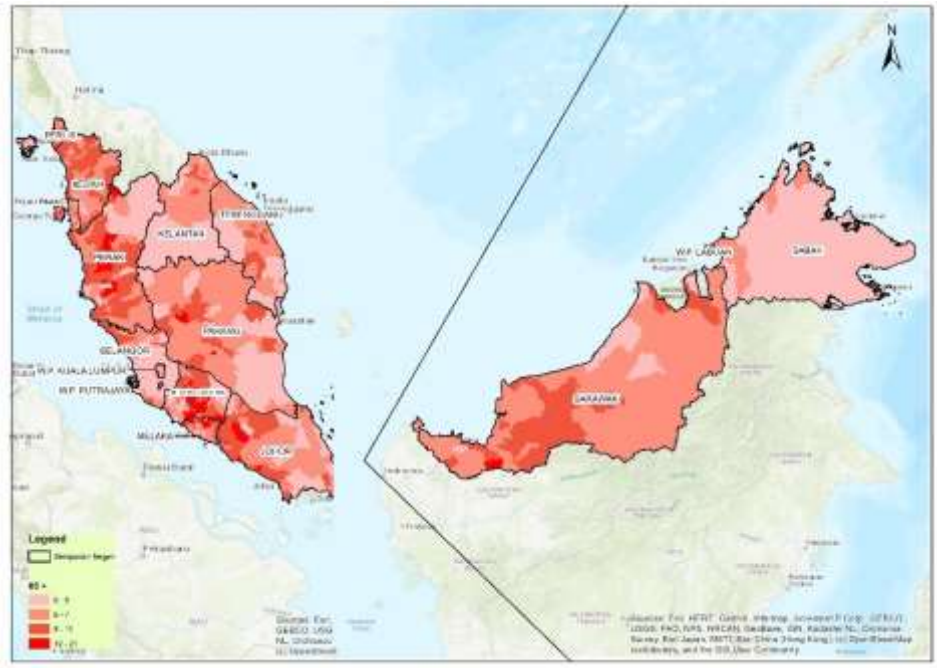

Figure 2: Map on population ageing (per cent aged 65 and above)
Source: DOSM: Population and Housing Census, 2010

In 2010, 19 mukims had more than 10,000 older people, ranging from 10,617 in Batu to 50,288 in Ulu Kinta. Petaling registered the most rapid rise in the number of older adults. In most of these mukims, the older population had increased more than six per cent per annum, resulting in the doubling of the older population between 2000 and 2010 (see Table 5).

Out-migration of the youths has exacerbated population ageing in the less developed areas. Geographic information on the distribution of older people and their profiles is crucial for providing goods and services and public amenities to those in need. It is also imperative to provide older people with opportunities to continue their active engagement in society.

Table 5: Mukim with at least 10,000 people aged 65 and above in 2010 and growth between 2000 and 2010

	2000	**2010**	**Annual rate of growth**	**Percentage change**
Plentong	6607	15,562	8.6	235.5
Pulai	4617	11,704	9.3	253.5
Tebrau	4272	10,725	9.2	251.1
Kluang	5636	10,733	6.4	190.4

Kuala Kuantan	6305	13,531	7.6	214.6
Ulu Kinta	28735	50,288	5.6	175.0
Georgetown	14607	19,083	2.7	130.6
Paya Terubong)	7822	14,833	6.4	189.6
Batu (Selangor)	5584	10,617	6.4	190.1
Klang	10388	19,963	6.5	192.2
Damansara	8172	18,078	7.9	221.2
Petaling (Selangor)	6434	17,871	10.2	277.8
Sungai Buloh	8080	19,086	8.6	236.2
Ampang	7605	12,814	5.2	168.5
Bandar KL	8978	10,728	1.8	119.5
Batu (Wilayah)	8587	17,133	6.9	199.5
Kuala Lumpur	10002	18,918	6.4	189.1
Petaling (Wilayah)	6690	13,483	7.0	201.5
Setapak	6118	11,081	5.9	181.1

Source: DOSM (2001, 2011): Population Distribution by Local Authority Areas and Mukims, Population Censuses, 2000, 2010

DISCUSSION AND CONCLUSION

This study used spatial data to demonstrate the unbalanced population distribution across regions, and portray the potential use of demographic data for planning purposes. The study has also highlighted demographic outcomes that warrant policy intervention. Additionally, it has raised some data reliability issues which require remedial actions to improve the registration and reporting systems. For instance, the under-reporting of births in a number of rural districts may have serious consequences such as resource misallocation and deprivation of services to those affected.

Population mobility and redistribution generally result in more efficient utilisation of human resources by moving surplus labour from one region to another region, in which there is a labour shortage. However, these processes also aggravate regional inequality. In its efforts to bring about a more balanced regional development, the Malaysian government has developed five development corridors and implemented other strategies. As the population continues to gravitate towards the central region, it appears that these development corridors have thus far been ineffective in population redistribution. Therefore, there is a need to find more effective ways to redistribute the population and improve the management of the cities. Detailed disaggregated socio-demographic data should be collected and analyzed for the formulation, implementation and evaluation of the state master plans, the National Physical Plans and the social impact assessment of mega projects.

While the fertility level in Malaysia has fallen below the replacement level, high fertility persists in certain localities, in which family planning practice is at a low level, and the unmet need for contraception is high. These localities

require more family planning efforts to provide couples with the necessary information and service to exercise their reproductive rights and plan their family size. A better understanding of the reasons for the higher mortality rate in some groups and localities can lead to measures to reduce the high death rate for these groups.

An in-depth analysis of the spatial distribution of the target groups is required for the allocation of resources to meet the needs of specific target groups, such as school-going children, the poor and the elderly. Multivariate analyses are needed to determine the covariates and confounding factors.

As stated at the outset, the purpose of this study is to present a case to the Department of Statistics Malaysia, as the central agency for official statistics to improve the collection, analysis and dissemination of spatial demographic data. The 2020 population census provides an excellent opportunity to fill the data gaps to develop SDG indicators to target the under-served and the needy to achieve the goal of "leaving no one behind."

LIMITATIONS

This study is exploratory, and it is meant to be illustrative of the relevance of spatial demographic data for planning in the public and private sectors. Some data are somewhat out-dated and are not sufficiently disaggregated for planning purposes. There are only a few readily available indicators. Data limitation precludes multi-layered analysis and analysis for smaller areas needed to improve the provision of targeted service and assistance.

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RECONSTRUCTING POST-EARTHQUAKE SETTLEMENT USING COMMUNITY DELIBERATION PARTICIPATION APPROACH IN YOGYAKARTA-INDONESIA

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Abstract

An earthquake occurred in 2006 at Yogyakarta which damaged 209,494 buildings and caused the death of 4,143 people. A post-disaster settlement reconstruction covering all settlement facilities and infrastructure was initiated using a participatory approach which involved the targeted residents in the process of mapping the conditions, potentials, and resources of the region. It is, however, important to evaluate the effectiveness of this reconstruction method to reduce the impacts of such disaster in the future. Therefore, this research was conducted to focus on the forms, levels, and driving factors of citizen participation at each reconstruction stage. A qualitative descriptive method was employed through the use of observation and the findings showed that citizens were involved in the process by attending and participating in *rembug warga* forums, suggesting ideas, donating funds, and serving as personnel at the socialization, planning, and implementation stages. The reconstruction led to the construction of quality residential infrastructure and facilities due to the systematic and integrated coordination of the *rembug warga* forums.

***Keywords**:* Post-disaster, Settlement, Reconstruction, Infrastructure, Community, Participation

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INTRODUCTION

Natural disasters are difficult to predict but several efforts are usually implemented to minimize their risk and impact. One of the methods to sustain a community after these disasters is through reconstruction and this has been reported to be hindered by the use of conventional top-down policy-making approach which is not understood or trusted by local residents. Therefore, a more cooperative and trustful approach involving the participation of residents in the decision-making and planning process of reconstruction is required to be intensified (Zhang, 2015). Moreover, one of the principles of the United Nations Development Programme is to "identify the need and priorities of affected populations by creating participatory processes that involve communities themselves in decision-making, service delivery, and recovery" (UNDP, 2016). Cartes showed the possibility of minimizing the impact of disaster by planning a risk map which involves people at risk in order to create resilient residents with the understanding and awareness of future disasters (Cartes, 2018). The planning process was also reported by Yu & Gao (Yu, 2013) to include effective steps towards reducing risks while the natural disaster risk assessment was observed by Yin (Yin, 2011) not to have specified general procedures and programs. However, the involvement of citizens is useful in identifying risks to be used as input in post-disaster settlement zone planning (Nasrollahi, 2018). This, therefore, means a community-based disaster preparedness approach is an important element in designing a management strategy, especially to reduce vulnerability (Allen, 2006).

Disaster mitigation strategies, both on a macro and micro scale, are used in improving the quality and quantity of post-disaster settlement infrastructure (Behnam, 2014). Moreover, the rehabilitation and reconstruction processes designed with consideration for risk-minimizing factors require quality control which is very important to the successful implementation of a community-based approach (Huda, 2007). Citizen participation is an important element in comprehensive planning (Ling, 2006) and also a driving force for residents' resilience to develop their residential areas, increase regional independence, overcome local crises (Song, 2018). It empowers and promotes behavioral changes in citizens (Murota, 2014), and also ensures successful management of the risks associated with disasters (Samaddar, 2017). Furthermore, the involvement of the community in planning housing reconstruction was emphasized and this led to the establishment of a zone for reconstruction. The linking of disaster risk awareness and preparedness activities to local cultural events has also been reported to be extremely effective in maintaining preparedness culture (Ishiwatari, 2014). This shows that people have a significant role and influence at different stages of disaster management using a community-based approach. Organizational development and strengthening of crisis-coping

skills are, however, two key components to improve their participation during crises (Valibeigi, 2019).

Citizens with high physical, human, and social capital are better prepared and more responsive to disasters (Buckland, 1999) while communities with substantial cohesion and a good sense of identity have the ability to spontaneously organize post-disaster reconstruction through collective action in the absence of government resources and support (Li, 2019). Their involvement is considered effective due to the possibility of an increase in income, acquisition of construction skills, and improvement in awareness of natural disasters through the working processes (Abe, 2018). Community participation, generally, refers to the involvement of people in setting goals, preparing, implementing, and evaluating plans and programs on any project implemented to solve problems or develop their socio-economic conditions. They derive motivation to work together based on the sense of community and recognition of the benefits attached to their involvement (Hossain, 2012).

The concept also requires the significant impact of non-profit organizations as partners in every disaster risk reduction activity (Bajek, 2008) and this means collaboration or partnerships among stakeholders is required for effective improvement of disaster risk management process (Prashar S., 2018). Several measures have been adopted by the governments to encourage better communication between policymakers and local residents as observed in the funds provided to NGOs to participate in post-disaster reconstruction but these efforts have been primarily concentrated on enhancing community cohesion (Cho, 2014). Meanwhile, it is possible to understand the vulnerability, danger, and resilience associated with disasters through the involvement of affected parties in the process (Van Niekerk, 2018). This means participatory planning is important to the provision of the data needed to improve the existing conditions of a particular place (Hendricks, 2018). Furthermore, people-centered housing recovery was defined as a concept requiring residents to play a central role in making reconstruction decisions. It also supports owner-driven and/or self-built reconstruction and broadly involves policy, process, and housing design. The concept which is often used interchangeably with terms such as "owner-driven" and "self-built" is closely connected with the participation of local people in the planning and design process (Maly, 2012) (Maly & Shiozaki, 2012). Meanwhile, the post-earthquake rehabilitation and reconstruction process implemented in Yogyakarta used a settlement arrangement based on citizen participation as the planning approach.

Aisyah Abu Bakar proves that community movement is a significant personal empowerment outcome (Aisyah Abu Bakar M. M., 2019). According to Aisyah Abu Bakar, appropriate design strategies can improve and sustain well-being through instilling a sense of empowerment, leading to positive relationships

among space occupants (Aisyah Abu Bakar M. M., 2019). Noralfishah Sulaiman stated that those who could not prevent disasters entirely but their impacts and severity could be lessened by applying specific frameworks (Noralfishah Sulaiman, 2019). Rahsidi focuses on the inclusiveness of Disaster Risk Management. The study assesses proactive adaptation of the Early Warning System (EWS) for Disaster Risk Reduction Program in Bertam Valley. The study aims to identify community preferences as an initiative to improve the effectiveness of the EWS system. To sustain the awareness and preparedness of EWS, continuous involvement by the community is necessary to make them resilient (Rahsidi Sabri Muda, 2018). Disaster is a significant threat that could jeopardize the development of economic, social, and physical elements of a nation and its people's well-being. The damage and loss of property and life caused by disasters are overwhelming and least desired by any country. Noraini Omar Chong identified three major issues and challenges in DRM in Malaysia, particularly from agencies' perspectives. These issues and challenges include (Noraini Omar Chong, 2018): a) Disaster management planning imbalanced between top-down and bottom-up approaches, b) Lack of coordination in disaster management cycle, with greater focus only on the disaster emergency response stage, c) Lack of planning of long-term recovery (post-disaster) resulted in low-level community low-level holders' resilience to disasters.

DESCRIPTION OF LOCATION AND PROBLEM

Panjangrejo Village is located in Pundong sub-District, Bantul Regency, Yogyakarta, Indonesia. This sub-district was, however, the epicenter of the tectonic earthquake experienced on May 27, 2006, where 4,143 people died, 26,299 seriously injured, 71,763 houses destroyed, 71,372 houses severely damaged, and 66,359 houses slightly damaged (Bantul District Goverment, 2011). This led to the need to acquire knowledge on risks associated with disasters and their handling process. Meanwhile, the settlements in Panjangrejo Village have been rehabilitated and reconstructed for over 10 years since the Settlement Arrangement Plan document was established in 2010. This study was conducted to answer the question “what are the forms, levels, and factors driving citizen participation from the preparation to the reconstruction evaluation stages of post-disaster reconstruction of settlements?”

RESEARCH METHODS

The descriptive qualitative method was used in this research with the data collected by interviewing community leaders and villagers from September to October 2019 and analyzed based on the level of citizen participation identified in the Preparation, Planning, Implementation, and Evaluation Phases. The Citizen Participation variable was measured using eight levels of participation according

to Sherry Arnstein which are Manipulation, Therapy, Informing, Consultation, Placation, Partnership, Delegated Power, and Citizen Control. These were further divided into three groups which are (1) Non-participation, (2) Degree of tokenism and (3) Degree of Citizen Power (Arnstein, 1969). The non-participation group is a level which is not in the true sense and it consists of manipulation and therapy, the Degree of Tokenism group is the level considered not serious which consists of informing, consultation, and placation while the Degree of Citizen Power group consists of Partnership, Delegated power, and Citizen control.
The measurement scale for the eight levels of citizen participation was adjusted to the number of indicators at each stage (see Table 1).

Table 1: Citizen Participation Measurement Scale

No	Level of Participation	Score 1 indicator Interval	Score 2 indicators Interval	Score 3 indicators Interval	Score 4 indicators Interval
(1)	(2)	(3)	(4)	(5)	(6)
8	Citizen Control	571 – 640	1.401 – 1.280	1.711 – 1.920	2.281 – 2.560
7	Delegated Power	501 – 570	1.001– 1.140	1.501 – 1.710	2.001 – 2.280
6	Partnership	431 – 500	861– 1.000	1.291 – 1.500	1.721 – 2.000
5	Placation	361 – 430	721– 860	1.081 – 1.290	1.441 – 1.720
4	Consultation	291 – 360	581– 720	871 –1.080	1.161 –1.440
3	Informing	221 – 290	441– 580	661 – 870	881 – 1.160
2	Therapy	151 – 220	301– 440	451– 660	601 – 880
1	Manipulation	80 – 150	160 – 300	240 – 450	320 – 600

Source: Studio, 2020

RESULT AND ANALYSIS

Panjangrejo villagers have the habit of holding *Rembug warga* to discuss common problems and the activities usually include deliberations, conveying aspirations, and making decisions. The level of citizen participation in this meeting was measured by interviewing 80 people used as respondents. The interview includes several stages such as Preparation with 2 indicators, Planning with 4 indicators, Implementation with 4 indicators, and Evaluation with 3 indicators and the results obtained concerning the level of citizen participation in *Rembug warga* at the Preparation Stage is presented in Table 2:

Table 2: Level of Citizen Participation in the Preparation Stage

No.	Indicator	N	Average Score	N x Score
(1)	**(2)**	**(4)**	**(6)**	**(7)**
1.	Attendance in *rembug warga* activities.	80	5.7	456
2.	The level of activeness in discussing and conveying ideas during *rembug warga* activities.	80	5.6	448
Total N x Score				904

Source: Studio, 2020

The total score of citizen participation level based on attendance at the *rembug warga* activity was 456 and this is included in the Partnership level using Table 1 Column 3 which is for 1 indicator. This means the residents at the *rembug warga* activities during the preparation stage negotiated effectively with the facilitators or partners and this made it possible for them to influence every decision. Moreover, the total score based on activeness while discussing and conveying ideas was 448 and this is also in the range of Partnership level. It shows the residents have a good direction and development ideas, are accountable, and have an influence on the activities at the preparation and later stages. The total score for both indicators at the preparation stage was 904 and this was also found to be at the Partnership level based on Table 1 Column 4 for 2 indicators and observed to be at the Citizen Power group. The results of the interviews obtained from the respondents at the planning stage with the scoring scale are presented in Table 3.

Table 3: Level of Citizen Participation in Planning Stage

No.	Indicator	N	Average Score	N x Score
(1)	**(2)**	**(4)**	**(6)**	**(7)**
1.	Attendance in *rembug warga* activities.	80	5.91	473
2.	The level of activeness in discussing and conveying ideas during *rembug warga* activities.	80	6.08	487
3.	The level of willingness to donate funds.	80	6.47	518
4.	The level of willingness to contribute energy.	80	6.16	493
Total N x Score				1971

Source: Studio, 2020

The total score of citizen participation level based on the attendance indicator at the *rembug warga* activity for the Planning Stage was 473 and this was also included in the Partnership level using Table 1 Column 3 for 1 indicator. This means attendance at *rembug warga* activities made the residents have good

working relationships with government and partners and this allowed them to influence the planning process. Moreover, the total score for the activeness level in discussing and conveying ideas was 487 and this is also included in the Partnership level using Table 1 column 3 for 1 indicator while citizen's willingness level to contribute funds is 518 and included in the Delegated Power level. This shows the citizens have full authority in managing finances, have the ability to establish direct relationships with sources of funds without going through third-party intermediaries, and participated significantly in ensuring accountability for the activities. Furthermore, the total indicator score for the level of citizens' willingness to contribute energy was 493 and this is included in the Partnership level using the same standard with previous indicators. This means the energy contributed aided the planning process. The total score for the four indicators at the planning stage was, however, recorded to be 1,971 and also included in the Partnership level with full authority according to Table 1 column 6 for 4 indicators. Therefore, the program was produced using the suggestions and decisions from residents during the *rembug warga* activities while the partnership level was observed to be the Citizen Power group. The results of the interviews obtained from the respondents at the implementation stage with the scoring scale are presented in Table 4.

Table 4: Level of Citizen Participation in the Implementation Stage

No.	**Indicator**	**N**	**Average Score**	**N x Score**
(1)	**(2)**	**(4)**	**(6)**	**(7)**
1.	The level of willingness to allow land use for development	80	5.60	448
2.	Level of willingness to contribute funds	80	6.11	489
3.	The level of willingness to contribute energy.	80	6.58	527
4.	The level of willingness to contribute materials/ goods.	80	6.33	507
Total N x Score				2011

Source: Studio, 2020

The total score for the level of citizen participation based on the people's willingness to allow the use of their land as a development location was 488 and included in the *Partnership* level according to Table 1 Column 3 for 1 indicator while the contribution of funds was recorded to be 489 and included in the same *Partnership* level. Moreover, citizens' willingness to contribute energy was found to be 527 and included in the *Delegated Power* level based on the same table used for the other indicators. These results showed the residents played an active role in controlling the course of development effectively and were able to overcome

problems during the process of implementation through labor contributions. Meanwhile, the total score of citizens' willingness to contribute materials/goods was 507 and included in the *Delegated Power* level using the same table. This score exceeds the initial estimate considering the social status of the residents which are majorly farmers but with a high willingness to donate goods to support the development. The total score of all indicators in the implementation stage was 2,011 and this was observed to be at the level of *Delegated Power* based on Table 1 column 6 for 4 indicators. This level is, however, part of the *Citizen Power* group and shows the citizen participation was active with full authority. The results of the interviews obtained from the respondents at the evaluation stage with the scoring scale are presented in Table 5.

Table 5: Citizen Participation Level in Evaluation Stage

No.	**Indicator**	**N**	**Average Score**	**N x Score**
(1)	**(2)**	**(4)**	**(6)**	**(7)**
1.	Attendance level in *rembug warga* activities	80	6	480
2.	The level of activity in discussing and conveying ideas.	80	6.03	483
3.	Level of willingness to donate funds.	80	6.47	518
Total N x Score				1481

Source: Studio, 2020

The total score for the level of citizen participation based on attendance at each *rembug warga* activity was 480 and included in the *Partnership* level according to Table 1 Column 3 for 1 indicator which means the residents participated actively. The total score through active discussion was recorded to be 483 and also included in the *Partnership* level while the willingness to contribute funds was found to be 518 and included in the level of *Delegated Power*. This level indicates the residents maybe have limited funds but tried their best to participate in the development program. Moreover, the total score for all indicators at the evaluation stage was 1,481 and included in the level of *Partnership* and the *Degree of Citizen Power* group according to Table 1 column 5 for 3 indicators. Therefore, the residents have a big concern and responsibility in the development process and participated actively and voluntarily.

