Original Research Article

DETERMINING THE PREVAILING EFFECTS AMONG PUBLIC SPACE UTILIZATION FACTORS IN SCIENCE CITY: A STUDY IN CYBERJAYA, MALAYSIA

ABSTRACT

The aim of this study was to develop an understanding on the contributing influences that occurs between qualities of public space, public space aesthetics, the comforts derive in public space and public space accessibility in science cities. This study seeks to investigate the extent at which public space attributes impact on another. Emphasis accruing to open greenery including public spaces in the physical development of science cities necessitates the selection of Cyberjaya (Science City) Malaysia as the study area. Survey questionnaires were used to investigate potential respondent's perceptions on public space utilization and the feedback was validated with structural equation modelling (SEM). The findings indicated that the accessibility attributes significantly influenced other public space utilization attributes while good quality of public space influenced the comfort derived from it. Attractiveness of public space was found not capable to predict the comfort and good quality of public space. However, public space attractiveness exhibited weak relationship with quality of public space while other attributes shown strong relationship with each other.

Keywords: Public space, Physical development, Respondent's perceptions, Utilization.

INTRODUCTION

The significance of public space has been dated back to the ancient Greek and Rome periods (Kurniawati, 2012). Its relationship with people has attracted high interest especially in the 1990s (Antrop, 2005; Scazzozi, 2004) while the rapid urbanization experience in urban cities offered new research insights in public development among the built environmentalist (Erickson,2004; Ester C et. at. 2015; Broussard, et al., 2008). Public spaces are those spaces that are publicly accessible such as parks, squares, streets and communal spaces (Gelh, 2001; Carmona et al., 2003; Beck, 2009). Great cities are known for their successful public spaces (Rogers, 2003; Wu& Planting, 2003). Public spaces in the context of this study are those open public spaces that are publicly accessible without undue restriction.

The contribution of public space has broadly been acknowledged in city planning (Oguz, 2000; Chiesura, 2004; Golicnikand Thompson, 2010) and human development (CABE Space, 2005; 2007; Ester C et. at.2015). For instance, the authority of England planning policy guidance 17 stipulated that all local authorities must carry out the audit of existing public spaces taking into consideration its utilization potential (Becko, 2009). Likewise, Western Australian has taken a step to approve 10% of the new housing development area of land for public spaces (Giles – Corti et al., 2005,).

Importantly, the enrichment of public space in cities physical environment is remarkable in science city as manifested in SiliconValley, United State of America, Tsukuba Japan, and Cyberjaya Malaysia (Rasidiand Shinozaki, 2009). These authors equally asserted that most of the buildings in Tsukuba Japan has its physical environment incorporated with about 40% of green spaces that encompassed pedestrian and streets while Cyberjaya Malaysia is having over 30% of its physical environment occupied by open greener and public spaces. The Federal Town Planning Department Malaysia (2000) has posits that relationship of man and the environment can be recognised from the Landscape Master Plan for Cyberjaya and its structured greenery and public spaces (SetiaHarumanSdn. Bhd., 2007). It is a science city that upholds its concept in attaining knowledge based development goal. However, Ergazakis (2004) and Carrillo (2004) both defined science city as a technological city that is gear towards achieving knowledge based development. Carrillo (2004) stressed that science city often encompasses the intermixed of industrial and academic research experts. Public spaces in Cyberjaya comprise of the following three categories: (1) the mini public space such as communal spaces, neighbourhood courtyards, pedestrian way and space between buildings; (2) the medium public spaces such as public square, urban courtyards and centres; (3) the extended public spaces such as public parks and recreational centres.

Therefore, celebrating the roles of public spaces without studying the in-depth interface of its utilization influencing attributes may retard its maximisation for human and environmental development. It is vital to understand the existing influencing relationship of public space utilization factors that determine user's satisfaction. This study focuses on public space in Cyberjaya. As a technological city, it is endowed in abundance public spaces with high knowledgeable residents as its users. It has been forestalled that public space utilisation predicts its satisfaction (Golicnik and Thompson, 2010). It reflects public space usage and patronage satisfaction. The satisfaction derived in utilization of public space rally around its attributes of comfort (Ester C et. at. 2015., Cerin E, et al., 2014), quality, aesthetics and accessibility of public space. Accessibility has been emphasised as important in determining public space utilisation (Kurniawati, 2012) while Whyte (1997) and Talen (2000) consider accessibility as primary among factors that determine public space utilisation. The measuring attributes of public space are hinged on the usage satisfactory level of the users. Researchers posits that accessibility to public space (Tinsley,et al., 2002; Giles – Corti, et al., 2005; Kong et al., 2007), attractiveness potential of public space (Giles- Cortli, et al., 2005), quality of public space (Tinsley,et al., 2002; PasaogulariandDoratli, 2004), comfort derive from public space (Cobster, 2002) significantly influence its utilisation.