CONCLUSION

The participation of citizens during the preparation stage was discovered to be between attendance at *rembug warga* activities and conveying ideas, the planning stage varied between attendance at *rembug warga* activities, conveying ideas, voluntary funding, and labor contributions while the implementation stage had voluntary labor and fund donations and the evaluation stage involved a sense of

responsibility and respect for the development process. The preparation stage was found to be at the *Partnership* level and included in the *Citizen Power* group while the same level was observed for the planning stage but the donation of funds was included in the *Delegated Power* level. Moreover, the implementation stage, especially permission to use land and fund donations, was included in the *Partnership* level while land use, labor, and goods donations indicators were categorized as the *Delegated Power* level and this belongs to the *Citizen Power* group. Meanwhile, the participation at the evaluation stage, especially in the form of attendance at community consultation activities and discussions and conveyance of ideas, was included in the *Partnership* level while the willingness to donate funds was included in the *Delegated Power* level. The overall participation at the evaluation stage was in the *Partnership* level and classified as the *Citizen Power* group as shown in Table 6.

Table 6: Conclusion of Citizen Participation

No.	Development stage	Indicator	Score	Participation Rate
1.	Preparation Stage	Level of attendance in *rembug warga* activities.	456	Partnership
		Level of activity in discussing and conveying ideas in *rembug warga* activities.	448	Partnership
Total			904	Partnership
2.	Planning Stage	Level of attendance in *rembug warga* activities.	473	Partnership
		Level of activity in discussing and conveying ideas in *rembug warga* activities.	487	Partnership
		Level of willingness to donate funds.	518	Delegated Power
		Level of willingness to contribute energy.	493	Partnership
Total			1.971	Partnership
3.	Implementation Stage	Level of willingness to allow land use.	488	Partnership
		Level of willingness to donate funds.	489	Partnership
		Level of willingness to contribute energy.	527	Delegated Power
		Level of willingness to donate materials/goods.	507	Delegated Power
Total			2.011	Delegated Power

		Level of attendance in *rembug warga* activities.	480	Partnership
4.	Evaluation Stage	The level of activity in discussing and conveying ideas in *rembug warga* activities.	483	Partnership
		Level of willingness to donate funds.	518	Delegated Power
Total			**1.481**	**Partnership**

Source: Studio, 2020

The activities of the *rembug warga* were found to be the driving factor determining the level at which the citizens participated at every stage of the post-earthquake settlement reconstruction process. The activities supported citizen participation in the preparation, planning, implementation, and evaluation stages, and their effectiveness was reflected in the activeness of the respondents.

SUGGESTION

Rembug warga activities are important to the successful post-earthquake reconstruction in Yogyakarta and considered a habit conducted "by the residents and for residents" to become an element of local wisdom in building a synergy of cooperation between government, partners, and residents. These activities are, however, expected to be the model for the post-disaster reconstruction activities in other areas.

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AWARENESS OF COMMUNITY ON THE CONSERVATION OF HERITAGE BUILDINGS IN GEORGE TOWN, PENANG

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Abstract

Having been gazetted as a World Heritage Site, George Town is known to have many heritage buildings that are more than a hundred years old. However, not all heritage buildings in George Town have appropriately been conserved by the local community, especially the owner and the tenant. This ignorance has caused severe issues of heritage buildings being neglected by the owner and the public. A stud has been carried out on the awareness of the local community in preserving historical buildings within George Town to gain insights into this issue. A quantitative method is used by distributing questionnaires to 387 respondents, which consists of the local community residing in George Town. The level of community awareness is measured to examine the extent of the local community being aware of the heritage buildings around them. Finding reveals that the community level of awareness to be moderate (mean=3.98), which reflects the ignorance of the local community in George Town towards preserving heritage buildings. Thus, the community in George Town is encouraged to be more vigilant in protecting the heritage buildings by joining activities related to heritage conservation held by the local authorities, NGOs, or even the local community. This activeness could ensure all the heritage buildings are protected from the effects of modernisation and be well-maintained for future use.

Keywords*:* Awareness, community development, participation, conservation, heritage

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INTRODUCTION

The awareness of heritage conservation is increasing alongside the number of historical heritage sites being granted World Heritage Site status by UNESCO. The trend towards restoring, conserving, and adapting historic buildings and landmarks has also been discussed and practised extensively (Suraiyati, 2018). As a result, the heritage sites become unique tourist attractions, which will increase domestic income and promote economic growth (Boudiaf, 2017). For example, the inscription into the World Heritage Site (WHS) of Melaka and George Town in 2008 has given a new course to the tourism industry. The WHS status for George Town has caused tourism commodification on the heritage buildings, environment and economy within the surrounding area (Nurbaidura & Badaruddin, 2018). Apart from contributing to economic growth, the heritage tourism industry has also positively impacted employment opportunities.

However, as time passed, the quality of monuments and historic buildings in George Town has declined, with signs of neglect. This negligence is due to the lack of community participation in conserving the heritage buildings. Some of these heritage buildings have been badly damaged due to natural causes and in need of restoration (Sinar Harian, 2020; Sofia, 2016; Ghafar, 2009). This situation would be worsened when the owners demolish the historic buildings due to ignorance of the historical value and prioritisation to modernise and develop alongside globalisation. One of these demolished heritage buildings demolished is the Runnymede Hotel that was built in 1920 with more than 200 years of history. The building is considered one of the famous historical buildings in George Town as once inhabited by Sir Stamford Raffles when he was the Assistant Secretary to the Governor of Penang Island. The Runnymede Hotel building was also used as a British military hospital during World War Two.

Some of the owners who have inherited the heritage buildings have sold the buildings to investors to be used as commercial units (Yusri, 2017; Sofia, 2016). Some of these buildings are located at Lebuh King and Lebuh Church. Based on data by the Penang Heritage Trust (PHT), a total of 24 units of heritage buildings located within the World Heritage Site Zone have already been sold to foreigners. Many historic buildings have not been preserved in the right way, with some examples of these buildings being the Penang City Hall and some located at Padang Kota Lama (Balvin, 2019).

The Penang state government has given the 'green light' to the demolishing of a 100-year-old bungalow at Peel Highway to make way for Medical City (Dermawan, 2018). However, several NGOs and heritage activists have opposed demolishing these heritage bungalows and believe that the state government is not serious about protecting heritage buildings. The demolition of heritage buildings is also contrary to the National Heritage Act (2005), which states that heritage buildings over 100 years are prohibited from being demolished and should be conserved as national heritage. The government's

decisions to demolish heritage buildings have set an appalling example to the community, which could have led to the negligence of heritage issues that occur in their areas. For example, a study by Castro, Guccio, and Rizzo (2011) states that low levels of awareness on heritage sites contribute to ignorance of heritage sites, which can cause the community to refuse any engagement or join heritage conservation activities. Failure of heritage awareness will lead to difficulties in preserving heritage assets, especially heritage buildings (Jaki, 2014; Amer et al., 2011). Nonetheless, the community bears the same responsibilities as the government in the conservation and preservation of heritage buildings (Jaki, 2014). Many heritage buildings belong to individuals than to the government. Hence, individuals in society should be dedicated and concerned about maintaining heritage buildings preservation and be responsible for the heritage buildings. Therefore, this article focuses on the level of awareness among the local community towards heritage conservation in George Town, Penang.

LITERATURE REVIEW

Heritage conservation

Heritage was a cultural process that described the history of a community, city, or area inherited by a community group to another community (Azizan et al., 2020; Wang, 2020; Awad & Bleibleh 2020). Heritage should not be considered an objective that had to be taken care of individually but should be the foundation of community development, with shared values among the community members (Waterton & Watson 2015). The term heritage can also be used in various contexts, such as non-physical elements of history, which included culture and art and past artefacts or relics without permanent physical structure connected to past events (Tunbridge & Ashworth, 1996). Heritage can also be defined as any hereditary relic, whether artificial or natural, movable or immovable, and visible or invisible, that symbolised the life and identity of (Akta Benda Purba, 1976).

Heritage conservation was also used to describe the preservation of architectural monuments or historical places using methods and materials close to the original building during reconstruction (Asyaari, 2018; Hamsah, 2006). These physical conservations focused on preserving and caring for heritage buildings from destruction by considering the importance of society and country (Azizan et al., 2020; Johar et al., 2011). The term can also be interpreted as all the processes involved in taking care of a particular place to preserve the importance of heritage and protect the value of cultural heritage from being damaged or lost (Esther et al., 2016).

The history of heritage conservation in Malaysia began only recently, around the 1960s to the 1980s, when the economy was developing. Bujang Valley in Kedah and other major towns, such as Kuala Lumpur and Georgetown, had been among the first locations to have heritage buildings conserved in Malaysia. Social agencies, such as the Malaysian Heritage Body, established since 1983,

had also created awareness of the importance of historical architecture. Nonetheless, the conservation of cultural heritage in Malaysia had improved after George Town and Melaka were recognised as World Heritage Sites by UNESCO on 7 July 2008 in Quebec, Canada (Ghafar, 2010).

Heritage conservation was fundamental in renovating old cities, such as Georgetown and Melaka, as UNESCO World Heritage Sites. Specifically, conservation of heritage buildings must be prioritised to prevent the country from losing its heritage, which was a shared responsibility by all society levels and not limited to professionals (Awad & Bleibleh, 2020; Normah et al., 2018). Authorities, such as the Ministry of Culture, the National Museum and the Department of National Heritage, played an essential role in supporting and encouraging communities and relevant people to contribute to the conservation of heritage buildings. Aside from making the heritage buildings liveable, effective conservation works could also help maintain the uniqueness of heritage buildings as time passes (Azmin et al., 2017).

Local communities' awareness

Generally, awareness can be defined as a condition or ability to view, feel, or realise an event that had occurred (Hafsah et al. 2019; Nur Zalina et al., 2020). This historical awareness was also vital to create a dependency between individuals and society and between society and the environment (Hargreaves & Fink 2004). Aisiah et al. (2016) defined historical awareness as a state and thought process that occurred when individuals remember the meaning and purpose of history. Moreover, another essential aspect of historical awareness was understanding historical events in the form of values, effects, and experiences gained from past events. Historical awareness was important for every individual in the country as individuals who did not understand and had no historical heritage awareness may lose their identity (Yung et al., 2011).

The awareness of the local community in George Town towards heritage buildings conservation was measured using the model of heritage awareness was adapted by Aisiah et al. (2016). The level of heritage awareness in the George Town community was considered high if all four components were prevalent. On the other hand, any one of the absent components would mean that the level of community heritage awareness was low and should be improved (Aisiah et al., 2016). Hence, all four of these components played a crucial role in assessing the degree of understanding of heritage among the local community.

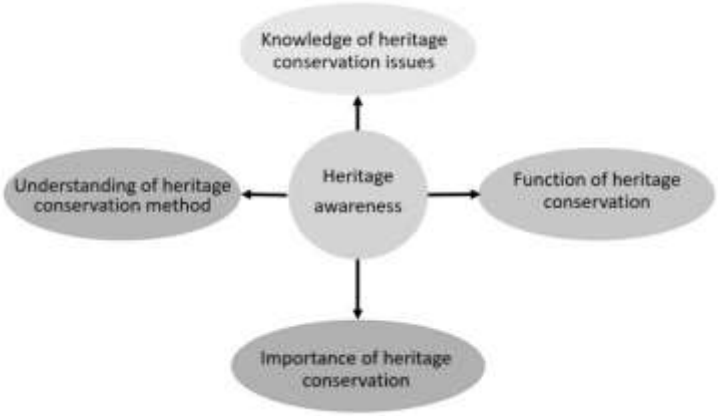

Figure 1: Heritage awareness model
Source: modified from Aisiah et al. (2016)

METHODOLOGY

This study had employed a quantitative approach by using a questionnaire as the main instrument to obtain data. The questionnaires were distributed to 387 respondents online, with some at the George Town conservation zone through convenience sampling. The items used in the questionnaire consisted of two parts, which was Part A, which focused on the background of the respondents and Part B, which was related to the level of community awareness in heritage building conservation. All questionnaire items developed formed a construct representing the real situation that effectively measured the awareness level of the local community.

FINDING

Background of the Community

Results for this study on the conservation zone of George Town were based on 387 responses received from respondents who worked, studied, or lived within the area of George Town. The study recorded that the Malays were the majority of people who participated in the study, followed by the Chinese and Indians. There are also races from other categories, such as Sabahans and Sarawakians residing in George Town and the Indian-Muslims living and working in George Town.

In terms of age, most respondents were youths between the ages of 20 to 30. As for education level, many respondents had at least an SPM, Diploma, Bachelor or Master's certification. This result indicated that the current generation had obtained formal education within Malaysia, with at least, the Sijil Pelajaran Malaysia certificate. The percentage of respondents with Penilaian Menengah

Rendah (PMR) and Sijil Rendah Pelajaran (SRP) education was small at 1.6%, while 0.3% of the respondents only had primary school education.

Assessing the awareness level of the local community in George Town

Overall, the analysis and discussion conducted in this study found that the level of community awareness was moderately high. The level of community awareness in the conservation of heritage buildings was measured using the heritage awareness model with four elements: awareness of heritage issues, awareness of heritage methods, awareness of the function of heritage, and awareness of the importance of heritage. Based on these four elements, the awareness towards heritage issues was the most prominent, with the highest cumulative mean value (mean = 4.10). These results suggested that most communities were already aware that George Town had been gazetted as a World Heritage Site. The local community was also aware of the status awarded to George Town and realised that the residence area had high-value heritage buildings.

Table 1:Awareness in conservation issues of heritage buildings

Items	Mean	Standard Deviation
Heritage buildings bear great heritage values	4.71	0.626
Must be conserved by local government	4.5	0.859
Must be restored for continuous use	4.29	0.943
Must be conserved by the buildings' owners	4.05	1.071
George Town had been gazetted as World Heritage Sites	4.03	1.194
Heritage buildings are neglected and obsolete	3.85	1.292
Many heritage buildings had been sold to developers	3.84	1.444
Issues related to heritage buildings conservation is unimportant	3.56	1.469

Besides, the local community was also aware of the need for heritage buildings to undergo renovations for continuous use. This result indicated that the local community was aware of conservation procedures and issues towards the heritage buildings in George Town (Table 2). Nonetheless, the local community was found to have disagreed that many of the heritage buildings in George Town were dilapidated and neglected. This finding further indicated that the conservation of heritage buildings in George Town could prevent the area from a neglected appearance. Besides, the local community agreed that heritage buildings should be preserved to be used continuously in terms of quality. Maintaining heritage buildings was a shared responsibility of both the local government and community, especially among the owners and tenants of these

heritage buildings. Adequate policies focused on implementation, adaptation, and mitigation strategies (Sesana et al. 2020) are also necessary to manage cultural heritage at risk.

Table 2:Awareness in methods of conservation for heritage buildings

Item	Mean	Standard Deviation
Local government and NGO should provide funds for conservation works	4.3	0.959
Renovation is one of the methods in heritage conservation	3.94	1.283
Reconstruction is one of the methods in heritage conservation	3.79	1.244
Restoration is one of the methods in heritage conservation	3.89	1.331
Conservation works are not done in a proper and planned method	3.82	1.352
Tourism tax should be raised to provide funds for conservation works	3.77	1.438
Limited funds caused conservation works to halt	3.43	1.380
All changes related to heritage building need to be approved by the local community	3.34	1.581

The understanding of conservation methods among the community was less encouraging. The result indicated that there were still members of the community who did not know that restoration, reconstruction, and renovation are among the methods used to preserve heritage buildings (Table 3). The average mean value for community understanding was 3.78, which was the lowest compared to the other elements in heritage awareness. Nonetheless, this result should not indicate that the community was to be blamed on the insufficient understanding of conservation methods among the community as these members may not have been exposed to heritage conservation processes. Many community members had also stated that they used to be involved in activities related to heritage building conservation but were unfamiliar with the specific terms used due to the lack of formal training and information related to conservation.

Local communities who were exposed to conservation methods and work would more likely participate in heritage conservation works. A respondent from Balik Pulau Polytechnic had stated that he did not know about the method used in the conservation of heritage buildings because he was unaware of the methods used for conservation of the heritage buildings due to lack of exposure. Thus, there was a high possibility for him to be involved in conservation activities if the information was made known. This finding further supported Solihah et al. (2015), who argued that communities who lack information and knowledge about

heritage conservation would have a high tendency not to be involved in heritage conservation efforts.

Besides, the local community had also agreed that the government and NGOs should provide funds and assistance to conserve heritage buildings, especially for owners and tenants of these heritage premises. As previously discussed, limited financial support was a factor for failure in the conservation of heritage buildings with the proper methods. Thus, with stable financial assistance, heritage building conservation works could be carried out correctly. Asyaari (2018) argued that archaeology and conservation were essential in creating, preserving, and protecting national heritage. As a result, authorities such as the Malaysian Department of Culture, Art and Heritage and related organisations (including the Department of the Museum and the Department of Heritage) were developed to protect and enhance national heritage.

Figure 1: Heritage building that had undergone renovation

Conservation work on the heritage buildings in George Town could be carried out with proper planning by adhering to the appropriate conservation methods. For example, most of the conservation work on the heritage buildings in George Town was part of local government projects, such as the George Town Fire Station project, which was over 100 years old, and the Sia Boey conservation project. The operation of these projects was also managed by individuals with experts in the field of conservation. However, for privately owned heritage buildings, owners or tenants of these heritage premises preferred to repair damage to buildings without hiring individuals who specialised in heritage conservation. As a result, many privately owned historical buildings lost heritage features. Besides reducing the aesthetic value of the buildings, the historical value was diminished as well. This situation indicated that the local community must be

well aware of the proper conservation methods to ensure that the heritage buildings can be well preserved to maintain the aesthetic essence of the buildings.

Table 3:Awareness in the function of heritage buildings conservation

Item	Mean	Standard Deviation
Improve the surrounding area	4.4	0.892
Heritage conservation is just wasting money	4.33	0.989
Helps in promoting George Town as WHS	4.31	0.903
Prevent the area from being neglected	4.08	0.991
Cause property values in surrounding areas to increase	4.05	1.089
Improve the cleanliness of the area	4.03	1.186
Improve the quality of amenities in the area (e.g.: road network).	3.62	1.476
Prevent the opening of new areas	3.46	1.529

Meanwhile, community awareness in the function or purpose of conservation was reasonable with a mean value = 4.04. This result indicated that the community knew and understood the role of heritage buildings in George Town. Most of the heritage buildings in George Town were shophouses. The conservation of these buildings can save financial resources from purchasing new land for business purposes through the adaptive reuse process. This process allowed optimal use of possible space available, including marginal areas, to fulfil the desired economic goals re-purpose the buildings and spaces (Haroun et al. 2019). Furthermore, George Town had a high population density to sustain the economic supply. Besides, well-preserved heritage buildings could also enhance the image of the surrounding area, which would further highlight the identity of George Town as a World Heritage Site.

Table 4: Awareness in the importance of conservation of heritage buildings

Item	Mean	Standard deviation
A symbol of pride for the local community	4.42	0.858
Ability to attracts tourists	4.26	0.990
As a place for the community's interaction	4.11	1.112
Unique architecture	4.09	1.137
Portrays local's culture	3.86	1.364
Portrays the life of the previous community	3.76	1.307
Can be makes gallery, souvenirs shop, hotel and restaurant	3.54	1.356

The local community in George Town also recognised the value of restoration of historic buildings (Table 5). The mean value for this element was 4.0. Many organisations had acknowledged that heritage buildings in George Town must be preserved because of the unique designs that symbolised the local culture. Hence, the heritage buildings in George Town are often used as souvenir shops, hotels, and even restaurants. The local community also made these heritage buildings a place for social interaction, such as cultural associations. This finding indicated that the community knew and understood that heritage conservation was vital for the future generation. Furthermore, preserving heritage buildings also helped current generations to appreciate history and embrace the constant changes in society. Nonetheless, the rapidly changing world was considered an aspect of stability (Awad & Bleibleh, 2020).

Table 5: Cumulative mean for components in community awareness

Components	**Cumulative mean**	**Standard Deviation**
Issues of heritage building's conservation	4.10	1.112
The function of heritage building's conservation	4.04	1.321
importance of heritage buildings' conservation	4.01	1.132
Method of heritage building's conservation	3.78	1.161
Overall	3.98	1.181

This study showed that the community of George Town had an awareness of conservation matters for heritage buildings. If the local communities were to be given more exposure to the methods, functions, and importance of heritage building conservation at George Town, the community would be more concerned about the heritage buildings as a World Heritage Site.

CONCLUSION

In conclusion, the level of awareness among the local community of George Town towards the conservation of heritage buildings is at min = 3.98, which is a moderately good level though still requires improvement. Local communities should also be more actively involved in heritage building conservation activities to cultivate a sense of ownership towards their heritage. Thus, the existing cultural heritage could be passed on from one generation to another and ensure continuity. More effective initiatives should also be implemented to encourage local communities to engage in conservation activities. As heritage awareness is closely related to community involvement, stakeholders, especially NGOs, need

to play their part by organising more conservation-related campaigns to increase awareness of local communities, especially owners and tenants of heritage premises. This research can help the owners and tenants of heritage premises understand the function and importance of heritage buildings that they were living in to appreciate the value and nurture the sense of patriotism.

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CULTURAL MAPPING AND HERITAGE TRAIL IN KUALA KANGSAR

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Abstract

Kuala Kangsar is the Royal Town of Negeri Perak. It was established in the 1720s. The name Kuala Kangsar is believed to be derived from the kangsar plant (Hibiscus flocussus) that grows in abundance along the banks of the Sungai Kangsar. Another strong suggestion claims that the name was handed down by explorers and settlers who had established a settlement at the mouth of the river. They called their new home Kuala Kurang Sa, a short form for Kuala Kurang Seratus because there were 99 tributaries that flowed into the Sungai Perak around the area. Kuala Kangsar became famous and remarkable not only because of its title as a royal town but also for its heritage and historical factors. There are a lot of heritage assets in this area. Because of these reasons, Kuala Kangsar has become popular and appealing to attract more tourists. This paper will identify and classify the heritage assets in Kuala Kangsar. The identifications and classifications will be based on some methods which consist of site familiarisation, unstructured interviews, visual observation and literature reviews. After heritage assets identification is done, this paper will develop the Cultural Mapping for Kuala Kangsar where Cultural Mapping is a tool to illustrate all the heritage assets' location and position in mapping and graphics. Finally, this paper will introduce the Heritage Trail to link all these heritage assets in Kuala Kangsar.

Keywords: Heritage Assets Identification, Cultural Mapping and Heritage Trail

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INTRODUCTION

When Sultan Idris Murshidul'adzam Shah (1877-1916) ascended the throne, he selected a site on Bukit Chandan to build his palace, thus becoming the first in a line of sultans to live at Bukit Chandan and be buried on the west side of the Sungai Perak. His palace, completed in 1895, was named Istana Negara. The royal ambience that characterises Kuala Kangsar started to take shape with the high ground at Bukit Chandan as its focal point. A townhouse for the Sultan, Istana Kota, was completed in 1903. It was also known as Istana Hulu, as it was upstream from Istana Negara. Today, this palace houses the Sultan Azlan Shah Gallery. The wooden Istana Kenangan, built in 1926, was used as the royal palace while Istana Iskandariah was being constructed to replace Istana Negara. A number of other palaces occupied by various members of the royal family dot Kuala Kangsar, including the Istana Chinta Berahi and Istana Kasar Ma'amor, which were built by Sultan Idris for his two wives. Istana Bendahara was the residence of the last Raja Bendahara of Perak, a son of Sultan Idris. In 1906, two newly completed houses of the Sultan at Bukit Chandan became the first houses in Kuala Kangsar to be lit with electricity, which was powered by a power station located at Bukit Chandan itself (Dr. Neil Khor, 2017). Kuala Kangsar has a lot of heritage assets to be recognised and appreciated. This paper will identify the heritage assets in Kuala Kangsar before developing the Cultural Mapping and Heritage Trail in order to ensure that all these assets are connected with each other.

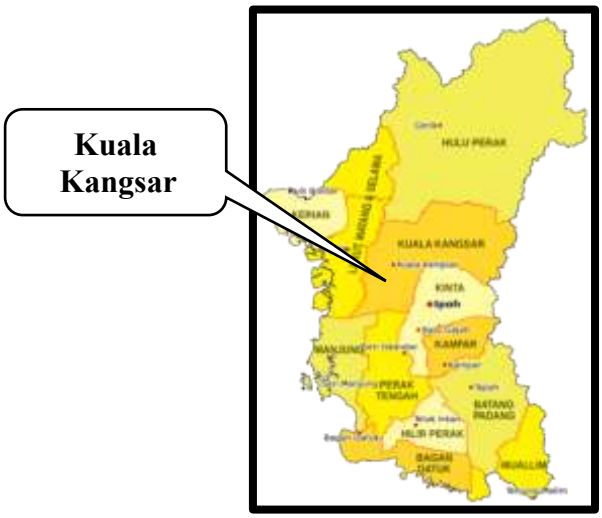

Figure 1: Location Plan of Kuala Kangsar, Negeri Perak

Heritage Assets Identification, Cultural Mapping and Heritage Trail

Heritage assets is defined as assets of historical, or scientific importance that are held to advance preservation, and educational objectives of charities, and through public access contribute to the national culture and education either at national or local level. Such assets are central to the achievement of the purposes of such charities and include the land, buildings, structures, collections, exhibits or artefacts that are preserved or conserved and are central to the educational objectives of such charities (Russell, 2006).

The identicafion of heritage assets in Kuala Kangsar is an exercise which will involve several steps such as site visit, visual observation, the collection of secondary data from literature reviews, and a few unstructured interviews if needed. Based on this approach, heritage assets in Kuala Kangsar can be identified effectively.

As for Cultural Mapping, it is a process of collecting, recording, analysing and synthesizing information in order to describe the cultural resources, networks, links and patterns of usage of a given community or group (Stewart, 2010). In this paper, the Cultural Mapping will be developed after identification of heritage assets in Kuala Kangsar is completed. The purpose of a Cultural Mapping is to ensure that all heritage assets are being connected with each other and presented in infographic. Based on this approach, the heritage assets full of cultural resources and characters will be compiled together and well-connected with each other.

Then finally, creating the Heritage Trail which is a designated journey that brings the trail explorer to learn more about a country's history, culture, architecture, flora and fauna by visiting historical sites and buildings (National Heritage Board Singapore, 2004) is part of the output of this paper. A Heritage Trail is being created in order to construct a journey through a series of historical and heritage sites with the aim of observing and discovering the area. Exploration of a Heritage Trail can be done on foot or by vehicles. For Kuala Kangsar, a Heritage Trail is quite important and significant in order to connect all the heritage assets in this area. Furthermore, the heritage assets are dispersed and located separately.

Heritage Assets Identification in Kuala Kangsar

Based on visual observation, site familiarisation, secondary data collection from literature reviews and unstructured interviews, 22 heritage assets in Kuala Kangsar have been identified as listed in the table below:

Table 1: Heritage Assets Identification in Kuala Kangsar

No.	Heritage Assets	Remarks
1.	Masjid Ubudiah	Mosque
2.	Istana Kenangan	Palace

3.	Istana Iskandariah	Palace
4.	Local handicraft	Gold Embroidery
5.	Local handicraft	Malay Traditional Weapon
6.	Baitul Annur	Mansion
7.	Baitul Rahmah	Mansion
8.	King's Pavilion	School
9.	Perak War Memorial	Cemetery
10.	Sultan Azlan Shah Gallery	Gallery
11.	The Oldest Rubber Tree in Malaysia	Tree
12.	Malay College Kuala Kangsar	School
13.	Pavilion Tower	Monument
14.	Labu Sayong	Local Handicraft
15.	Makam Sultan Ali Al-Mukammal Inayat Shah	Mausoleum
16.	Makam Sultan Yusuf Sharifuddin Mudzaffar Shah	Mausoleum
17.	Rumah Kutai in Kg. Sayong Lembah	Malay Traditional House
18.	Tomb Stone of Sultan Mansur Shah 1 @ Masjid Kota Lama Kanan	Tomb Stone
19.	Iskandar Bridge	Bridge
20.	Victoria Bridge	Bridge
21.	Air Raid Shelter	Fort
22.	Tok Setia's Mansion	Mansion

This paper managed to identify the heritage assets in Kuala Kangsar. There are 22 heritage assets consisting of buildings, palaces, rubber tree, institutions, mausoleums, monuments and handicrafts. These heritage assets can be promoted and can boost Kuala Kangsar as a heritage site and tourism destination. These heritage assets have their own potential and strength to promote Kuala Kangsar to become a good destination for heritage and conservation enthusiasts and lovers. The location of each heritage asset in Kuala Kangsar is presented in Figure 2 below:

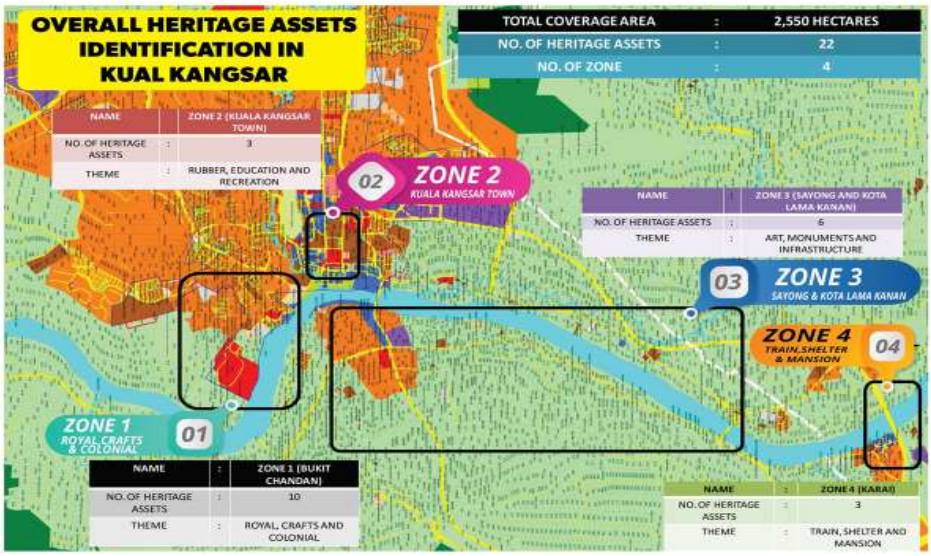

Figure 2: Location of Heritage Assets in Kuala Kangsar, Negeri Perak

Development of Cultural Mapping for Kuala Kangsar

Cultural mapping is a process of collecting, recording, analysing and synthesizing information in order to describe the cultural resources, networks, links and patterns of usage of a given community or group (Stewart, 2010).

Cultural mapping is widely recognized as an effective tool for development and planning. Mapping makes culture more visible so that it can be utilised in new ways such as exchanged, linked and further developed (Young, 2003).

Cultural mapping has been recognized by United Nations Educational, Scientific and Cultural Organisation (UNESCO) as a crucial tool and technique in preserving the world's intangible and tangible cultural assets. It encompasses a wide range of techniques and activities from community-based participatory data collection and management to sophisticated mapping using Geography Information System (GIS) (UNESCO).

Cultural mapping is a methodology that can also support an interpretation of space. At both individual and collective levels, it is a means to locate yourself in the world "physically, culturally, and psychologically" as well as politically. It provides a means to consider day-to-day realities, and provides a possibility to question this reality and generate an improved understanding of the cultural context. Mapping processes provide ways to interact creatively with urban reality, to uncover and articulate diverse perspectives, and to generate unique meanings and value that can be shared (Duxbury N. G.-P., 2015).

The purpose and usage of Cultural Mapping is mentioned in the table as below:

Table 2: The Purpose and Usage of Cultural Mapping

No.	Uses	Explanation
1.	Increasing knowledge and appreciation	Helping to define the local culture. Demonstrating the breadth and variety of cultural activity in the municipality.
2.	Identifying previously unknown resources and activities	Providing concise information to elected officials, tourist groups, branches of municipal government, the general public and other stakeholders. Advocating for and drawing attention to the cultural area.
3.	Getting a fresh perspective	Looking at data from different points of view, cross-cultural, public access, concentration and networking.
4.	Gaining objectivity and overview	Going from intuitive or anecdotal information from the "worm's-eye view" on the ground, to a broader, more concrete view. Seeing around discipline-based and siloed viewpoints.
5.	Identifying networks and hubs	Where do groups obtain their resources, how do they communicate with one another, and who are the liaisons?
6.	Locating gaps, needs and overlaps	How much duplication or scarcity is there in a given sector or area of the city.
7.	Is the distribution of resources effective?	How far does a population group have to travel to borrow a book or hold a meeting? Where can a Chinese dance troupe find a qualified instructor?
8.	Evaluating Projects	How large is the population served? How does the community view an initiative? Does a solution respond adequately to the problem?
9.	Seeing the present, looking to the future	How many informal community hubs will that new expressway disrupt? What will be the impact of an influx of mmigration from Southeast Asia on the existing community and its resources?
10.	Cultural planning	Mapping is often the first stage of preparing a cultural plan.

Source: (Stewart, 2010)

This paper also will explore the practices of establishing the Cultural Mapping in Canada, Portugal and Asia (Nepal and Thailand). The main purpose is to identify the similarities and divergences of practices among three different localities. Based on this exploration, the similarities and differences will be translated in detail in the table below:

Table 3: Stages of Cultural Mapping Preparation Practices in Canada, Portugal and Asia

Canada	Portugal	Asian (Nepal and Thailand)

1. Planning a. Determine Objectives b. State Objectives c. Set Parameters d. Estimate Readiness e. Assemble Resources 2. Project Design a. Frame the Fundamental Question b. The Inventory c. Design Survey and Interview Questions 3. Implementation Explore a. Contacting the Community b. Tallying Entering Results 4. Synthesis Make Sense a. Roughing Out the Maps b. Converting an Inventory to Map c. Analysis and Interpretation 5. Finalising the Map a. Speaking to Different Audiences 6. Going Public a. Getting the World Out	1. Identification of Tangible Assets 2. Engaging Community Members 3. Cultural Information Data Collection, Analyse and Synthesis 4. Produce A Multi-layered Picture 5. Involvement of Activists, Residents, Researches and Political Dimensions 6. Establishment of Framework for Cultural Mapping	1. Identify the Heritage Assets, Intangible and Tangible 2. Establish A Broad Framework of Ideas and Practices 3. Community involvements and Empowerments 4. Protection of Human Rights and Respecting the Traditional Knowledge

Source: (Stewart, 2010) (Duxbury N. , 2015) (Taylor, 2013)

This paper has investigated three practices in preparation of Cultural Mapping which are from Canada, Portugal and Asia. The Canada practices are very detailed and particular when designing the Cultural Mapping stages and steps. They have six stages in preparing the Cultural Mapping and every stage have their own steps. Among the three practices, Canada's is better and more effective in terms of preparing Cultural Mapping. They determine the objectives, design

the project, explore the implementation, conduct synthesis, finalise the map and promote the map to the public.

From the Portugal perspective, they are also concerned about the community's involvement but they prefer to identify the assets first, especially tangible assets. Then they proceed to data collection, and next they produce a multi-layered picture and establish the framework of Cultural Mapping. Based on the Portugal practices, they are very particular with public participation and also activists, researches and political influence. These situations have proved the importance of Cultural Mapping to be in line with public needs and to garner a bit of political will. Finally, the Cultural Mapping projects are able to fulfil the people's needs from the heritage sites.

When this research looked into the Asian practices specifically in Nepal and Thailand, it was found that they are also concerned with the identification of heritage assets for both types of assets which are tangible and intangible. Then they proceed to establish the framework of ideas and practices, and allow the public to participate in this exercise for them to share and exchange their views and opinions. For Asian practices, they also consider the protection of human rights and respecting the traditional knowledge. This aspect is very significant and outstanding compare to the other two practices. Maybe for the Asian society, there is a stronger need to protect and more concern on human rights and traditional knowledge which are in line with Asian customs and cultures. For the Asian practice, the number of stages is less than Portugal and Canada, which is four stages only. Portugal and Canada have six stages in practice of preparing for Cultural Mapping in their country, and among the two, Canada is more detailed and comprehensive.

Cultural Mapping is the method and platform to identify the heritage assets on the site, inventorise all assets, connect them, produce the profiles, highlight their strength, potential and also weakness, and finally approach the community to get their feedbacks and responses. These principles and keywords can be used for designing and producing the Cultural Mapping for Kuala Kangsar. The elements, contents and items of the stages and steps can be duplicated in the Kuala Kangsar context and practise. Perhaps these stages and steps can help develop the best Cultural Mapping of Kuala Kangsar in line with complimenteng the public needs with the appreciation of heritage assets in Kuala Kangsar.

Establishment of Cultural Mapping for Kuala Kangsar

This paper will develop a Cultural Mapping of Kuala Kangsar. In order to ensure that heritage assets will be managed properly, besides identifying them, this paper also included them in the Cultural Mapping. Based on this mapping, all the assets are connected each other and a Heritage Trail will be used as a mechanism to

achieve the purpose and approach. This paper will illustrate how the Heritage Trail will be implemented and constructed. This paper managed to generate the table of stages in preparing the Cultural Mapping, propose the Cultural Mapping illustrations and lastly propose a Heritage Trail for Kuala Kangsar as shown in the table and maps below:

Table 4: The Proposed of Stages in Preparing a Cultural Mapping for Kuala Kangsar

No.	The Stages in Preparing a Cultural Mapping for Kuala Kangsar	Justification
1.	Planning and Designing the Objectives and Framework	To ensure that the Cultural Mapping is totally useful and practicable.
2.	Identification of the Heritage Assets, Both Tangible and Intangible	To produce the inventory and profile for all heritage assets in all heritage sites.
3.	Establishment of Heritage Assets Database	This inventory and profile will become a database and reference for any parties in relation to the conservation of the heritage assets.
4.	Communities Involvement and Participation	To create a sense of belonging and ownership amongst the local residents and to reduce the burden on the government side.
5.	Protection of Human Rights and Respecting the Traditional Knowledge	Some heritage assets especially intangible heritage will have values to our culture, custom and civilisation.
6.	Producing the Cultural Mapping into Pictures, Infographics and User-Friendly Mapping	To create and produce the most interesting, attractive and practical Cultural Mapping in the future.

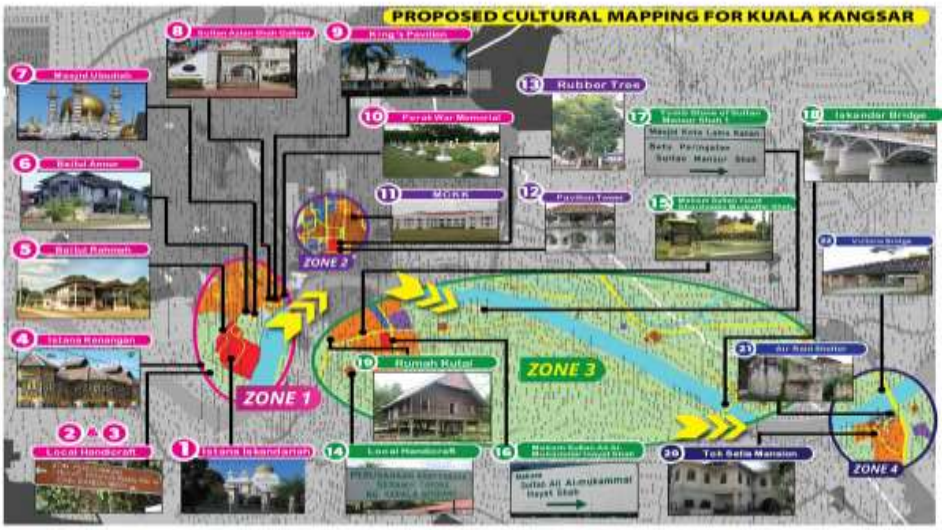

Figure 3: Proposed Cultural Mapping for Kuala Kangsar

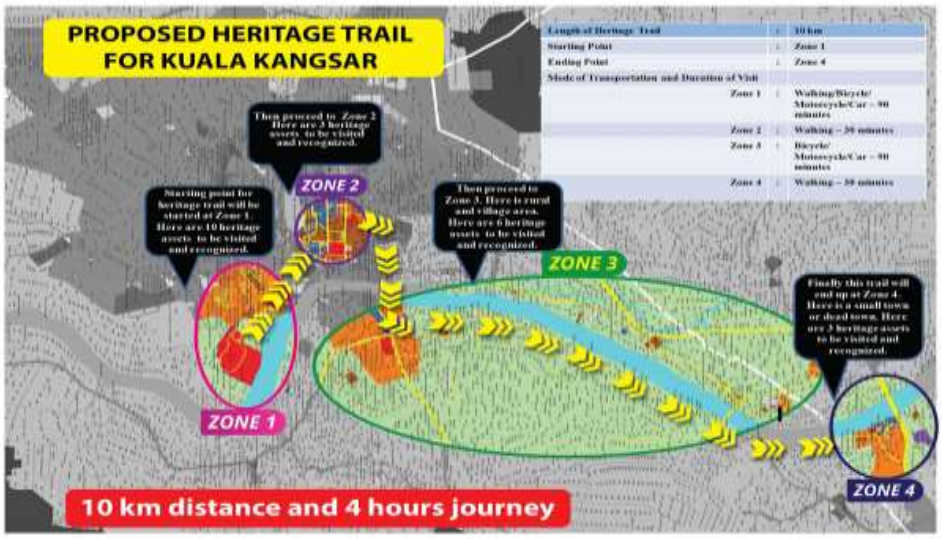

Figure 4: Proposed Heritage Trail for Kuala Kangsar

CONCLUSION

In this paper, there are three major aspects that have been acknowledged and explored which are the identification of heritage assets in Kuala Kangsar, the development of a Cultural Mapping for Kuala Kangsar and finally the proposed

heritage trail for Kuala Kangsar. This paper managed to identify 22 heritage assets in Kuala Kangsar based on visual observation, site visits, secondary data collections and unstructured interviews. These heritage assets are consisting of buildings, palaces, the oldest rubber tree, institutions, mausoleums, monuments and handicrafts. These heritage assets can be promoted to boost yje attraction of Kuala Kangsar as a heritage site and tourism destination. Besides identifying the heritage assets in Kuala Kangsar, this paper has also managed to develop the Cultural Mapping for Kuala Kangsar. This paper has analysed three Cultural Mapping practices which are in Canada, Portugal and Asia (Nepal and Thailand). Based on this analysis, this paper found that there are six stages that need to be implemented in preparing the Cultural Mapping for Kuala Kangsar. These are the best practices to be carried out for the development of the Cultural Mapping for Kuala Kangsar. At the same time, in order to ensure that all heritage assets will be manageable and connected properly, a Heritage Trail has been introduced as a mechanism to achieve the purpose.