This study considers comfort, attractiveness, goodquality and accessibility as measuring constructs for public space utilisation. As such, the influencing relationships among the four

constructs are to be investigated to determine the prevailing possessions within the constructs as a clue to clear-cut understanding of developing an effective public space.

SITE BACKGROUND

Cyberjaya is adjudged as a modern science city that constitutes the multimedia super corridor center in Malaysia. The conception of Cyberjaya city commence out of a study by management consultancy McKinsey for themultimedia super corridor and commissioned by the Federal Government of Malaysia in 1995 (Federal Department of Town and Country 2001). The city is located in Sepang, Selangorand about 50 km south of Kuala Lumpur city in Malaysia. Cyberjaya occupied an area of about 28.94 square kilometers with population of about 45,000 that comprises of 19,000 workforces, 16,000 students and 10,000residences (SetiaHaruman,2009).

DEFINITION OF MEASURING CONSTRUCTS AND HYPOTHESES

Accessibility

Lau and Chiu (2003) defined accessibility as the freedom of man to meet the basic needs for the actualisation of desirable quality of living. Accessibility of public space is an important factor in the design and planning of public spaces. The spatial pattern of public space and its accessibility influence the people's choice (Tsou et al., 2005; Landry and Chakraborty, 2009) while proximity and dispersion in public space can be measured by its degree of accessibility (TalenandAnselin, 1998; Talen, 2000). Accessibility entails its proximity and the likely social barrier in visiting a public space. Thus, location of public space is an important factor in its planning. On the visual and physical dimensions, the connectivity of public space to the built environment can be used to determine its accessibility (Whyte, 1997; Chang and Liao, 2011). PasaugullariandDoratli (2004), and Erkip (1997) asserted that utilisation of public space will not be visible if its location is far from the users. The comfort, attractiveness and quality of public space can only be observed and acknowledge when it is access. Therefore, the following hypotheses are formulated(Figure 1):

H1a. Accessibility to public space positively influences its degree of attractiveness.
H1b.Accessibility to public space has significant relationship with its attractiveness.

H2a. Accessibility to public space positively influence the comfort derived from it.
H2b. Accessibility to public space has significant relationship with the comfort derived from it.

Quality of Public Space

Quality of public space surrounds the degree of the facilities and amenities provided couple with the standard of upkeep. Maintenance of public space facilities and amenities

influence its quality (Carmona et al., 2008). The size and nature of activities occupied in public space are related to its user judgement of quality (Ward-Thompson, 2002; Low et al., 2006). Similarly, the security and safety available in public space influence the quality attached to it. Good quality public spaces enhance the quality of living in the urban environment (Bertolini andDjist, 2003). Good quality facilities and amenities attract users and invariably facilitate its accessibility. Thus, it was hypothesized (Figure 1) that:

H3a. Accessibility to public space positively influences its quality.
H3b. Accessibility to public space has significant relationship with its quality.

Comfort in Public Space

Comfort has been suggested to be part of the prerequisite for a successful public space (Carmona et al., 2003). The comfort derived from public space can be considered as an integrative dimension of natural experience in an urban setting that assured intimacy and sense of protection. Greenery and features like water body and urban amenities has become an interesting theme in today public space research. Amenities such as streets, posts and lighting; landscape such as greenery, water body and sculptures; facilities as in safety aids and convenient form the basis of pre-determine the user's comfortability in public spaces (Paumier, 2004; Carr et al., 1992). High standard public space facilities and amenities contributed to comfort derived in public space (Carmona, et al., 2008). Hence, comfort is derived from well instituted public space physical features (Gelh, 2001). Such features lie in degree of good quality, maintenance and attractiveness of public space. Therefore, it was hypothesized (Figure 1) that:

H4a. Comfort derived from public space positively influences its attractiveness.
H4b.Comfort derived from public space has significant relationship with its attractiveness.

H5a. Comfort derived from public space positively determines its quality.
H5b. Comfort derived from public space has significant relationship with its quality.

Public Space Attractiveness

Public space attractiveness is reflected in its physical environment which denotes its aesthetics. Attractiveness is the perception of the physical judgment of things by individual as being aesthetically pleasing. In this context, it encompasses every aspect of public space that has the potential of attracting the attention of people. Public space attractive feature includes its landscape and fittings (Lych, 1960; Tinsley et al., 2002; Sallis et al., 1998). A good physical setting of public space constitutes its aesthetics and attractiveness (Giles-Corti et al., 2005). Proper maintenance of public space facilities and amenities for better outlook determines its beauty and attractiveness. As such, public space attractiveness reflects it quality. Hence the following hypothesis proposed (Figure 1):

H6a. Public space attractiveness positively influences its quality.
H6b. Public space attractiveness has significant relationship with its quality.