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QUALITY OF DESIGNS AND FEATURES OF SMALL URBAN GREEN SPACES IN PETALING JAYA TOWN, MALAYSIA

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Abstract

Small Urban Green Spaces (SUGS) mushroomed in dense cities as a scaled-down version of larger parks. In the past, SUGS are often abandoned, or their quality is often overlooked. The purpose of this study is to explore the design and features to make a good quality SUGS. Five experts were approached with a weightage evaluation to rate its quality based on selected criteria's; Accessibility, Attractiveness, Functionality, and Safety. Each criterion had a variable to measure the construct. Findings from the expert evaluation showed that SUGS were rated medium or low overall quality. The variables that obtained the highest score and attained high-quality ratings were Obstacles (Safety criteria), General Maintenance (Attractiveness criteria), and Play Area (Accessibility criteria). Interview with park users revealed that they preferred the "presence of trees," "well-maintained environment," and "walking path accessibility." The least preferred attributes were "poor maintenance," "dangerous walking path," and "negative perception of safety." Overall, to ensure the quality of SUGS attention should be placed on the Accessibility of its features (e.g., walking path and play area), the attractiveness of the park (e.g., vegetation and maintenance), the functionality of the features (e.g., sports facilities) and perception of Safety (e.g., absence of obstacles).

Keywords*:* Attractive; Accessible; Functional; Safe; Neighbourhood Parks; Park Users

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INTRODUCTION

Urbanisation has caused a significant decline in green spaces, which impacts the well-being of city dwellers because it goes against the natural tendency of people to connect with the natural environment for psychological restoration (Nordh, Hartig, Hagerhall, & Fry, 2009). Open space in the form of Small Urban Green Spaces (SUGS) is found in cities and towns with limited space (Nordh and Østby (2013). SUGS placed within communities allows residents to connect with nature while fostering an area to carry out a range of activities, whether it is passive or active. The UGS system hierarchy starts from local, district to city levels, where parks in residential areas are the SUGS provided right at users' doorsteps. SUGS are scaled-down versions of larger parks, where some vegetation is present.

Experience Factors of Green Spaces

The quality of green space is judged based on various attributes such as specific facilities and amenities, fitness for use, and maintenance. Malek et al. (2012) defined the quality of green spaces as a space that fits the users' needs. This study identified four criteria to measure the quality of SUGS subjectively. The first factor, Accessibility, is evaluated based on its welcoming atmosphere or the spatial ease in reaching the activities available because it is essential for usability and functionality. Attractiveness encourages users to spend time in the space willingly. Studies have shown that users prefer the presence of biodiversity and natural features (e.g. trees, brightly coloured flowers and birds), attractive amenities (e.g. park furniture and leisure equipment's) and a clean and well-maintained environment (Biernacka & Kronenberg, 2018; Wen, Albert, & Von Haaren, 2018). Functionality, however, is the way green spaces are perceived and used by users. This relates to the variety of features and facilities provided, where users form an attachment with the space according to how they function in it (Stessens et al., 2017). The last factor is Safety, where it can either be judged objectively (by experience) or subjectively (by perception) (Maas et al., 2009).

Significance of the Study

Green spaces come in different shapes and forms, but they should be designed with quality to give benefits to their users (Aram, Solgi, & Holden, 2019). SUGS in residential areas is still not fully utilised or even abandoned despite being a fundamental social space in city planning (Anuar & Muhamadan, 2018; Moulay, Ujang, & Said, 2017). Thus, this study aims to add to the body of knowledge and qualitatively assess the quality of designs and features of SUGS that are meant for rest and recreation to understand the factors that are perceived to make a good quality space. On that basis, the main objectives of this paper are:

(1) To determine the main designs and features of Small Urban Green Spaces
(2) To assess the quality of designs and features of Small Urban Green Spaces

Therefore, the questions addressed in this study are:
(1) What are the typical size, layout, and concept of Small Urban Green Spaces?
(2) What is the quality of current Small Urban Green Spaces?

METHODOLOGY

Study Area

The primary data collection was carried out from January to February 2019 in six (6) selected Small Urban Green Space (SUGS) in Petaling Jaya (PJ), Selangor, Malaysia. The secondary data collection was carried out in March 2019. Selected SUGS are under the jurisdiction of Petaling Jaya City Council (PJCC), where the administrative area consists of 97.2 square kilometres. The parks were selected based on criteria for size, location, and function (Jasmani, Ravn, & van den Bosch, 2017) using the earth observation technique by Google Earth (Refer to Figure 1). The size of the selected SUGS for this study was between 0.2 to 2 ha.

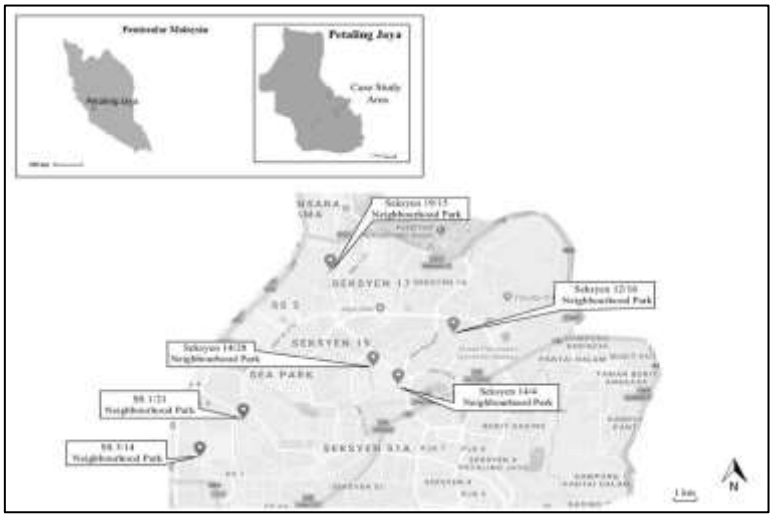

Figure 1: Selected SUGS in PJ (This map was extracted from Google Earth satellite image)

Primary Data Collection

To meet the first objective, an inventory, photographic stimuli, and layout were obtained for each SUGS. A joint structured observation and field measurement method was used to look at the characteristics of the park. Field measurements were carried out to map the routes and waypoints of the park's shape, walking path, facilities, and furniture using a Garmin Geographical Positioning System 64s device. Photographic stimuli were then obtained using a

high-resolution camera. The photographs were taken at eye level on clear or less cloudy days using panoramic views to reflect all the area's characteristics. The data collected from the inventory, layout, and photographic stimuli are used as tools for experts to carry out weightage evaluation.

Secondary Data Collection

Experts and park users were approached to objectively and subjectively evaluate the quality of design and features in SUGS.

Variables and Measures for Quality Weightage Evaluation

For the weightage evaluation, a systematic literature review technique was used to establish variables and items. Table 1 shows the criteria with the variables used to measure subjective quality. There were 14 variables in total, as listed in Table 1; each had a subjective statement to measure the construct.

Table 1. Criteria for Quality Assessment with selected Variables

Criteria	Variables
Accessibility	Walking Path (WP), Play Area (PA), Shelter/Shade (SS), and Furniture (F).
Attractiveness	Shelter/Shade (SS), Vegetation (V), General Maintenance (GM), and General Naturalness (GN).
Functionality	Sports Facilities (SP), Seating (S) and Vegetation (V).
Safety	Boundary (B), Obstacles (O) and Lighting (L).

Expert Judgment for Quality Weightage Evaluation

Once the items were established, experts were approached. Previous studies on the expert-based judgment of landscape are often used between four to nine experts (Wang, Zhao, & Liu, 2016; Bakar, Malek, & Mansor, 2016). Five experts were approached to meet the second objective; a weightage evaluation was provided to experts to evaluate the quality based on selected park criteria objectively. The weightage was rated by experts in the field of environmental planning and design from a governmental sector and educational institutes. The scoring technique used was according to a study done by (Malek, Mariapan, & Shariff, 2012) and (Bakar, Malek, & Mansor, 2016) on the Quality of Neighbourhood Park Criteria (QNPC) (Refer to Table 2).

Table 2. Quality of SUGS Classification (Source: QNPC Scoring Marks as derived from (Bakar, Malek, & Mansor, 2016; Malek, Mariapan, & Shariff, 2012)

QNPC Scoring Marks	
0-59	Low
60-79	Medium
80-100	High

Interview with Park Users

To further achieve the second objective, park users were interviewed to evaluate park quality subjectively. A semi-structured interview with park users carried out

with an open-ended question on which attributes of the park they favoured the most and the ones they least favoured as a source of qualitative data. A random sampling approach is adopted for users, where every five to six individuals that visit the selected park were approached. Thus, a total of 41 park users were interviewed. The selected park users were those using the facilities (e.g., using the equipment or walking path, sitting on the bench or gazebo), while those who were merely using the park as a short cut were not approached. The interview session was conducted in each park for two days, one on a weekday and the weekend in the morning (7.30–9.00 am) and evening (5.30–7.00 pm) between February 2019 to April 2019.

Data analysis

The data were compiled in Microsoft Excel and transferred to SPSS, where the average QNPC marks (refer to Table 2) were used to classify the average scores of variables, criteria, and overall quality from scores (refer to equations in appendix H) based on expert evaluation. The average score was classified based on low, medium, or high quality using the QNPC scores. Next, Spearman's correlation was used to test the strength of the relationship between the four criteria (Accessibility, Attractiveness, Functionality, and Safety) and the Overall Quality based on the QNPC scores.

FINDINGS

Expert Evaluation on Variables for Quality

Table 3 depicts the average scores for the variables based on expert evaluation for each park. The variables that obtained the highest score and attained high-quality ratings were O (Safety criteria), GM (Attractiveness criteria), and PA (Accessibility criteria). On the other hand, the variables that obtained the lowest score and had obtained low-quality ratings were GN (Attractiveness criteria), S (Functionality criteria), SS (Accessibility and Attractiveness criteria), and L (Safety criteria).

Expert evaluation of Criteria for Quality and Overall Quality

Based on the expert weightage evaluation, the scores of the parks' average scores were quantified to obtain the mean for criteria of Accessibility, Attractiveness, Functionality, and Safety. Then, the criteria were classified based on the QNPC marks, as shown in Table 4. SS 3/14 and *Seksyen* 14/28 parks were rated low-quality with scores of 56% and 55%, respectively. The highest score was attained by *Seksyen* 19/15 park, and the lowest score was obtained by *Seksyen* 14/28 park. All the criteria (Attractiveness, Accessibility, Functionality, and Safety) were at low or medium quality, ranging from 50% to 75%.

Relationship between Criteria for Quality and Overall Quality

A very strong relationship was observed between the Overall Quality for Accessibility (AC) (0.896), Attractiveness (AT) (0.862), and Functionality (FN) (0.820) criteria. On the other hand, Safety (0.329) depicted a weak relationship with Overall Quality. AC showed a strong relationship with AT and FN (AC-AT = 0.618; AC-FN = 0.763) but AT showed a moderate relationship with FN (AT-FN=0.553). SA was an exception as it showed a weak relationship with AC and AT (AC-SA = 0.316; AT-SA = 0.135) and an even weaker relationship with FN (FN-SA = 0.178). Table 6 depicts the correlation coefficients of the criteria.

Park Users Perception

According to interviews with park users, the most preferred and the least preferred attributes based on the design and features in a park are shown in Figure 4 and Figure 5. The most preferred park attributes were the "presence of trees", followed by "clean and well-maintained environment", and "easy access of walking path". The attributes that park users preferred the least were the perception of the "lack of maintenance", followed by the "dangerous walking path" and the "negative perception of safety".

Table 3: Average QNPC Scores of Variable

Variables	Criteria	Sek. 12/16	Sek. 14/4	Sek. 14/28	Sek. 19/15	SS 1/21	SS 3/14	Average Score
Obstacles (O)	Safety	**84**	76	72	**84**	**92**	68	79
General Maintenance (GM)	Attractiveness	68	**84**	68	**92**	68	68	75
Play Areas (PA)	Accessibility	60	68	64	**84**	**84**	76	73
Sports (SP)	Functionality	56	60	64	**84**	**92**	68	71
Walking Path (WP)	Accessibility	60	76	72	76	76	52	69
Boundary (B)	Safety	64	72	60	**80**	72	60	68
Vegetation (V)	Attractiveness and Functionality	71	75	52	79	64	63	67
Furniture (F)	Accessibility	68	76	60	60	68	44	63
General Naturalness (GN)	Attractiveness	60	68	44	64	60	48	57
Seating (S)	Functionality	64	66	44	60	56	48	56
Shelter/Shade (SS)	Accessibility and Attractiveness	64	66	44	60	56	48	56
Lighting (L)	Safety	44	40	40	56	48	40	45
	Legend		High-Quality		Medium-Quality		Low-Quality	

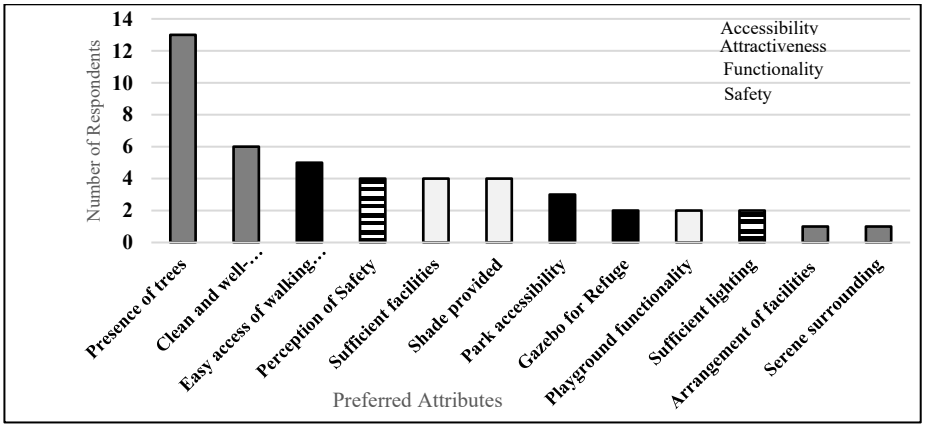

Figure 4: The attributes that park users preferred with the characteristics of quality (Accessibility, Attractiveness, Functionality and Safety)

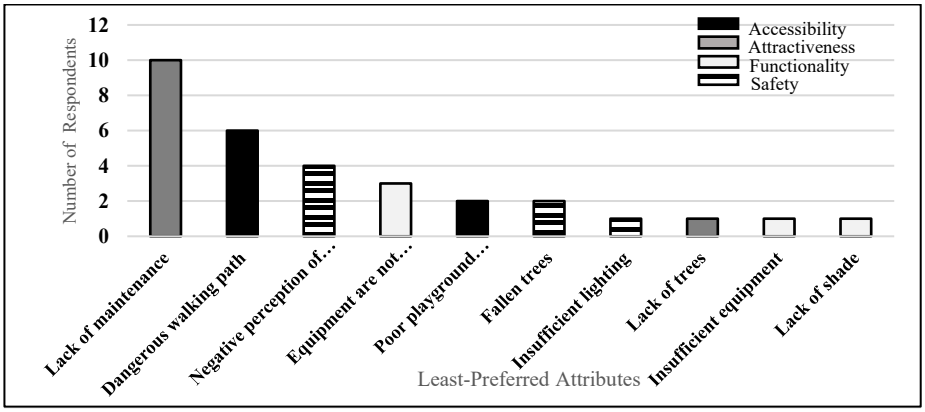

Figure 5. The least preferred park attributes by users with the characteristics of quality (Accessibility, Attractiveness, Functionality and Safety)

DISCUSSION

This study aims to measure quality based on four pre-requisite criteria (Accessibility, Attractiveness, Functionality, and Safety) to draw on variables that should be given attention and identify the weak variables that need improvement. There have been several noteworthy findings from this regarding the quality of SUGS.

Quality of Neighbourhood Parks based on Expert-Based Judgment

The findings show that experts perceive that SUGS does not meet high-quality standards. Although one of the selected parks*, Seksyen* 19/15 park, obtained the highest score for the overall quality. We used this park as an ideal space to identify successful features that contributed to its high rating of quality. First, the

criteria that obtained the highest score for the quality measure in *Seksyen* 19/15 park was Functionality and Safety. The variable to measure Functionality, *Sports Facilities,* was rated high-quality for *Seksyen* 19/15 park. This park provided space for a basketball court and various equipment suitable for users of various age groups; this shows that SUGS that offers active recreation opportunities contributes to a good quality park. The findings are in line with a study by Cohen et al. (2014), which found that parks in residential areas that are equipped with various facilities promote physical activity where park use is determined by the presence of basketball courts, tennis courts, and exercise facilities.

On the other hand, the variables *Boundary* and *Obstacle* used to measure Safety criteria were rated high-quality for *Seksyen* 19/15 park. These two variables were drawn from the Safe Community Principles by Luymes and Tamminga (1995), where variable B refers to the ability to see others in the space visibly. While the variable O refers to the visibility by others, which is the ability to be seen when within the space, which could invoke a sense of Safety. The high-quality rating for variable O reflects experts' perception that the space does not have any perceived obstruction of view. Thus, it is essential to avoid placing any components in SUGS that block users from looking around the space. As stated by Hadavi, Kaplan, and Hunter (2018), any perceived barriers in green spaces create a safety concern due to a negative association of it by park users. Next, Variable B's high-quality rating shows that a distinct boundary is a crucial component to determine the quality of SUGS. A distinct boundary or a well-defined area is vital for SUGS as separation from the surrounding space (Nordh et al., 2009; Peschardt et al., 2012). Thus, designing parks with access mechanisms through property controls such as the barriers can regulate entry, which is a crime prevention feature (Iqbal & Ceccato, 2016).

To identify factors that should be improved; we also looked at the parks with the lowest ratings to learn from features that require improvement in these SUGS. The parks that obtained an overall low quality were *Seksyen* 14/28 and SS 3/14 park. Both of these parks obtained a low-quality rating for the variables *General Naturalness* (GN), *Seating* (S), *Shelter/Shade* (SS), and *Lighting* (L) by experts. Firstly, S variable as a measure for the functionality criteria shows SUGS with poor seating arrangement, and even the lack of seating reflects a low-quality space. Benches are essential features in SUGS, where studies by Nordh et al. (2009) and Peschardt and Stigsdotter (2013) found that benches draw attention to SUGS because they give the space a sense of "refuge."

Moreover, apart from providing benches, Peschardt and Stigsdotter (2014) mentioned that the placement should also be given importance where benches should provide a visual view that should not be directed to disturbing surroundings. These parks obtained a low-quality rating for the SS variable, which is the variable for attractiveness and accessibility criteria. The low-quality rating is a distinctive feature that these two parks did not provide, a gazebo or a

shaded area for rainy days. In Malaysia's tropical climate (hot and humid with rain throughout the year), a place of refuge is an essential provision in a green space. SUGS should provide a shaded area to create a rest and restitution space for the park users (Peschardt & Stigsdotter, 2014).

Moreover, green spaces need to have natural features present than built features. Hence, the GN variable's low-quality rating reflects that experts perceived them to have a poor ratio of natural features to built features. The L variable for all the parks obtained a low-quality rating. The parks were perceived to have poor quality because of the insufficiency of lighting provided. A study by Ngesan, Karim, and Zubir (2012) stated that the presence of artificial lights positioned strategically provides visibility and protection and is vital to increase night-time use for leisure and recreational activities.

Perception of Park Users on Small Urban Green Space Design and Features

Results showed that park users' most preferred attribute in SUGS was the "presence of trees". A study by (Malek & Nashar, 2018) reported similar findings on their green space design in Malaysian parks, where the author found that "nature appreciation" is the most valued feature. Meanwhile, Nordh et al. (2009) elaborated that users prefer the presence of natural features in SUGS because they give a sense of mental restoration, a sense of recovery from mental fatigue. One of the park users also mentioned that trees are suitable for shade, but placing trees in the wrong place can create a sense of insecurity in the space. Additionally, "a clean and well-maintained environment" was an attribute preferred by users, while the least preferred park attribute was "the lack of maintenance" in the parks. A study by Danis et al. (2014) stated that trash and general uncleanliness reduce aesthetic quality and deter use. Maintenance refers to the fallen dried vegetation around the park. People interpret well-maintained lawns in green spaces as a sign of care that makes the place looks safer (Akpinar, 2016). Although this factor relates more to social factors and management than the design or facilities, it is still essential in representing the space's attractiveness.

Park users also prefer easy Accessibility of the walking path. Pathways accessible and connected will draw a large number of users (Zhai & Baran, 2016). Although "dangerous walking path" was highlighted as one of the least preferred attributes, users added that the walking path is not safe for elderly people due to its uneven surfaces, and at times, after it rains, the path becomes slippery. Zhai and Baran (2017) found that pathways with smooth pavement fit seniors with limited movement the most, where brick or plastic pavements attract more senior users while uneven ones deter use.

Users in some of the selected parks mentioned that "negative perception of safety" was the least preferred attribute in the SUGS; this shows that perception of Safety is one of the main determining factors of park use. Perceived Safety is how safe people perceive a place is or the feelings of Safety it invokes, where it

can be affected by factors such as the lighting and views of other users (Bakar et al., 2016). Perceived Safety can be affected by various factors such as the placement of trees, lighting for park usage at night and a well-defined boundary. (Malek & Nashar, 2018) elaborated that too many trees can reduce a user's visual link, which creates a sense of enclosure. Meanwhile, Iqbal and Ceccato (2016) explained that perceived safety is reflected in physical design for users to navigate through space with features such as proper barriers, enclosures, and entry points.

RECOMMENDATIONS AND CONCLUSIONS

The findings of this study contributed to an improved understanding of the perceived quality of SUGS. Each park is different and unique; thus, it is a challenge to create one standard that could assess the quality of design and facilities in all SUGS. SUGS in Malaysia is often designed to conform to a standard where its quality can be easily overlooked or neglected. Based on the expert evaluation findings, scores showed that most of the SUGS in PJ fell within a medium or low overall quality. Park users stressed on the Accessibility of the walking path and maintenance. This study recommends that the managers (i.e. local authority) and designers of SUGS provide quality in terms of better Accessibility to its features, such as the walking path and play area. Next, the attractiveness of the park should be improved with better planning on vegetation density and location.

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USERS' PREFERENCES ON THE PROVISION OF FACILITIES FOR MASS RAPID TRANSIT SUNGAI BULOH – SUBANG – PUTRAJAYA LINE (MRT2) STATIONS

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Abstract

National Transport Policy (2019-2030) strives to improve the transportation sector towards a conducive and competitive sector while fulfils the demands of people. The new development of Mass Rapid Transit (MRT2) Sungai Buloh – Subang – Putrajaya Line is expected to complete in 2022 and would benefit 529,000 users. This paper analyses the preferences of users on the facility provision at mass rapid transit stations in the local context. This paper was based on secondary and primary data sources such as official documents, websites and data collected for the Integrated MRT2 Land Use Masterplan. Document analysis method was employed to review official sources from public transport providers across selected benchmarked countries. Six categories of facility at mass rapid transit stations were evaluated using 40 criteria. Results suggested improvements are needed in barrier-free considerations and convenient facilities. Statistical analyses, involving descriptive and inferential analyses, were conducted. The results show that gender and travel time to station influenced users' preferences on facilities needed at stations. This paper suggests that certain criteria of facilities must be considered based on universal needs of the population to encourage usage of MRT2 as public transport as well as to provide convenient travel experiences.

***Keywords**:* MRT2, mass rapid transit station, public facility, perception study

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INTRODUCTION

The development of mass rapid transit in cities is expected to improve the economic state of urban areas in terms of productivity, social and quality of life. Mass Rapid Transit (MRT) development is aimed to encourage the use of public transport and to reduce dependence on private vehicles, hence will minimise environmental pollution (Basagaña, Triguero-Mas, Agis, Pérez, Reche, Alastuey, & Querol, 2018; Gao, Yu, Wang, & Vejre, 2019). MRT also allows adjacent cities and towns to benefit from urban agglomeration that offers exchange of knowledge, services and manpower. Additionally, it helps to boost the services sector such as logistics, education, health, tourism, industry and agriculture.

As the growth of Kuala Lumpur conurbation expands, Klang Valley's challenges are to provide sustainable transport infrastructure and public transport facilities. Arterial roads in cities are unable to accommodate the high number of vehicles, particularly during peak hours. Traffic congestion and poor public transport network will affect the transportation system between urban and suburban region. Studies have found that daily commuters with health issues prefer to use public transport, however on average, private vehicle users are willing to pay more for cars rather than to rely on public transport (Bazrbachi, Sidique, Shamsudin, Radam, Kaffashi, & Adam, 2017). Other studies have shown that price changes for car fuel and public transport fares did not inclusively affect commuting behaviours (Abdulrazzaq, Abdulkareem, Yazid, Borhan, & Mahdi, 2020). Additionally, deficiency of facilities at public transport stations and the difficulty of access between commuters' origins and destinations using public transport also influence commuters' decisions to commute using private vehicles (Yusoff, Safian, Bilal, & Yassin, 2019).

RESEARCH BACKGROUND

There are multiple terminologies used referring to the rapid transit system across the globe. American Public Transit Association (1994, p.23) defines heavy rail as "an electric railway with the capacity for a 'heavy volume' of traffic and characterized by exclusive rights-of-way, multi-car trains, high speed and rapid acceleration, sophisticated signalling and high platform loading. Also known as 'rapid rail', 'subway', elevated railway' or 'metropolitan railway'. Table 1 shows the overview of rapid transit providers for MRT SBK Line, Taipei MRT, Osaka Metro, Sydney Metro and London Underground.

Table 1: Overview of Rapid Transit Providers in Local and Global Context

	Malaysia	**Taiwan**	**Japan**	**Australia**	**UK**
Provider	MRT Corp.	Taipei Rapid Transit Corp.	Osaka Metro Corp. Ltd.	Metro Trains Sydney	London Underground Ltd.
Area	Sg. Buloh – Kajang (SBK), Klang Valley	Taipei Metropolitan	Osaka Metropolitan	Sydney Metro City & Southwest	Greater London, Buckingham shire, Essex & Hertfordshire
Track length	52.2km	152.9km	129.9km	66km	402km
No. of station	31 station	108 station	133 station	31 station	270 station
Daily ridership	175,213	2,163,000	2,452,000	37,909	5,000,000
Operation year	2017	1996	1933	2019	1863

Source: Prasarana Malaysia Berhad (2019); Kadir, Mohamad, Olabayonle, Zahari, Bachok, & Osman, (2020); Taipei Rapid Transit Corporation (2019); Osaka Municipal Transportation Bureau (2017); Transport Performance and Analytics (TPA) (2019); Transport for London (2021); Office of Rail and Road (2020)

On 16th December 2016, Mass Rapid Transit (MRT) Sungai Buloh – Kajang Line or also introduced as MRT1 Kajang Line is officially operating in Malaysia spanning across 31 stations between Sungai Buloh and Kajang, and recorded an average daily ridership of 175,213 riders. MRT Sungai Buloh – Serdang – Putrajaya Line or MRT2 Putrajaya Line is the second of the three planned MRT routes by MRT Corporation after MRT1 Kajang Line. While the MRT2 Putrajaya Line is under construction, this paper aims to determine the facilities needed at the new stations based on analysis on users' preferences and current provision of facilities at MRT1 Kajang Line.

MRT2 Putrajaya Line is part of the development of inclusive metro rail transportation system focuses to expand the networks in densely populated and developed areas, and to reduce the dependence on private vehicles (Mass Rapid Transit Corporation, 2017). The development of MRT2 Putrajaya Line is planned along a 52.2km route that includes 38.7km elevated track and 13.5km underground track. This line has 36 stations with three committed stations, out of which 25 will be elevated stations and 11 will be underground stations. The line spans across five local authorities (LA) that are Petaling Jaya Municipal Council (MBPJ), Kuala Lumpur City Hall (DBKL), Subang Jaya City Council (MBSJ), Sepang Municipal Council (MPSp), Perbadanan Putrajaya (PPj). One LA that is Selayang Municipal Council (MPS) is located within the Zone of Influence (ZOI) of MRT2 Putrajaya Line development. There are 4 stations in MPBJ area, 21 stations in DBKL area, 7 stations in MPSJ area, 3 stations in MPSp area and 1 station in PPj area.

The development of complete and well-circulated train stations is among the main criteria of efficient operation of the transport system. They ensure passengers' convenience and safe travel (Yusoff et. al, 2019; Bachok, 2010). Scholars have found that improving the level of service (Ramos, Vicente, Passos, Costa, & Reis, 2019) and facilities of stations (Susanti, Soemitro, & Suprayitno, 2019) can engage daily commuters to utilise urban railway service. Furthermore, constantly maintained and occasionally upgraded stations can also encourage commuters to shift from driving to transits (Khattak, Jiang, Zhu, & Hu, 2017). Meanwhile, Loukaitou-Sideris and Peters (2017) suggest that station spatial connectivity (pedestrian connections, wayfinding strategies & outdoor-indoor communal space), intermodal connectivity (interchange transport terminal, bike parking & storage lockers) and operational connectivity (coordination among agencies and public transport providers) are other key factors of a successful transport system.

Perception plays a great role in determining travellers' motivation and confidence to visit an area (Khan, Chelliah, & Ahmed, 2017). Negative perception of certain attributes such as risks, safety and constraints could deter an individual from visiting a particular place. To form a perception, an individual will collect, choose, arrange and transmit information regarding the place (Bachok, Osman, Khalid, & Ibrahim, 2013). Furthermore, Kadir et al. (2020) added that other important aspects that describe perception are satisfaction, expectation and experience of an individual. Thus, perception evaluation is a great tool that can be employed to assist service providers in identifying the relevant services or products to provide or the quality of those services and products being provided (Tukamushaba, Xiao, & Ladkin, 2016).

RESEARCH METHODOLOGY

This paper analyses secondary and primary data from multiple documents and perception questionnaire survey from a study for MRT2 Putrajaya Line Land Use Masterplan using multiple methods of document analysis, descriptive analysis and inferential analysis. Document analysis is the interpretation information from written documents or materials related to a subject matter (Ay & Zeynep, 2019). To conduct the document analysis, several official documents and information were gathered from public transportation providers particularly for mass rapid transit from Malaysia, Taiwan, Japan, Australia and the United Kingdom. The documents were reviewed using inductive approach where six themes or categories were generated throughout the process. From the data collected, the correlation between selected countries and facility categories were tabulated. Additionally, multiple descriptive and inferential analyses were also undertaken using the primary data from the questionnaire survey which was conducted among the potential users of MRT2 Putrajaya Line.

FINDINGS AND DISCUSSION

This section discusses the results from the document analysis on facilities at MRT stations in the global and local context, as well as the results from the primary data analyses.

Evaluation of Mass Rapid Transit Stations Facilities

The discussion begins with the comparative method employed to identify and categorise the facilities provided at rapid transit stations for MRT1 Sungai Buloh-Kajang Line (Malaysia), Taipei Metro (Taiwan), Osaka Metro (Japan), Sydney Metro (Australia) and London Underground (United Kingdom).

Table 2: Criteria Matrix Table

Category	No.	Criteria	Malaysia	Taiwan	Japan	Australia	UK
Safety and security	1	Platform screen doors	x	o	o	o	o
	2	CCTV surveillance	o	o	o	o	o
	3	Emergency intercoms	o	o	o	o	o
	4	Good lighting	o	o	o	o	o
	5	Handy safety guide	x	x	o	x	x
	6	Automatic external defibrillators (AEDs)	x	o	o	x	o
	7	Disaster prevention monitoring	x	x	o	x	x
	8	CPTED pedestrian infrastructure	o	o	o	o	o
Information	9	Wayfinding signage	o	o	o	o	o
	10	Sound broadcast	o	o	o	o	o
Barrier-free facility	11	Ticket gate	o	o	o	o	o
	12	Tactile for visually impaired	o	o	o	o	o
	13	Guidance system	o	o	o	o	o
	14	Vertical transport	o	o	o	o	o
	15	Ticket machine/counter	o	o	o	o	o
	16	Toilet	o	o	o	o	o
	17	Rail ramp	x	o	o	o	o
	18	Taxi service for PWD	x	o	x	o	o
	19	Hearing loop system	x	x	x	o	o
	20	Accessible-friendly handrail	x	o	o	o	o
	21	Audio announcement	o	o	o	o	o
	22	Wheelchair rental	x	o	o	x	x
Convenient facility	23	Worship facility	o	x	x	x	x
	24	Public toilet	o	o	o	o	o
	25	Children toilet facility	x	o	o	o	o
	26	Baby care room	x	o	o	x	x
	27	Storage locker	x	o	o	o	x

	28	Refreshment facility	o	o	o	o	o
	29	Shaded waiting area/meeting point	o	o	o	o	o
Accessibility	30	Park N Ride	o	o	o	o	o
	31	Transport interchange	o	o	o	o	o
	32	Pedestrian infrastructure	o	o	o	o	o
	33	Bicycle parking	o	o	o	o	o
	34	Bicycle storage	x	x	x	o	o
	35	Bicycle hire service	x	o	o	o	o
	36	Car parking	o	o	o	o	o
	37	Bicycle infrastructure	o	o	o	o	o
	38	Taxi stand and drop-off point	o	o	o	o	o
General service	39	Lost property office	x	o	o	o	o
	40	Free Wi-Fi	x	o	x	x	o

Source: Document analysis from multiple documents (various years)

As shown in Table 2, 40 criteria were identified under six facility categories namely Safety and Security, Information, Barrier-free Facility, Convenient Facility, Accessibility and General Service. It was found that under Safety and Security category, all selected service providers operate stations equipped with CCTV surveillance, emergency intercoms, and good lighting as well as adopted CPTED principles in the design of pedestrian infrastructure. In addition, it can be seen that safety and security received greater attention in Osaka Metro stations where handy safety guide was provided and disaster prevention monitoring system was put in place. The extra precautions maybe due to the geographical location factor of the country where the likelihood for an earthquake to happen is great.

Information and Accessibility facilities are also well-provided at the at the stations operated by the service providers. These include signage, public broadcast, park and ride, transport interchange, and bicycle and pedestrian infrastructure.

Facilities related to Barrier-free category are also comprehensively provided by majority of the service providers. However, for stations under the the MRT1 Kajang Line, further improvement is required especially with regard to the provision of handrail, taxi service for person-with-disability (PWD), hearing loop system and wheelchair rental.

Similarly, stations under MRT1 Kajang Line also lacking in terms of Convenient facilities, where children toilet facility, baby care room and storage locker are not provided on site. However, these stations offer worship facility (prayer room) while others do not.

Users' Perception of Facilities Needed at MRT2 Sungai Buloh – Subang – Putrajaya Line Stations

To obtain first hand perception of facilities needed for the MRT2 Putrajaya Line stations, a total of 580 potential users were surveyed, of which 53.4% were males and 46.6% were females (Table 3). 92.9% of the respondents agreed that they would potentially use the MRT2 Putrajaya Line stations once the line is up and running.

Table 3: Cross-tabulation between potential to use MRT2 with gender

Potential to use	Male		Female		Total	
MRT2	**F**	**%**	**F**	**%**	**F**	**%**
Yes/Maybe	288	93.5%	251	92.3%	**539**	**92.9%**
No	20	6.5%	21	7.7%	**41**	**7.1%**
Total	**308**	**100.0**	**272**	**100.0**	**580**	**100**

Source: Author's calculation based on perception study for Integrated MRT2 Land Use Masterplan (2020)

In terms of travel time, majority of the respondents (79.9%) will require less than 30 minutes to arrive at the stations from their origins (Table 4). Out of this, 40.2% of respondents will take less than 15 minutes to arrive at MRT2 Putrajaya Line stations from their origin and 39.7% will take between 15 to 30 minutes. Students (47.62%) and visitors (40.9%) made up the highest group with travel time to stations less than 15 minutes. Meanwhile, the group that will require 15 to 30 minutes travel time is dominated by employees (40.7%), and entrepreneur and traders (40.7%).

Table 4: Cross-tabulation between travel time to arrive to station by group

Travel time	Entrepreneur & Traders		Employee		Visitor		Student		Total	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
< 15 mins	52	38.5	92	39.8	79	40.9	10	47.62	**233**	**40.2**
15 - 30 mins	55	40.7	94	40.7	73	37.8	8	38.10	**230**	**39.7**
31 - 45 mins	18	13.3	30	13.0	22	11.4	3	14.29	**73**	**12.6**
46 - 60 mins	6	4.4	13	5.6	9	4.7	0	0.00	**28**	**4.8**
61 - 90 mins	0	0.0	0	0.0	1	0.5	0	0.00	**1**	**0.2**
> 90 mins	4	3.0	2	0.9	9	4.7	0	0.00	**15**	**2.6**
Total	**135**	**100.0**	**231**	**100.0**	**193**	**100.0**	**21**	**100**	**580**	**100.0**

Source: Perception study for Integrated MRT2 Land Use Masterplan (2020)

Table 6 shows that most preferred 'outside station' facilities were car and motorcycle parking (91.9%), shaded bus stop for intermediate-bus service (77.4%) and shaded pedestrian walkway (73.0%). Meanwhile, Table 8 shows most preferred 'inside station' facilities were CCTV surveillance (93.3%), toilet

(84.4%) and vertical transport (80.8%). 63.4% of respondents also suggested that barrier-free must be provided as part of the facilities needed inside station. This is in line with the earlier findings that improvements are required for MRT stations in Malaysia with regard to barrier-free facilities.

Table 5: Hypothesis of Chi-square test on perceptions of facilities needed outside station with gender and travel time to arrive station

Decision	Statement
H_0	Respondent's gender and travel time have no effect on their perceptions of facilities needed outside station
H_1	Respondent's gender and travel time have positive effect on their perceptions of facilities needed outside station

Table 6: Chi-square test between perceptions of facilities needed outside station with gender and travel time to arrive station

Facility needed outside station	Gender			Travel time to station		
	Value	p-value	%	Value	p-value	%
1. Car and motorcycle parking	47.044	0.000	0.0	**0.207**	**0.147**	**0.0**
2. Bicycle parking	341.733	0.000	0.0	340.506	0.000	0.0
3. Shaded bus stop for intermediate-bus service	34.177	0.000	0.0	11.694	0.000	0.0
4. Taxi and e-hailing service parking	117.265	0.000	0.0	106.503	0.000	0.0
5. Wayfinding and signage	50.941	0.000	0.0	38.414	0.000	0.0
6. Shaded pedestrian walkway	48.022	0.000	0.0	18.996	0.000	0.0
7. Space for food vendors	171.943	0.000	0.0	167.128	0.000	0.0
8. Food vendors and motorcycle parking away from entrance	293.603	0.000	0.0	289.333	0.000	0.0
9. Shaded waiting, meeting and resting area	90.554	0.000	0.0	79.662	0.000	0.0
10. Area for cultural activities	279.334	0.000	0.0	277.585	0.000	0.0

Note: % = % cell with count less than 5; for result to be valid, the % must not be more than 20%
Source: Author's calculation based on perception study for Integrated MRT2 Land Use Masterplan (2020)

Inferential tests were run for facilities needed outside and inside station by using Chi-square test against gender and travel time to station. In Table 6, all tested p-value for respondents' perceptions on facility needed outside station were less than 0.05 that stipulates the H_0 can be rejected. Therefore, it can be concluded from Table 5 that respondents' gender influences their preferences for facility needed outside station.

The result of Chi-square for facility needed outside station and travel time to station shows that one tested p-value for car and motorcycle parking is more than 0.05 (Table 6). This indicates H_0 cannot be rejected. Nevertheless, the

other p-values for facility needed outside station with travel time to station were less than 0.05, thus H_0 can be rejected. In other words, this result shows that respondents' travel time to station influence their perceptions of facility needed outside station, except for car and motorcycle parking (0.147).

Table 7: Hypothesis of Chi-square test on perceptions of facilities needed inside station with gender and travel time to arrive station

Decision	Statement
H_0	Respondent's gender and travel time have no effect on their perceptions of facilities needed inside station
H_1	Respondent's gender and travel time have positive effect on their perceptions of facilities needed inside station

Table 8: Chi-square test between perceptions on facilities needed inside station with gender and travel time to arrive station

Facility needed inside station	Gender			Travel time to station		
	Value	p-value	%	Value	p-value	%
1. Maintained and cleaned station	30.936	0.000	0.0	0.498	0.024	0.0
2. Seating area	48.837	0.000	0.0	23.985	0.000	0.0
3. Wayfinding and signage	49.060	0.000	0.0	29.546	0.000	0.0
4. Toilet facility	31.023	0.000	0.0	0.621	0.012	0.0
5. Barrier-free considerations	42.299	0.000	0.0	15.990	0.000	0.0
6. Refreshment facility	164.651	0.000	0.0	158.608	0.000	0.0
7. CCTV surveillance	42.760	0.000	0.0	0.398	0.044	0.0
8. Vertical transport	32.269	0.000	0.0	4.469	0.000	0.0
9. Emergency intercom	117.164	0.000	0.0	111.527	0.000	0.0

Note: % = % cell with count less than 5; for result to be valid, the % must not be more than 20%
Source: Author's calculation based on perception study for Integrated MRT2 Land Use Masterplan (2020)

The Chi-square test shows for facilities inside station returns p-value of less than 0.05 for all relationships (Table 8). Referring to Table 7, null hypothesis is rejected, thus this indicates that respondents' gender and travel time to station influence their perceptions of facility needed inside station.

RECOMMENDATIONS AND CONCLUSION

This paper has identified the provision of facilities at MRT stations across selected countries and evaluated users' perceptions of facilities needed at MRT2 Putrajaya Line stations. The findings show that MRT stations in Malaysia can be improved in terms of Barrier-free and Convenient facilities. Comparative analysis shows that local stations experience deficiencies in the provision of rail ramp, taxi service for PWD, hearing loop system, accessible-friendly handrail and wheelchair rental. Similarly, children toilet, baby care room and storage locker

are also not provided. Current MRT stations in Malaysia also lack platform screen doors, bicycle storage and hire services, and lost property office.

In terms of perceptions, Chi-test square results showed respondents' gender and travel time influence their perceptions of facility needed outside station, except for car and motorcycle parking facilities. Therefore, to cater the gender preference, concerns on safety and security measure such as CCTV surveillance and separated pedestrian walkway should be emphasised. Design of stations and facilities inside and outside of the stations must also reduce the safety risks to users, especially female users. In terms of travel time, provision of refreshment facilities, waiting and meeting area should be considered.