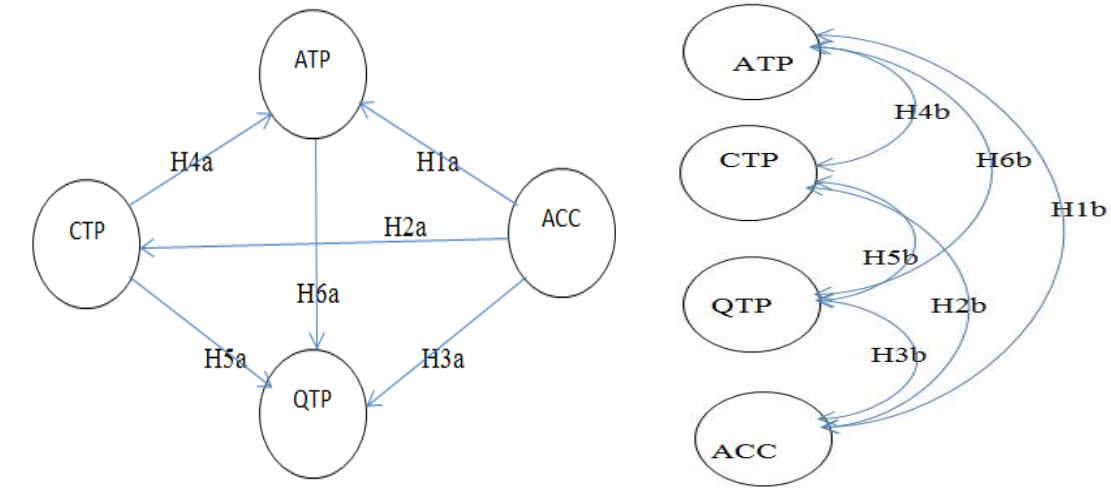

Figure 1 Research theoretical model

Note: Comfort =CTP, Quality =QLP, Accessibility =ACC, Attractiveness =ATP

METHOD

A total of 450 sets of questionnaires were randomly distributed to be administered by residents in Cyberjaya Malaysia. However, 211 questionnaires were successfully completed. The usable questionnaires returned representing a response of 46.9% of the respondent rate. Using Raosoft population sampling approach, the completed questionnaires indicates a reliable representation of the study area as it amounted to 6.7% confidence interval of 95% confidence level of the study population of 45,000. The demographical factors of age, sex, education, gender, working status, duration of residents, evidence of public space usage and types of public space visited were used to investigate their impact on the subject matter as illustrated in Table 1. It was shown that higher percentages 73% of the responds are residents in science city and they show good interest (94.3% of respondents) in public space patronages. The majority of public space users in Cyberjaya exhibited high level of literacy as 64.5% were holders of university degree or equivalent while 19.9% were postgraduate degree holders as reflected in Table 1.

Table.1
Respondents profile (n =211)

Measure	Items	Frequency	Per cent (%)
Gender	Male	132	62.6
	Female	79	37.4
Residents Status	Yes	154	73
	No	57	27
Duration of Residents	0 – 3yrs	66	31.3
	4 – 6yrs	36	17.1
	7 – 9yrs	88	41.7
	10 yrs. and above	21	10.0
Educational status	High School or equivalent	4	1.9
	undergraduate	29	13.7
	graduate	136	64.5
	postgraduate degree	42	19.9
Evidence of public space usage	Yes	199	94.3
	No	12	5.7
Types of Public Space visited	Neighbourhoods courtyard/communal spaces	119	56.4
	Public square/ Urban clusters	43	20.4
	Public Parks	27	12.8
	Others(bus/stop, canopy, etc.)	22	10.4

MEASURES

In this study, all constructs were measured with multiple items. Thus, the indicators that were used to operationalize the constructs were mainly adopted from literature as affects public space utilisation and carefully modified for the use of this study. The indicators for each construct were measured using a five point Likert-scale that ranges from 5 for strongly agree to 1 for strongly disagree. Figure 1 depicts our research model thatwillexamine the influencing potentials of public space utilisation construct in the science city. Hence, the approach measurement for this research model is explained as follows. Accessibility to public space was measured by using three items. Two items was adopted from Erkip (1997); traveling time and proximity. While one other item was modified from Whyte (2000) that emphasized on public space easy of connection to users surrounding. This factor was related to the degree of possible barrier to access public space.Four items scale was used to measured public space attractiveness which comprises landscape, maintenance, aesthetics and form.