In conclusion, this paper has provided insights on the criteria of the facilities to be improved and factors to be considered upon in determining the type of facilities to be provided at MRT2 Putrajaya Line stations. The findings from this study can be implemented in order to encourage travellers to opt for MRT2 Putrajaya Line as the main mode of transport other than providing convenience to the travellers. It is recommended that future research further identify MRT2 Putrajaya Line group of users and their travel purpose to best facilitate travellers' need with particular facilities at MRT2 Putrajaya Line stations.

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ASSESSING MRT FEEDER BUS SERVICES PERFORMANCE THROUGH PASSENGER'S SATISFACTION LEVEL IN THE SELECTED STATIONS OF KLANG VALLEY, MALAYSIA

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Abstract

Resultant impacts of mobility increase within the *Klang Valley*, for example, congestion, parking problem and air pollution have highlighted the reason for a move towards the use of more sustainable transport modes within the cities. Hence the need for effective and reliable public transport. It is perceived that Mass Rapid Transit (MRT) feeder buses hold the guarantee of easing the growing congestion in *Klang Valley* if they are managed efficiently and sustainably. For this reason, this research expands the exploration of the MRT feeder bus services quality by evaluating the passengers' level of satisfaction. A quantitative approach was employed for this study by administration of the questionnaire. A total of 303 survey forms were collected through convenience sampling. The study's findings confirmed the efficiency and effectiveness of services provision. Surveys showed that most riders (62.7%) were females with the majority possessing a bachelor's degree and above (64.4%). Also, a large proportion of the riders fell into the age group category between 20 and 29 years (69.0%), with less than half of the respondents earning an average monthly income of above RM 6,000 (45.9%). Most of the respondents were satisfied with the overall quality (above 80% satisfactory) but punctuality, waiting and travel times as well as services frequency of this first and last mile connection (FLM) had left a lot to be desired. The study also found significant relationships between gender and the fear of crime as well as conditions of bus stops. Thus, it recommends overall enhancement of service with safer environment for female riders and an increase in the service frequency of the MRT feeder buses to retain the existing users and attract more new users.

***Keywords**:* MRT Feeder Bus, Service quality, Passenger Satisfaction, Fairness

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INTRODUCTION

As each country's population keeps growing, the public transportation need is very high to serve all human beings moving from one location to another. In the past two decades, the number of private car dependency has highly increased as it is the most favourable mode adopted by many people across the globe, including *Klang Valley*, in Malaysia (Shaharudin et al., 2018).

The private car enables people to gain services and maintain social relationships more quickly than the other modes. However, cities depending on this mode of transport would be continuous and prolonged congestion. Cities with conventional bus services have, in turn, failed to convey many people to land uses where activities are carried out because of the limited bus service capacity. Today, the city centres' major roads are nearing their usage capacity, and the *Klang Valley*'s land scarcity issue is no longer suitable for more road development and parking facilities. Evidence of this can be seen in most places within the cities whereby many roads were fully crowded with cars parked up to the point of double and triple parking, which added more to the road congestion (Shaharudin et al., 2018). Traffic congestion within the city is increasing, and as a result, it takes even longer to arrive at one's destination (Chuen et al., 2014). Within the *Klang Valley*, limited parking space, traffic congestion and environmental pollution have become significant concerns, particularly with the high growth of motorisation in the region (Almselati, 2011). Also, the productive time lost during the congestion will eventually cost the nation its competitiveness, particularly in its critical economic corridor. The situation is becoming worrisome in *Klang Valley* while comparing higher public transport usage in cities like Singapore, Hong Kong and London, where travels using public transportation being above 60% and nearly reaching 90% (Chuen, 2014).

Hence, first and last-mile (FLM) complimentary public transport such as feeder bus is essential as one of the significant elements for the country's growth, specifically in the city centre where a high density of development filled with people dominate the central core area. The chairman of the Commission of Public and Land Transport emphasised that only 5% of Malaysians opted for public transportation to travel nationwide (Dahalan et al., 2017), meaning that, compared to private vehicles, fewer people are using public transport (Borhan et al., 2019; Ismail et al., 2012).

Thus, this study aimed at assessing the current MRT feeder bus services in selected stations of *Klang Valley*, Malaysia and offered a possible framework for efficient and sustainable feeder bus service. The study achieved this by determining the satisfaction level among the riders in the ten selected stations and analysing the factors influencing individual satisfaction level.

LITERATURE REVIEW

A transit mode must be competitive against other available transit modes for a given trip so that rider might choose the given mode as depicted in the manual (Transportation Research Board, 2002, p. 5). Areas of concerns to the travellers when deciding to ride the public transport include public transport service availability and whether the available service is convenient and comfortable. Some of the factors influencing the passengers' choices are under the transit agency's control, such as travel time, safety and security, service delivery, and maintenance. The entirety of the above-referenced, except for safety and security, relates directly to service reliability. Service deliveries mirror the daily basis aspects of how well the service meets the passengers' expectations, for example, how well the actual service corresponds to the scheduling. Likewise, the travel times and how well the actual travel times fit the timetable, just as if the travel times are planned so that the trip length is reasonable and competitive to other available modes. Service reliability on an incident basis could be put under the maintenance part, for example, if a vehicle breaks down during the service and how the transit agency manages the situation. Passenger satisfaction is a cornerstone in running a successful public transport system. The number of riders has to be sufficient for the system to be effective and economical. As recently portrayed, service reliability is connected to the passengers' reflections severally and consequently the most critical factor in passenger satisfaction (Transportation Research Board, 2013). Additionally, FLM connection is the main factor contributing to the successes of suburban and outskirt stations (Feinsod et al., 2016), where demand catchment radius tended to be wider (Guerra & Cervero, 2013). Bus-based FLM faces longer travel time especially when trapped in congestion due to the road-sharing nature of the services.

Rojo *et al*. (2015); Chocholac (2020), and *Zakiah* et al. (2017) argue passengers' satisfaction survey is a vital tool to measure the efficiency and effectiveness of any bus services which could also serve as a benchmark or an indicator for enhancing any bus service delivery efficiency and effectiveness. Similarly, Ismail et al. (2012) defines passengers' satisfaction survey as a judgement by the riders relating to the pleasant level of consumption.

Ismail et al. (2012) assert that bus quality of service and riders' level of satisfaction, prominent features are measurable by the levels of the convenience of the bus, reliability of the bus, bus condition, degree of difficulties (ingress and egress), safety and security, service information, travel time, and service frequency. Service quality lies around intangibility, heterogeneity and inseparability (Mikhaylov *et al*., 2015) and can be characterised as the degree and direction of disparity between the perception of passenger and passenger expectations (Morton *et al*., 2016). Although there is no particular specification to quantify the quality of service rendered by the bus, the attributes in passengers'

satisfaction study are considered as adequate as far as the service quality evaluation is concerned (Ismail *et al*., 2012). For a new system such as the MRT feeder services, which began in 2017, following the commencement of the rail system operation, it is essential to record the longitudinal progression of such quality. Focus on safety and security are presented in this study, as contemporary literature has also concentrated on equality and fairness issues (Hail & McQuaid, 2021; Rock et al., 2014). Whilst females travel greater distances to more varied destinations and have greater access to diversified transportation mode; public transportation design and services have been centred around a typically male-dominated environment (Priya Uteng & Turner, 2019; Peters, 2013), especially in developing cities, including *Klang Valley*. Hence, aspects of gender and safety and gender and convenience/comfort are discussed in this study.

METHODOLOGY

This present study adopted a quantitative approach. The data was acquired through a personally administered survey which otherwise known as a self-administered questionnaire, the most common tool to assess passengers' perception. Survey forms were distributed using convenience sampling at the various MRT feeder bus stations in the *Klang Valley*. The most crowded MRT stations (based on observational counts in a pilot survey) were selected for the study as the sampling frame. Due to a large population (Shaharudin *et al*., 2018) for the overall MRT feeder bus stations, some 380 riders were targeted as the sample size. However, out of 380 questionnaires distributed, only 303 (79.7%) were valid and further analysed. The remaining forms happened to be filled by those waiting at the bus stops but were non-users of the feeder bus; hence, those people were not eligible to represent the study population. The dependent variable employed in this study was the overall passengers' satisfaction with the service provided by the MRT feeder bus, categorised by the specific service quality characteristics that comprise comfort and convenience, reliability and vehicle conditions, among others service qualities. Independent variables are the socio-demographic and trip characteristics of the respondents. The data were analysed using IBM Statistical Package for Social (SPSS) software, version 24, to present the descriptive findings, such as the frequency analysis and the cross-tabulation of variables.

FINDINGS AND DISCUSSION

Demographics

The passengers' demographics were analysed. Table 2, presented gender, age group, education level, income and occupational status distributions. Table 2 shows that 62.7%, were female users. This result was comparable to the gender distribution of developed nations such as the United States of American (Clark,

2017). Some 62.7% fall into the most economically active age ranging from 20 to 29 years old. The rest were divided between the age group between 30 and 39 years (12.5%), below 20 years (12.5) and the remainder being 40 years or older (6.0%). Likewise, more than average riders were either bachelor's degree holders or higher (64.4%), while the rest were either school or college certificate holders (35.6%).

Table 2: Demographic Factors of the Passengers

Demographic Factors	Frequency	(%)
Gender		
Male	113	37.3
Female	**190**	**62.7**
Age Group		
Below 20	38	12.5
20 – 29	**209**	**69.0**
30 – 39	38	12.5
Above 40	18	6.0
Education		
School/College	108	35.6
Bachelor Degree & Higher	**195**	**64.4**
Income Group		
Below 2000	50	16.5
2000 – 3999	48	15.8
4000 – 5999	66	21.8
Above 6000	139	45.9
Occupation		
School/College/University	**148**	**48.8**
Private Sector	133	43.9
Public Sector	14	4.6
Pensioner/Retiree	2	0.7
Housewife	5	1.7
Unemployed	1	0.3

Some 45.9% riders earned average monthly income of above RM6000, 21.8% earned between RM4,000 and RM5,999, 16.5% earned below RM2,000 and 15.8% earned between RM2,000 and RM3,999. At a glance, it can be seen clearly that the high-income people chose not to ride the public transport most probably due to having ownership and access to a private vehicle. Some 48.8% of the users intercepted were students, 43.9% were working in a private sector,

4.6% were working in the public sector, 1.7% were housewives and the remainder (0.7%) were retirees.

Table 3 below revealed the passengers' level of satisfaction with the MRT feeder bus service. Most of the respondents were satisfied with the service of the MRT feeder bus services in all the factors measuring the influence on satisfaction levels. These included bus convenience level, the reliability of the bus, bus physical condition, driver behaviour or attitude, degree of difficulties in ingress and egress and bus stops assessment. The results might have been attributable to respondents being captive to buses as many falls in the category of the low-income earners (Table 2) and the MRT feeder bus service being a newly installed infrastructure. According to many studies conducted in Malaysia (Shaharrudin *et al.*, 2018; Chuen *et al*., 2014; Almselati, 2011; Borhan et al., 2019; Ismail, 2012; and Abdul Jalil *et al*., 2015), revealed a continuous increase of the private car dependency by the citizens particularly in *Klang Valley*. When compared to the developed nations such as Singapore and Australia, feeder bus services in Malaysia still needed to improve in many areas, such as the frequency of service, cleanliness and comfort while waiting for the bus at the bus station (see Figure 2a through 2e), hours of service and the reliability of service, among others, to retain the existing users and to capture the attention of the high-income earners.

Worthy of attention is the quality of bus reliability such as departure and arrival times, travel time and services frequency receiving higher dissatisfactory responses (32.0% to 35.4%) compared to variables of other bus quality in the assessment. In *Klang Valley*, bus-based FLM shared the road space with other users and the former were very susceptible to congestion, incidents and accidents, resulting in unreliability, delay and longer overall travel time. This raised a concern over the effectiveness MRT stations which catchment depended on road-based FLM. A strong feeder is needed to support the rail system to ensure the success of Transit Oriented Development implementation. In the long run, low quality FLM services would not be able to commensurate the more efficient rail-based MRT system, which would jeopardise the hub and spoke system and targeted modal split of 40:60 *Klang Valley*. Improvement of the feeder system is, therefore, essential to realise various transportation objectives in the city.

Table 3: Passengers Level of Satisfaction with the MRT Feeder Bus Service

Element	Scale of Measurement			
	Very Dissatisfied %	Dissatisfied %	Satisfied %	Very Satisfied %
Bus Convenience				
Information and guidance	1.0	8.3	58.1	32.7
Ease of boarding or alighting bus	1.0	4.6	57.4	37.0
Seats Availability	3.0	5.9	58.7	32.3

Seat Comfort	2.0	7.3	61.1	29.7
Crowdedness	3.0	6.6	60.4	30.0
Air Conditioning	1.7	4.0	59.4	35.0
Cleanliness	2.6	5.3	58.1	34.0
Physical Condition	1.3	4.0	61.7	33.0
Other Bus Users Behaviour	1.0	6.6	60.4	32.0
Vehicle Breakdown	1.3	4.3	58.7	35.6
Reliability of the Bus				
Bus arrives on time	**8.9**	**26.4**	48.8	15.8
Bus departs on time	**11.2**	**22.8**	50.5	15.5
Travel Time	**8.3**	**24.1**	54.5	13.2
Service Frequency	**5.6**	**26.4**	49.5	18.5
Safety while onboard	0.7	9.9	64.0	25.4
Bus Condition				
Appearance of the Bus	1.0	5.0	44.9	49.2
Storage Availability in the Bus	1.3	7.6	42.9	48.2
Provision and Visibility of Handrails	1.0	3.6	49.2	46.2
Shape or diameter of Handrails	0.7	5.0	62.4	32.0
Passenger Injured due to the Handrails	1.0	5.3	60.1	33.7
Bus Spaciousness	1.0	5.0	45.2	48.8
Driver Behaviour/Attitude				
Physical Appearance of the Driver	0.7	6.3	63.0	30.0
Helpfulness of the Driver	1.3	8.6	58.1	32.0
Improper Bus Parking	1.3	4.6	65.3	28.7
Degree of Difficulties in Ingress and Egress of the Bus Passenger				
The gap between kerb and bus is wide	1.0	5.6	52.8	40.6
Steps are too high or otherwise	1.0	4.6	52.5	41.9
Kerb Level Vary with the Bus Level	0.7	5.6	51.2	42.6
Comfort Level of handrails	1.0	3.6	50.8	44.6
Handrail Access during Ingress/Egress	0.7	4.3	54.1	40.9
Preference mode of Ingress/Egress	1.0	4.3	52.8	41.9
Ease of Carrying bags while Ingress/Egress	0.7	4.0	53.5	41.9
Possibilities of Stumbling on moving Buses	1.3	5.9	50.2	42.6
Bus Stops Assessment				
Bus Stop Cleanliness	0.7	7.3	51.8	40.3
Information prior to travel, during and after alighting	1.0	7.6	53.8	37.6
Bus Stop distance from final destination	1.0	5.9	53.5	39.6
Fear of crime at the bus stop	1.7	6.9	53.1	38.3
Shelter provision at the bus stop	1.7	5.6	53.1	39.6
Seat comfort	2.0	5.9	53.1	38.9
Condition of the bus stop	1.3	5.9	52.1	40.6
Routes map at the bus stop	2.0	6.9	51.8	39.3
Distance to the bus stop	1.3	5.0	53.5	40.3

Figure 2a: MRT Feeder Bus Stop at Pusat Bandar Damansara

Figure 2b: MRT Feeder Bus Stop at Pusat Bandar Damansara

Figure 2c: MRT Feeder Bus Stop at Kota Damansara Pintu B

Figure 2d: Riders waiting for the Bus at MRT Feeder Bus Stop at Phileo Damansara

Figure 2e: Riders waiting for the Bus at MRT Feeder Bus Stop at Phileo Damansara

Discussion on gender-specific service provision in public transportation has been on the rise (Ceccato, 2017; Ceccato & Loukaitou-Sideris, 2020). In assessing this, the study further analysed the bus service quality related to gender-specific issues. Table 4 below shows the relationship between gender and the fear of crime at the respective selected MRT feeder bus station. Only 4.3% of the female were dissatisfied with the safety at the MRT feeder bus stations. Another 34.0% and 24.4% of the female satisfied and very satisfied with their safety. Whereas 1.7% of their male counterpart were very dissatisfied, 2.6% dissatisfied, 19.1% and 13.9% were satisfied and very satisfied. From this result, it can be deduced that the overall safety concern at the respective bus stations was generally accepted as the majority were satisfied with their respective safety quality. However, in-depth statistical tests demonstrated the disparity in perception between the two genders.

Hypotheses Testing

Various chi-square tests have been carried out on the hypotheses relating to socio-demographics and feeder buses quality perception. Two tests have produced significant results differentiating gender in the perception and of safety and security: fear of crime and bus stops' conditions. Tables below depict the results.

Hypothesis 1

H_0: There is no significant relationship between gender and the fear of crime at the MRT feeder bus stops.

H_1: There is a significant relationship between gender and the fear of crime at the MRT feeder bus stops.

Table 4: Gender against Fear of Crime at the Bus Stop

Respondent Gender		Fear of crime waiting at the bus stop				
		Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied	Total
Female	Count	0	13	103	74	190
	% of Total	0.0%	4.3%	34.0%	24.4%	62.7%
Male	Count	5	8	58	42	113
	% of Total	1.7%	2.6%	19.1%	13.9%	37.3%

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.582[a]	3	.035
Likelihood Ratio	10.039	3	.018
Linear-by-Linear Association	1.898	1	.168
N of Valid Cases	303		

The chi-square test showed a ρ-value of 0.035, which was less than 0.05. Therefore, the rejection of the null hypothesis was valid and alternative hypothesis was accepted. In other words, there was a significant relationship between gender and the fear of crime at the MRT feeder bus stops. According to Ceccato (2017), if public transport is not safe, women's mobility is impaired. Though women are most often the target of these behaviours but are not the only victims, it cut across the gender. Many studies have revealed evidence that all gender are often victims of violence and sexual harassment in Portugal (Ceccato, 2017). Hence, it calls for a holistic approach to safety, including understanding the intersectionality of victimisation and fear. Thus, the notion that fear and victimisation are not only influenced by gender but are instead a result of the intersection of an individual's characteristics (Ceccato & Loukaitou-Sideris, 2020). Several transport systems in Jakarta, New Delhi and even the *KTM Komuter* system of *Klang Valley* have segregated facilities for female users such as ladies-only front section of the buses and ladies-only rail coaches.

Hypothesis 2

H_0: There is no significant relationship between gender and the bus stops condition perception.
H_1: There is a significant relationship between gender and the bus stops condition perception.

Table 5 indicates the relationship between gender and the condition of the bus stop. Out of the total 303 samples, very few of them were dissatisfied with a bus stop condition. Some 3.3% of females were dissatisfied, while 1.3% and 2.6% of the male riders were very dissatisfied and dissatisfied. However, 35.5% and 24.4% of the female were satisfied and very satisfied respectively with bus stop conditions. Likewise, 17.2% and 16.2% of male riders were too (respectively).

Table 5: Relationship between Gender and Bus Stop Condition

Respondent Gender		Bus stop condition				
		Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied	Total
Female	Count	0	10	106	74	190
	% of Total	0.0%	3.3%	35.0%	24.4%	62.7%
Male	Count	4	8	52	49	113
	% of Total	1.3%	2.6%	17.2%	16.2%	37.3%

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.757[a]	3	.033
Likelihood Ratio	9.934	3	.019
Linear-by-Linear Association	.341	1	.559
N of Valid Cases	303		

It can be seen from the chi-square test that the ρ-value was 0.033, which was less than 0.05. Therefore, the null hypothesis was rejected. In other words, there was a significant relationship between gender and the bus stop condition assessment.

The study found that overall perception tended to be positively skewed for a new service system, reflecting the high-quality infrastructure installations in the first few years of operation. At the surface, safety as an overall quality was positively perceived by many users. However, a closer look at user demographics demonstrated otherwise, indicating gender issues like fear of crime and bus stop conditions that still fall below the quality anticipated by females. This significant finding supports various other contemporary research on equality issues (Priya Uteng & Turner, 2019; Peters, 2013; Duchène, 2011).

RECOMMENDATION AND CONCLUSION

In conclusion, this study has identified MRT feeder bus users' level of satisfaction with the current MRT public bus transport system in *Klang Valley*. The objective of this present research has been achieved by revealing the users' level of satisfaction about services provided by the feeder bus: bus punctuality, frequency of service of the bus, seat availability, waiting time among others and the travel time of the bus, in which needed to be improved to reduce the continuous growing of personal mobility in the core region of *Klang Valley*. Even though the study has revealed riders were satisfied with the overall services, apart from bus arrival and departure times, overall journey time and bus stop conditions. The reasons for such evaluation can be further investigated in future research opportunity.

This current study is expected to benefit the MRT feeder bus operators in helping to recognise the significant factors that influence the MRT feeder bus users to enhance the services. Having improved the services, especially in FLM travel and waiting times, could increase the number of users, significantly the high- and middle-income people, and ultimately maximise the revenue in the long run. Future research is suggested to include these non-users in their study to ascertain the factors impeding selection to use public transport.

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ASSESSING THE CURRENT IMPLEMENTATION OF COMPACT AND MIXED USE DEVELOPMENT WITHIN PUBLIC RAIL TRANSIT STATIONS IN MALAYSIA

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Abstract

In the past years, the concept of Transit-Oriented Development has been adopted in cities and countries including Malaysia and Singapore. The integration of land use and public transport stations through Transit Oriented Development (TOD) as part of urban and cities strategy is highly acclaimed in promoting sustainable development concept in cities development. To understand the performance of TODs implementation in Klang Valley, this study has selected eleven stations in of Mass Rapid Transit (MRT) Putrajaya Line as case studies. This paper aims to evaluate the current implementation of TODs in Malaysia, benchmarked against the TOD land use composition and percentage from Singapore's model. The findings show that Raja Uda, Ampang Park and Persiaran KLCC stations show significant performance. However, Bandar Malaysia North station displayed poor result with the lowest percentage of residential and commercial components. All stations did not achieve the ideal TOD value for residential land use and eight out of eleven stations recorded higher than the ideal TOD value for roads. However, highest number of stations achieved the ideal TOD value for mixed-use and commercial land uses. These results would help policymakers to improve the current implementation of TODs in Malaysia.

Keywords: Transit-Oriented Development, Ideal TOD, Land Use Composition and Percentage

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INTRODUCTION

The provision of the train-based mass transportation system effectively tackles the challenges faced by cities such as traffic congestions, environmental problems and urban sprawl. These problems are intensified by the absence of land use planning and an effective transportation system (Belzer & Autler, 2002). The concept of Transit Oriented Development (TOD), which is the integration of land use and transportation that can accelerate a fast-growing trend towards creating vibrant, liveable and sustainable communities, is one of the potential solutions to these problems.

TOD can be defined as a vibrant development concept that promotes seamless connectivity within transit distance with the compactness of land activities (Patnala, Parida, & Chalumuri, 2020). TOD is seen as the most effective urban renewal approach to uniform the segregated land use sprawl of the city, to integrate with the walkable district, high density, transit, non-motorised dependency, shifting mode, mix-use of land, and dense street and path network. The essential elements of TOD are their proximity to the place of employment, school, health services and public transport, thereby enhancing mobility and productivity of the urban population. When a mixed development project is located close to a transit station, it can maximise public transport ridership, support local businesses and make the neighbourhood a vibrant place to live and work in. TOD focuses on urban growth around transit facilities and leverages on transit investments in creating compact and sustainable urban development in cities.

TOD serves as an option for high-density Asian cities to tackle urban problems under the condition of limited land resource in urbanisation. Currently, the Mass Rapid Transit (MRT) is being implemented as one of the transit systems in Malaysia. Phase 1 of the transit network construction focuses on Klang Valley. By 2020, 70% of the work has been completed. The line is expected to be fully operational in 2023.

This study aims to evaluate the performance of Malaysia's TOD implementation at the MRT line. Eleven MRT stations along the MRT Putrajaya Line were selected as case studies; Damansara Damai, Metro Prima, Kentonmen, Sentul Barat, Titiwangsa, Raja Uda, Ampang Park, Persiaran KLCC, Conlay, Chan Sow Lin and Bandar Malaysia North. The land use composition of the MRT stations are then compared to the relatively successful model of TOD project in Singapore.

LITERATURE REVIEW

Land Use-Transportation in The Planning of TOD

Transit oriented development is a great tool to mitigate the urban sprawl phenomenon by focusing on density, proximity of locations between residences

with jobs, retail and public transit facilities, mixed use and urban design guidelines and design features to discourage automobile (Freilich, 1998). The concept of TOD is developed through an integration of transit system and pedestrian-oriented that creates an environment with convenience, security, and walkable pedestrian environment (Iamtrakul & Zhang, 2014). The combination of activities generates shorter trips and faster journey, which attracts commercial area centre, offices, retail, services, and localities with a population density of medium to high density (Wey, 2015). Directly, this will create a livelier urban environment and healthy competitiveness in development.

From transportation point of view, TOD involves the urban inhabitants in everyday interaction and reduced auto-oriented activities. With TOD, inhabitants who have limitations in using private vehicles (due to economic, age or other reasons) still have access to facilities to meet their needs (De Vos, Van Acker, & Witlox, 2014). This can be contributed through the design for compact and mixed-use development, which creates a high-quality pedestrian-oriented environment, and utilize the street grid to connect and provide direct access to commercial. Pongprasert and Kubota (2019) claimed that land use planning for TOD could significantly help to increase the community's reach for services within walking distance to the stations. It is believed that a significant number of people who have their residence and office in or near the transit route are more likely to ride than those who are not on the route (Dittmar & Poticha, 2004).

METHODOLOGY

Study Area

The Putrajaya Line is the second line of the Klang Valley MRT Project to be developed. It will serve a corridor of around two million people stretching from Kwasa Damansara, a new township development in northwest Kuala Lumpur to Putrajaya, Malaysia's federal administrative centre.

The alignment will have a length of 57.7km, consisting of 44.2km of elevated track and 13.5km running through underground tunnels. It will have 36 operational stations of which 27 are elevated and 9 underground. A further 4 stations have been provided for the future. There will be 10 interchange stations and connecting stations, making it much easier for commuters to transfer from the Putrajaya Line to existing and future rail lines. Sixteen of the stations will have park and ride facilities.

Figure 1: MRT Putrajaya Line consists of 36 stations in total

Eleven MRT 2 stations in Klang Valley were selected for this study. These stations are under two different local authority; one station under the Petaling Jaya City Council and the rest under Kuala Lumpur City Hall. The selected stations were classified as Urban TOD by *Pelan Induk Perancangan Bersepadu Guna Tanah Laluan MRT Sungai Buloh-Serdang-Putrajaya* (SSP).

This study evaluated the TOD performance of the stations within their 400 to 800 metres radius, which is the recommended distance according to PLANMalaysia as it represents pedestrian scale distances of 5 to 10 minutes' walk.

Table 1: Brief profile of the selected stations

Local Authority	**Station**	**Form**	**Population within 800 metre radius**
Majlis Bandaraya Petaling Jaya	Damansara Damai	Elevated	18,513
Dewan Bandaraya Kuala Lumpur	Metro Prima	Elevated	19,134
	Kentonmen	Elevated	12,807
	Sentul Barat	Underground	14,483
	Titiwangsa	Underground	18,734
	Raja Uda	Underground	15,294
	Ampang Park	Underground	23,211
	Persiaran KLCC	Underground	25,851
	Conlay	Underground	17,410

	Chan Sow Lin	Underground	15,209
	Bandar Malaysia Utara	Underground	130

Source: *Kajian Pelan Induk Perancangan Bersepadu Guna Tanah Laluan MRT SSP*

Data Collection and Analysis

To gauge how well MRT Putrajaya Line TODs conform with TOD principles, benchmark study was needed for comparison. This study utilized several data sources to attain benchmark references such as papers, reports, websites and articles of the ideal and suggested model for land uses surrounding TOD. However, due to availability of data and suitability of context, comparative analysis was then conducted between land use compositions and percentage of the Singapore's model and Malaysia's MRT Putrajaya Line model to determine deviations from the benchmarks.

To obtain insights on the MRT Putrajaya Line TOD performance, data regarding selected stations were gathered from primary and secondary data sources. The statistics on the land use composition of the stations were collected from *Draf Kajian Induk Perancangan Bersepadu Guna Tanah Laluan MRT Sungai Buloh-Serdang-Putrajaya*. Additional information on the stations were gathered from news articles, reports and development plans prepared by the local authorities.

FINDINGS

Four models of ideal and suggested land use types surrounding TOD stations were identified based on the literature review from benchmarking studies. The models varied from cities in the United States, China and Singapore in Southeast Asia. To maximize transit ridership, these cities have proposed their idealised mixed use land use composition for area surrounding TOD stations as means to achieve an optimization of land use allocation.

Calthorpe's model is derived from the idea of redevelop able and urbanizing sites should complement existing on-site and surrounding uses, yet seek to achieve a proportion of uses that will stimulate pedestrian activity and create mutually reinforcing land use patterns (Calthorpe, 1992). Public, core commercial and residential uses must be provided as minimum requirements.

Ideal TOD model for Shen Zhen is based on the urban TOD, which revolves around the idea of land should be mainly used for commercial and office purposes. Other land use types, such as public service, public open space, and a small amount of commercial residential land is needed to support the development (Zhou & Dai, 2017). However, it did not recommend purely residential land use and the proportion of road land is higher.

The third model of TOD implementation focused on station planning and real estate development processes. However, according to Wood and Brooks (2009), the federal funding formula based on this model are disconnected from real estate market forces. Urban, walkable, and mixed-use TOD projects is overburdened with additional costs when compared to competing real estate investments. The cost of developing TOD is significantly higher than other suburban or infill real estate product.

The last ideal TOD model was identified from Singapore. The land use component compared were residential, mixed-use and commercial, public facilities and amenities, green area and open space, roads, or transportation.

<table>
<tr><th>No.</th><th>Composition and Percentage of Land Uses</th><th>Sources</th></tr>
<tr><td>1.</td><td><table>
<tr><td>Public</td><td>10%</td></tr>
<tr><td>Core</td><td>30%</td></tr>
<tr><td>Housing</td><td>20%</td></tr>
</table></td><td>Calthorpe, A. (1992). Transit-oriented development design guidelines (Resolution no. R-280480). San Diego: Planning Department. City of San Diego.</td></tr>
<tr><td>2.</td><td><table>
<tr><td rowspan="2">Residential</td><td>Purely residential area</td><td>-</td></tr>
<tr><td>Hybrid area of commerce and residence</td><td>10-15%</td></tr>
<tr><td rowspan="2">Commercial office</td><td>Commercial retail area</td><td>0-5%</td></tr>
<tr><td>Business office area</td><td>20-40%</td></tr>
<tr><td colspan="2">Public service</td><td>5-15%</td></tr>
<tr><td colspan="2">Public open space</td><td>10-20%</td></tr>
<tr><td colspan="2">Land of roads</td><td>25-30%</td></tr>
</table></td><td>Zhou, Q., & Dai, D. (2017). The evaluation of transit oriented development of metro station areas using node place index in Shenzhen China. In *inaugural World Transport Convention. Beijing, China*.</td></tr>
<tr><td>3.</td><td><table>
<tr><td rowspan="2">Residential</td><td>Housing</td><td>10%</td></tr>
<tr><td>Affordable housing & senior housing</td><td>10%</td></tr>
<tr><td rowspan="2">Commercial</td><td>Retail</td><td>15%</td></tr>
<tr><td>Office</td><td>25%</td></tr>
<tr><td colspan="2">Institution & public amenities</td><td>10%</td></tr>
<tr><td colspan="2">Open space</td><td>10%</td></tr>
<tr><td colspan="2">Infrastructure & transportation</td><td>20%</td></tr>
</table></td><td>Wood, D., & Brooks, A. (2009). Fostering Equitable and Sustainable Transit-Oriented Development. *Overview of Briefing Papers, Boston University*.</td></tr>
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<td>4.</td>
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<table>
<tr><td>Residential</td><td>30-60%</td></tr>
<tr><td>Mixed Land Use and Commercial</td><td>7-30%</td></tr>
<tr><td>Public Facilities and Amenities</td><td>7-11%</td></tr>
<tr><td>Open Space and Green Area</td><td>2-8%</td></tr>
<tr><td>Roads and Infrastructure</td><td>17-18%</td></tr>
</table>
</td>
<td>Niu, S., Hu, A., Shen, Z., Lau, S. S. Y., & Gan, X. (2019). Study on land use characteristics of rail transit TOD sites in new towns—taking Singapore as an example. Journal of Asian Architecture and Building Engineering, 18(1), 16-27.</td>
</tr>
</table>

Based on the table above, the benchmark model to compare the TOD performance of MRT Putrajaya Line was synthesized from properties of the TOD model in Singapore. Singapore, being one of the successful models of urban development, is known for its efficient public transportation system with pragmatic policies on TOD implementation (Joshi et. al, 2017). Next, Singapore shares many similarities and challenges with urban centre in Klang Valley, Malaysia due to their locations being in the Southeast Asia. Other than that, both Singapore and Klang Valley realised the needs for TOD when it could no longer expand the road infrastructure to accommodate more cars, hence, focusing more on the urban renewal through the expansion of the transit network (Yusoff et. al, 2021).

TOD benchmark can be used to discover and demonstrate the performance of a city's specific TODs and how effectively regions are steering development growth to the areas around the transit stations. The benchmark can be used to identify the gaps in the current TODs implementation.

Singapore's Benchmark Model

This study examines the relatively successful TODs of Singapore city as it is known to be a pioneer in urban development and ecological city construction among other Asian cities (Curien, 2017). Transportation has always played an essential role in the economic and physical development of modern Singapore. Cervero (1998) recognised Singapore's urban transportation infrastructure as one of the most influential Transit Metropolis, a city designed to be especially conducive for sustainable public transit modes. Singapore's short development into a futuristic and for being the first for many landmark policy initiatives contributes to its recognition by Newman and Kenworthy (1999), Schwaab and Thielmann (2002), and many other scholars.

Given its limited land, planning for a compact city with maximised land use utilisation is critical for Singapore. Since land use is one of the prime determinants of movement and the propensity of trip-making, it is important to integrate the planning of transport systems with the land use system to minimise

travel demand and the need for more transport infrastructure. The TOD mode of planning has created a flattening effect of the population density distribution in Singapore urban development (Chin & Fong, 2006). This can be seen through the unique mode of planning and urban development trend in Singapore which relies heavily on the public transit system. According to Niu et al. (2019), Singapore's urban planning policy, density distribution and urban design were all driven by the TOD principles to realise a more compact layout due to land scarcity.

In the new towns of Singapore, a land use pattern oriented to transit villages is gradually developed in TOD station areas. To some degree, land use pattern in Singapore realises a balanced usage of residence, retail, catering, public services and parks and green space.

In terms of land use composition of the selected five TOD station, residential land occupies the most area, ranging from 30% to 60%. Meanwhile, mixed and commercial land use ranges from 7% to 30% according to the different locations and positioning of the stations. In addition, proportions of the land for public service facilities, parks and green space, and roads are roughly the same, ranging from 7% to 11%, 2% to 8%, and 17% to 24%, respectively. Table 2 below shows the land use composition and their percentages.

Table 2: Ideal land use composition of TOD stations in Singapore

Land Use Composition	**Percentage (%)**
Residential	30-60
Mixed Land Use and Commercial	7-30
Public Facilities and Amenities	7-11
Open Space and Green Area	2-8
Roads and Infrastructure	17-18

Source: (Niu et al. 2019)

Comparison of land use percentage between study area and benchmarking model

The land use within a radius of 800 metres of the eleven selected MRT Putrajaya Line TOD stations were determined and compared to the benchmark TOD model of Singapore's. The results are as shown in Table 3 below.

Table 3: MRT Putrajaya Line TOD Performance

No	**Land Use Types**	**Residential 30-60%**		**Mixed Land use and Commercial 7-30%**		**Public Facilities and Amenities 7-11%**		**Green Space and Open Area 2-8%**		**Roads 17-24%**	
1	Damansara Damai	23.15	L	10.77	I	8.41	I	8.22	H	37.09	H
2	Metro Prima	18.63	L	10.34	I	3.24	L	3.35	I	37.28	H
3	Kentonmen	20.19	L	2.10	L	29.17	H	0.69	L	26.09	H
4	Sentul Barat	24.82	L	4.27	L	7.81	I	14.14	H	35.15	H
5	Titiwangsa	17.96	L	12.63	I	27.06	H	2.14	I	28.10	H

6	Raja Uda	27.99	L	10.55	I	19.48	H	4.84	I	19.37	I
2	Ampang Park	26.58	L	14.73	I	7.92	I	7.92	I	24.12	
8	Persiaran KLCC	18.23	L	22.85	I	14.33	H	4.94	I	21.84	I
9	Conlay	12.54	L	22.77	I	9.4	I	17.37	H	27.07	H
10	Chan Sow Lin	9.74	L	18.59	I	11.66	H	2.42	I	35.39	H
11	Bandar Malaysia North	1.33	L	0.47	L	20.63	H	1.49	L	17.57	I

L	**Lower than the Ideal TOD**	**I**	**Within Ideal TOD**	**H**	**Higher than the Ideal TOD**

While the detail TOD performance of each of the selected stations on the MRT Putrajaya Line differs between one another, several important across-the-board trend can be seen from the results presented in Table 3. For instance, percentage of residential land use at all of the selected stations were below the ideal benchmark percentage of 30-60%. The low percentage of residential land use could mean that future demand for services at the stations could also be low. However, this can be offset by high-rise, high density residential development within the TOD radius.

Unlike residential land use, many of the stations registered significantly higher than the benchmark ideal in terms of roads. Only three out of the eleven stations were with percentage of roads within the ideal benchmark value of 17-24%. High percentage of roads within the 800m TOD radius of the stations could indicate high dependency on motorised, especially private, vehicles. This could undermine the very objective of developing a TOD, that is to encourage walking and to provide high quality of walking environment to and from transit station.

Compared to other land uses, the percentage of mixed and commercial land use within the 800m radius of the stations conformed better to the ideal benchmark value, which is 7-30%. In general, majority of the stations, except for three stations, registered mixed and commercial land use percentage within the benchmark range.

In the context of TOD performance of individual stations, Raja Uda, Ampang Park and Persiaran KLCC are the stations with better TOD performance compared to the others. This is because the percentage of three of their land use components were within the ideal benchmark range. Meanwhile, Kentonmen performance is the poorest without any of the land use components fall within the ideal benchmark range.

DISCUSSION AND RECOMMENDATIONS

The comparative analysis between MRT Putrajaya Line stations with the Singapore's TOD model revealed the less than average TOD performance of the stations. Only three of the stations managed to score three categories of land use

within the benchmark ranges. The rest of the stations only managed to score two or less land use categories conformance to the benchmark ranges.

To improve the TOD performance of the stations, future development within the TOD radius of the stations must be optimised to conform to the TOD benchmark model. Vacant land that is available within the TOD radius (Table 4) must be developed in a way that strategically enhance the TOD performance of the stations.

According to the *Kajian Pelan Induk Perancangan Bersepadu Guna Tanah Laluan MRT SSP*, the land use zoning of vacant land for the MRT Putrajaya Line TOD sites are planned to be converted to accommodate TOD-inclined future development. Potential developers are free to decide on the mix of uses for each vacant land as long as it follows the land use class order from the development plan, and it does not exceed the permissible density or plot ratio for the area.

Table 4: Vacant land within the TOD radius of the stations

Station	**Percentage of vacant land in 800m radius**
Damansara Damai	1.95
Metro Prima	16.98
Kentonmen	8.99
Sentul Barat	11.29
Titiwangsa	3.78
Raja Uda	8.84
Ampang Park	10.36
Persiaran KLCC	16.60
Conlay	10.31
Chan Sow Lin	10.36
Bandar Malaysia North	42.72

Source: *Kajian Pelan Induk Perancangan Bersepadu Guna Tanah Laluan MRT SSP*

Nevertheless, from the findings, almost all stations are constructed on a matured and existing built-up area, with limited vacant land (Table 4) available. Thus, it can be challenging to ensure the development surrounding the stations follows TOD principles and improve the TOD performance of the stations. Despite the limited vacant land, TOD-inclined rejuvenation process and infill development can be undertaken where possible.

The roads percentage for the stations was recorded as among the highest land use components at the stations. Incremental increases in road and parking supply create more dispersed land use patterns, hence, increasing the travel distance required to achieve a given level of accessibility. This favours automobile travel and reduces the utility and efficiency of other transport modes. Planners and policymakers need to put together transport planning decisions that

encourage smart growth such as improving pedestrian and cycling, installing traffic calming and traffic speed reductions, transit service improvements and encouragement strategies, and mainly reducing roadway capacity and speeds.

CONCLUSION

In conclusion, the results of this study provide some academic insights into the current implementation of TOD under the MRT Putrajaya Line project compared to the Singapore model. This study, however, is limited to the perspective of utilisation and composition of land uses of TOD sites. The findings from this study show that Raja Uda, Ampang Park and Persiaran KLCC stations display a better TOD performance with three out of five land use components were within the ideal benchmark ranges. Overall, all the stations failed to conform to the minimum or ideal recommended values of 30-60% for residential land use. More residential development is required, not only to increase TOD performance of the stations, but also to provide population catchment to the services at the stations. At the same time, with high roads percentage in the TOD sites, planners and local authorities need to consider implementing a street design that encourages smart growth. This can be implemented through improving pedestrian and cycling lane provision, install traffic calming and traffic speed reductions, transit service improvements and encouragement strategies, and mainly reducing roadway capacity and speeds.

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A COMPARATIVE ANALYSIS OF LAND USE AND COMPACT CITY PRINCIPLES AND GUIDELINES ON RAIL PUBLIC TRANSIT STATIONS IN MALAYSIA

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Abstract

Transit Oriented Development (TOD) is an emerging concept to optimise the land use development surrounding a transit station and to create a reliable relationship between a densely compact urban form and high public transportation ridership. In Malaysia, the concept of TOD was initiated in the first National Physical Plan in 2005 and mentioned again in National Physical Plan 2 in 2010. This paper identifies the principle of TOD applied in Malaysia and other countries, and discusses the differences and similarities of the TOD practices using comparative analysis and document analysis methods. Findings of this study indicate that mixed-use development, high density, intensity and connectivity are the main TOD principles adopted in Malaysia and other countries around the globe. The current policy and practises of these countries tend to focus more on the better management and increase ridership of these transit rail stations, including ways to encourage users to shift from private vehicles to public transportation. The findings of this study would contribute towards policy decisions and practices of TOD in Malaysia.

***Keywords**:* Transit Oriented Development, principle, mixed-use development, density, connectivity

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INTRODUCTION

This paper identifies the principle of Transit Oriented Development (TOD) applied in Malaysia and other countries and discusses the differences and similarities of the principles. Under *Garis Panduan Perancangan Pembangunan Berorientasikan Transit* (Planning Guidelines for Transit Oriented Development) published by PLANMalaysia in 2018, TOD refers to a well-planned development network, particularly in areas near the transit station. Development in the transit area focuses on high-density development, mixed-use development, residential, commercial, businesses and offices development, of which all the components are readily accessible by public transport.

Globally, TOD is a rising concept introduced to maximise the use of land surrounding a transit station to create a reliable relationship between a densely compact urban form and high public transportation ridership. Around the globe, TOD was first introduced by Peter Calthorpe, an American architect in 1993 where the initial idea of TOD is to plan for a compact pedestrian and bicycle-friendly mixed-use development clustered around transit stations. While in Malaysia, the concept of TOD was initiated in the first National Physical Plan in 2005 (NPP27) and National Physical Plan 2 in 2010 (NPP21). The National Physical Plan stated that *"Transit Oriented Development concept shall be promoted as the basis of urban land use planning to ensure the viability of public transport"*.

To achieve the goal of TOD, a set of principles is established to act as an indicator in implementing TOD on the ground. However, resulting from more than a decade of gaps in the period of implementing TOD between Malaysia and other countries, this paper explores the differences and similarities between the principles of TOD established. Findings from this study are expected to contribute towards additional knowledge in meeting the policymakers' gaps in Malaysia's TOD policy formulation.

RESEARCH BACKGROUND

Definition of Transit Oriented Development

The definition of TOD varies according to different guidelines published by different states and countries. Authors also define TOD according to differing perspectives. The Ontario Transit Supportive Guidelines (Ministry of Transportation, 2012) characterised TOD as a type of mixed-use development that incorporates high-density residential areas, high plot ratios commercial areas, as well as community and business amenities, to reduce dependency on private transportation by offering more flexible and comfortable accessibility. The guideline suggests that the boundaries from the transit station towards the surrounding development should reflect about 5-10 minutes walking duration for 400-800 metres walking distance as shown in Figure 1.

Figure 1: Boundaries of walkability route from the node (transit station)
Source: Ministry of Transportation (2012)

On the other part of Canada, Winnipeg, through Winnipeg TOD Handbook (2011) defines TOD as a growth development within a compact area and accessible walking distance from transit station. It also promotes the idea of higher public transportation ridership compared to private vehicles. Akin to the Ontario guideline, Winnipeg also suggests for a 5-10 minutes walking duration for 400-800 metres walking distance from the transit station to surrounding development.

Other than that, the City of Calgary TOD Policy Guidelines (Land Use Planning & Policy, 2004) adopts the definition of TOD as a mixed-use development within a development area typically clustered within a radius of 600 meters from the transit station. For Calgary, the 600 metre radius is an appropriate distance that generally used to define the planning for LRT station. The division of TOD areas is also identified where high-density development is clustered surrounding the transit station to promote better accessibility for the population. The planning for high density land uses such as apartment and office towers should be located as close as possible to the transit station. The route leading to these land uses should be short, continuous, barrier-free, safe, easily navigable and design to cater for the local climate. The policy guideline also suggests the development of TOD station includes identification of primary and secondary access routes (Figure 2).

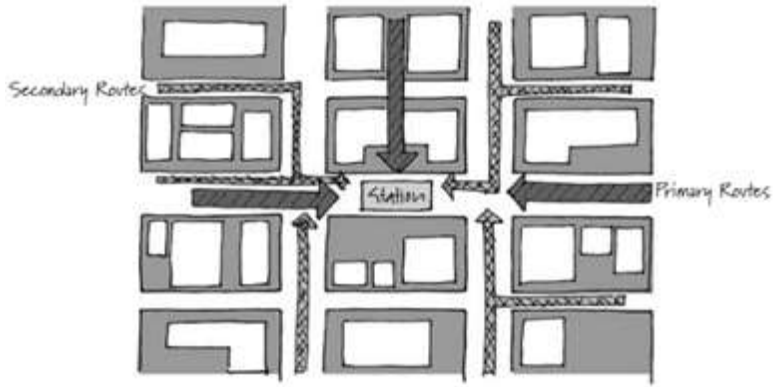

Figure 2: Identify the primary and secondary route towards the TOD station area
Source: Land Use Planning and Policy (2004)

In San Francisco, Alameda, Contra Costa and San Mateo, which is being connected by San Francisco Bay Area Rapid Transit District (BART) describes TOD as:

> *"Moderate to higher-density development, located within an easy walk of a major transit stop, generally with a mix of residential, employment and shopping opportunities designed for pedestrians without excluding the auto. TOD can be new development or reconstruction of one or more buildings whose design and orientation facilitate transit use."*
>
> (San Francisco Bay Area Rapid Transit District, 2003)

In India, TOD is interpreted as integration between land use and transportation to establish targeted sustainable urban growth centres, with walkability and liveability as the main elements in the high density and mixed-use development. TOD in India is clustered within 500 – 800 metres walking distance from the transit station. Figure 2 indicates the illustration of TOD along the transit station in India.

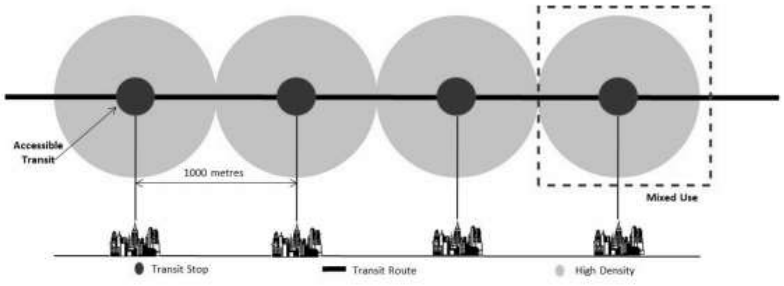

Figure 2: TOD along the transit station in India
Source: Ministry of Housing and Urban Affairs (2021)

Definition of Transit Oriented Development in Malaysia

According to Transit Oriented Development Guideline by PlanMalaysia in 2018, TOD is defined as a development concept centred around rail transit or bus station which promotes high connectivity, public transportation-friendly, pedestrian and bike-friendly, and reduce dependency on private vehicles. This manual envisions TOD as a concept that encourages mixed-use development with a bearable walking distance from the station to the surrounding development. One of the purposes is to increase public transportation ridership from residential to commercial land uses, economical spaces and socio-cultural spaces near the transit station. TOD in Malaysia also encourages the inclusivity and optimum use of land and space to cater for all needs.

A bit indistinguishable from the above guideline, Transit Oriented Development Policy in Selangor by PLANMalaysia Selangor in 2016 defines TOD as a supporting development towards increasing public transportation ridership in a high-intensity growth area, with walkable distance from the transit station towards the mixed-use development in the surrounding transit area. *Kajian Pelan Potensi Pembangunan Berorientasikan Transit* in Selangor (PLANMalaysia@Selangor, 2013) suggests that the TOD concept focuses more on accessibility, surrounding land uses, population density, integration with other transportation modes, existing bus routes and rail station design and routes.

On the other hand, MRT Selangor-Kuala Lumpur Line Integrated Land Use and Public Transportation Master Plan (PLANMalaysia, 2017) identifies TOD as the area within 400 – 800 metres with 10 minutes walking duration from the transit station. The transit station is located at the very centre of TOD and ought to be accessible and act as a node to other transportation modes. Meanwhile, Petaling Jaya TOD Guideline (2016) adopts the same definition as the Selangor's TOD policy, which envisions TOD as a development that supports the use of highly integrated public transport within walking distance from transit stations to the surrounding mixed-use development which encompasses residential, employment, shopping and interacting spaces.

METHODOLOGY

This study adopts a comparative analysis on the differences between the principle of TOD applied in Malaysia with other countries. In Malaysia, the concept of TOD has only been widely introduced since 2005, while in many other parts of the world the concept has been well known since 1993. Thus, it brings several differences resulting from the different period of TOD implementation.

The study uses the document analysis method as the main method in collecting and analysing the data. According to Bowen (2009), document analysis is defined as a structured technique for analysing or assessing records, for which it includes both written and electronic content (computer and internet-based). For

this study, the documents collected as part of the evaluation are from the government's publications, manuals, journals, organisational and institutional reports and other various public records.

The data is presented in the form of cross-tabulation method and matrix table, which entails detailed information on the principle of TOD and thus, differentiate the similarities and differences between the local and overseas principles.

FINDINGS AND DISCUSSION

Findings in this section indicate the comparative analysis between the principle of TOD locally and globally. Different kind of TOD principles gathered from several practises in Malaysia are tabulated in Table 1 below:

Table 1: Principle of TOD in Malaysia

Guideline	**Principle**
Garis Panduan Perancangan Pembangunan Berorientasikan Transit (PLANMalaysia, 2018)	▪ Diversity ▪ High Intensity ▪ Connected ▪ Inclusive ▪ Liveable ▪ Resilient ▪ Smart ▪ Green and Low Carbon ▪ Optimise Resources
Pelan Induk Perancangan Bersepadu Guna Tanah Dan Pengangkutan Awam Laluan MRT Selangor – Kuala Lumpur (PLANMalaysia, 2017)	▪ Pedestrian, PWD and bike-friendly environment ▪ Connectivity ▪ Mixed-use development ▪ Smart, compact and high-density development ▪ Efficient parking management ▪ Attractive and safe urban design ▪ Inclusive development ▪ Provision of suitable and adequate public facilities ▪ Environmental protection and green living lifestyle ▪ Placemaking
Dasar Perancangan Pembangunan Berorientasikan Transit Negeri Selangor (PLANMalaysia@Selangor, 2017)	▪ Mixed-use and diverse development ▪ Higher intensity ▪ Provision of the affordable unit in commercial land uses ▪ Additional provision of affordable commercial spaces ▪ Pedestrian and bicycle lane ▪ Provision of adequate public facilities

Guideline	Principle
	▪ Reducing the provision of parking spaces ▪ Provision of feeder bus ▪ Encourage green building concept
Kajian Pelan Potensi Pembangunan Berorientasikan Transit (TOD) Negeri Selangor (PLANMalaysia@Selangor, 2013)	▪ Supporting land use development and high density residential area ▪ Improving public services and facilities management ▪ Increasing the exchange of transportation modes ▪ Strengthening the efficiency of the transportation system ▪ Creating safe and liveable architectural urban design development
Petaling Jaya TOD Guidelines (2016)	▪ Mixed-use and diverse development ▪ Higher intensity ▪ Provision of affordable unit in commercial land uses ▪ Additional provision of affordable commercial spaces ▪ Pedestrian and bicycle lane ▪ Provision of adequate public facilities ▪ Reducing the provision of parking spaces ▪ Provision of feeder bus ▪ Encourage green building concept
Final Report, Petaling Jaya Urban Design Study	▪ Diversity ▪ High Intensity ▪ Mobility ▪ Reducing parking spaces ▪ Provision of affordable housing ▪ Provision of green corridor (open space) ▪ Provision of integrated public facilities ▪ Ensuring a safe public space ▪ Suitable setback for buildings ▪ Low carbon ▪ Smart initiatives ▪ Unique character
Draft Local Plan of Subang Jaya	▪ Optimise the existing land uses for future growth ▪ Creating new land uses surrounding transit area to cater for residential and public facilities ▪ Creating a new character for cities in classifying LRT station and transit centre to show the character and functions

Guideline	Principle
	▪ Creating higher density for residential, commercial and office spaces to support transportation infrastructure investment ▪ Creating safe and comfortable circulation to create a different mode of public transportation including pedestrian and cyclist ▪ Towards low carbon city in 2030 ▪ Increasing the ridership of public transportation and reducing the dependencies on private transportation

Source: Pelan Induk Perancangan Bersepadu Guna Tanah Laluan MRT Putrajaya (2019)

Based on Table 1, several principles can be seen interconnected with the others. Using the method of cross-tabulation, this study identifies the significant TOD principles mostly used in Malaysia's TOD guidelines, as shown in Table 2 below.

Table 2: Cross-tabulation between different guidelines and application of TOD principles in Malaysia

Principle	Guideline						
	TOD Guideline	MRT Selangor – KL TOD Masterplan	Selangor TOD Policy	Selangor TOD Potential Plan Study	Petaling Jaya TOD Guideline	Final Report, Petaling Jaya Urban Design Study	Draft Local Plan of Subang Jaya
Mixed-use development and diversity of land use activities	√	√	√	√	√	√	
High intensity/ density and compact development/ optimise resources	√	√	√	√	√	√	√
Connectivity – comprehensive provision of public transportation, pedestrian walkway, bicycle lane and PWD - friendly	√	√	√	√	√	√	√
Provision of affordable house and job opportunities			√		√	√	
Liveable	√			√			
Provision of adequate public facilities and amenities		√	√	√	√	√	
Resilient	√						

Principle	Guideline						
	TOD Guideline	MRT Selangor – KL TOD Masterplan	Selangor TOD Policy	Selangor TOD Potential Plan Study	Petaling Jaya TOD Guideline	Final Report, Petaling Jaya Urban Design Study	Draft Local Plan of Subang Jaya
Preserving urban design, image and character of the city		√		√		√	√
Green technology and low carbon city	√	√	√		√	√	√
Provision of feeder bus			√		√		
Parking management		√	√		√	√	

Based on Table 2 above, amongst the main principle that co-exists in most of the guidelines in Malaysia are mixed-use development, diversity of land use activities, high intensity/ density and compact development, connectivity, adequate public facilities and green technology, green building and low carbon city. Meanwhile, the least adopted principles are the principles of liveable, resilient and feeder buses. On top of that, the principles that are seen as less dominant but equally important are affordable houses and job opportunities, urban design, image and character, as well as parking management.

On the other basis, different kind of TOD principles from other countries are gathered and tabulated in Table 3 below:

Table 3: Principle of TOD from different countries

Guideline	Principle
TOD Implementation Resources & Tools, World Bank Group, China (2018)	▪ **Transportation** - Excellent transit system design (500m walking distance) - Integration of transportation modes (pedestrian walkway, PWD facilities and bicycle lane) - Sufficient provision of roads - Traffic management ▪ **Public space** - Transit plaza - Pedestrian facilities - Public realm - Public park ▪ **Built environment** - Compact development (optimised density) - Mixed-use development

Guideline	Principle
	- Diversity of residential development - Informal sector integration ▪ **Supporting elements** - Climate change - Inclusive - Market value - Universal access - Sustainable infrastructure - Bike-friendly - Technology integration
Transit Oriented Development (TOD), Shenzen, China (2007)	▪ Density ▪ Mixed-use development ▪ Connectivity ▪ Provision of comprehensive public transportation
Transit-Oriented Development in Emerging Cities: Principles From Singapore (2019)	▪ Public transportation ▪ Land use (affordable residential development) ▪ Management ▪ Technology
Transit Oriented Development Guide, Queensland (2010)	▪ Location ▪ Land use - Supporting the transit development - 5 – 10 minutes walking duration to the transit station - High residential density - Increase in commercial intensity - Mixed-use development - Connectivity up to 800 metre ▪ Design ▪ Transportation ▪ Social - Supporting inclusivity and diversity - Diversity in job opportunities - Diversity in commercial activities - Affordable housing ▪ Process - Coordination - Community engagement - Period
Transit Oriented Development Strategy, Denver (2014)	▪ Connectivity ▪ Innovative ▪ Efficient ▪ Place (active, vibrant, destination) ▪ Mixed activities (choice, diversity, resilient)

Guideline	Principle
	▪ Shift (car-free/car-lite, public space, reduce and energize)
Institute for Transportation and Development Policy (ITDP), United States of America (2017)	▪ Pedestrian ▪ Cyclist ▪ Connect ▪ Transit ▪ Mixed-use development ▪ Densify ▪ Compact ▪ Shift
Transit Oriented Communities Design Guidelines, Metro Vancouver, Canada (2012)	▪ Destination ▪ Distance ▪ Design ▪ Density ▪ Mixed-use development ▪ Management
The Urban Transit Group, United Kingdom, The Place To Be (2019)	▪ Compact development ▪ Transportation ▪ Affordable houses ▪ Mixed-use development ▪ Connectivity ▪ Pedestrian and cyclist

Source: Pelan Induk Perancangan Bersepadu Guna Tanah Laluan MRT Putrajaya (2019)

The principles from six countries are tabulated to find the correlation between the set of TOD principles applied. According to Table 4 below, mixed-use development, density, pedestrian walkway, bicycle lane and PWD friendly, connectivity, public transportation and management are the most dominant principles adopted in the implementation of TOD. Meanwhile, the least applied principles are affordable housing, design and technology. On the other hand, public space is the principle that is halfway dominant compared to the 6 countries analysed.

Table 4: Cross-tabulation between different cities and application of TOD principles

Principle	Countries							
	China (2018)	Shenzen (2007)	Singapore (2019)	Queensland (2010)	Denver (2014)	United States (2014)	Vancouver (2012)	United Kingdom (2019)
Mixed-use development	√	√	√	√	√	√	√	√
High density/ Compact	√	√		√		√	√	√

Principle	Countries							
	China (2018)	Shenzen (2007)	Singapore (2019)	Queensland (2010)	Denver (2014)	United States (2014)	Vancouver (2012)	United Kingdom (2019)
Pedestrian walkway, bicycle lane and PWD friendly	√			√	√	√		√
Connectivity	√	√		√	√	√	√	√
Public transportation		√	√	√		√	√	√
Public space	√			√	√		√	
Affordable housing			√	√				√
Design				√			√	
Technology	√		√					
Management			√	√	√	√	√	

The findings indicate that several principles of TOD implemented in Malaysia and other countries overlap with similarities (Table 5). Mixed-use development is the common main principle adopted in implementing TOD. TOD promotes the diversity of land uses surrounding the transit area including residential, commercial, offices, public spaces and public park. Other than that, a higher density and intensity development is also promoted as the main criteria for TOD in both cases. It optimises the resources within the transit area to achieve compact development that will be beneficial to all. Similarities are also found in the principle of connectivity, where the accessibility back and forth to the transit station is considered as absolutely crucial in designing a TOD development. It incorporates all level of users including the provision of a comfortable pedestrian walkway for the pedestrians, a safe bicycle lane for the cyclist and guidable facilities for the disabled people.

Table 5: Summary comparison of TOD principles in Malaysia and overseas

Principles	Malaysia	Oversea Practises
Most dominant TOD principles	▪ Mixed-Use Development ▪ Diversity of Land Use Activities ▪ High Intensity/ Density and Compact Development ▪ Connectivity ▪ Adequate Public Facilities ▪ Green Technology Green Building and Low Carbon City	▪ Mixed-Use Development ▪ Density ▪ Pedestrian Walkway, Bicycle Lane and PWD Friendly ▪ Connectivity ▪ Public Transportation ▪ Management

Less dominant TOD principles	▪ Affordable Housing and Job Opportunities ▪ Urban Design, Image and Character ▪ Parking Management	▪ Public Space
Least dominant TOD principles	▪ Liveable ▪ Resilient ▪ Feeder Buses	▪ Affordable Housing ▪ Design ▪ Technology

Nevertheless, the overseas practises are also accentuating the management of TOD. A TOD has to be planned and managed at the same time to achieve the targeted goals. TOD management includes objectives to shift the usage of private vehicles to public transportation, which was less seen in the TOD practices in Malaysia. Other management masterplan includes conducting coordination between different agencies to achieve TOD's target and conducting community engagement with the residents benefiting from the TOD planning.

On a different note, Malaysia is seen to promote the elements of affordable housing, urban design, image and character of city and parking management more compared to other countries. According to TOD characters, several guidelines evolved on the idea of preserving the image of the city through the transit design and classifying stations. However, design and affordable housing elements are considered as the least dominant principle according to the overseas practises, alongside technology.

SUMMARY AND CONCLUSION

To summarise, mixed-use development, high-density and intensity and connectivity are the main TOD principles adopted in Malaysia and worldwide. The leading reason for this is to create a compact development with the highest benefit to the public and ensuring the success of the planned TOD transit station. The overseas practises focused more on the management side, including ways to shift the usage of private vehicles to public transportation and thus, increase the ridership at the TOD transit station. It is a crucial element in meeting the policymakers' gaps in Malaysia's TOD policy formulation.

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NOTES TO CONTRIBUTORS AND GUIDELINES FOR MANUSCRIPT SUBMISSION

INTRODUCTION

The Journal of the Malaysian Institute of Planners or PLANNING MALAYSIA is a multidisciplinary journal related to theory, experiments, research, development, applications of ICT, and practice of planning and development in Malaysia and elsewhere.

The objective of the journal is to promote the activity of town planning through dialogue and exchange of views concerning professional town planning practice. PLANNING MALAYSIA will welcome any news, feature articles, or peer reviewed (including book reviews, software review, etc.) articles for publication. All articles should be original work by the authors. **Articles, views and features will not be taken to be the official view of the Malaysian Institute of Planners (MIP) unless it carries the name of MIP as the author.** This is to encourage open discussion on diverse issues and opinion for the advancement of town planning practice. Articles and contributions will be accepted from MIP members and non-members worldwide.

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Manuscript should be emailed to pmjournal@gmail.com. Manuscript should ideally be in the range of 8-10 pages long. Each manuscript should have a title page and an abstract of about 150 words. The title page should contain the title, full name(s), designation(s), organizational affiliation(s), a contact address, and an email address. All manuscripts are received on the understanding that they are not under concurrent consideration at another journal. One copy of the current Journal will be provided for each article. Additional reprints of article can be ordered, at cost, by the author(s). PDF format of the article (if available) can be obtained from the Publisher.

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