Landscape item was adopted from (Gobster, 2002; Giles – Corti, et al., 2005).Maintenance and aesthetics was adopted from PasaugullariandDoratli (2004) and public space form was modified from Wu andPlantinga(2003). Three item used to measured comforts were safety, physical features and size. Safety was adopted from Erkip (1997) while two items, public space physical features and size, were modified from Ward-Thompson, (2002) and Low et al., (2006) as the authors suggested that public space comfort judgment is visible using its physical features and size. Public space quality was measured using three items derived from PasaugullariandDoratli (2004) which focused on the perception of quality judgment of public space on its facilities, amenities and human activities. In summary, a total of 13 items were used for this model.

DATA ANALYSIS AND RESULTS

Structural equation modelling (SEM) was applied to analyse the collected data to validate the research model based on its potential to test casual interfaces between latent variables of multiple indicators (Joreskogand Sorbom, 1996).The Measuring indicators were examined using confirmatory factor analysis and test for validation (Anderson andGerbing, 1992; JoreskogandSorbom, 1996) in line with the two stage process for using structural equation modelling. Internal consistence reliability to test un-dimensionality was accessed by Cronbach's Alpha. Alpha values results ranged from 0.849to 0.900 and above the acceptable threshold of 0.70 suggested (Nunnallyand Bernstein, 1994). The level of multiple attempts to measure the same concept in agreement (convergent validity) was assessed based on the factor loading, composite reliabilities and variances extracted.

Table 2 presents factor loadings of indicators in the measurement model. Factor loadings for all the constructs exceeded 0.5 as the loadings ranges from 0.791 to 0.897 at significant level of P= .002. The measurement for the proposed model demonstrated an adequate convergent, reliability and discriminant validity. The two models (Figure2and3) exhibited the same measurements. As presented in Table 4, the observed normed x^2/dffor the measurement model was 1.622 (x^2 = 95.701; df = 59) which indicates a strong fit value (Bagozziand Yi, 1988). The goodness fit of index (GFI) was 0.937 and the comparative index

fit (CFI) was 0.977 while the adjusted comparative index fit was 0.904 which both exceeded the recommended value of ≥ 0.9 for strong fit (Bagozzi and Yi, 1988). The root mean square error of approximation (RMSEA) was 0.054 which also indicates strong fit. Therefore, the combination of the analysis output implies that the measurement model exhibited a very good level of model fit. Hence, the measuring model is fit to explain this research hypothesis. Table 3 demonstrates outstanding effects of accessibility on other public space utilization factors.

Table2
Confirmatory analysis model result

Measure	Measure items	Standardized Estimate	t-value	Cronbach's alpha
Accessibility				0.849
Travelling time	Acc1	.791		
proximity	Acc2	.811	11.859	
Barriers	Acc3	.824	12.014	
Attractiveness				0.894
Maintenance	Atp1	.813		
Landscape	Atp2	.788	12.513	
Aesthetics	Atp3	.855	13.863	
Forms	Atp4	.841	13.594	
Quality				0.854
Facilities	Qtp1	.815		
Amenities	Qtp2	.816	12.042	
Human Activities	Qtp3	.809	11.969	
Comfort				0.900
Safety	Ctp1	.897		
Physical features	Ctp2	.841	15.757	
Size	Ctp3	.858	16.238	

Note: Comfort =CTP, Quality =QLP, Accessibility =ACC, Attractiveness =ATP

Table3
Effects of accessibility significant on other measured constructs

Construct	**ACC**		
	Direct effect	Indirect effect	Total effect
CPT	.64	----	.64
QTP	.38	.14	.52
ATP	.28	-.03	.25

P≤0.002

Having presented the measuring model fit, the result of the goodness fit as reflects in Table 4 suggest strong acceptable degree of model fit and provide support to the validity and structural model. The practically significant path was depicted by bold lines while the insignificant path depicted by thin lines (Figure 2and 3). Pathscoefficient of ≥ 0.2 was considered practically significant (Cohen, 1988; 1992a; 1992b).In Figure 2, the H1 result indicates that accessibility to public space (ACC) was found to be positively influence public space attractiveness (ATP) with 0.22 path coefficient. H2 indicated that accessibility to public space (ACC) positively influence comfort derived in public space (CTP) having 0.64 path coefficient that signified strong influence (Figure 2). However, the H3 implies that accessibility to public space (ACC) has positive influence on the quality of public space (QTP) with 0.41 path loading while H4 reflects that comfort derived in public space (CTP) cannot positively influence public space attractiveness (ATP) as it exhibited lower path coefficient of 0.05 (Figure 2).

The results of H5 showed that comfort derived in public space (CTP) can determine public space quality (QTP) having path loading of 0.23. Finally, public space attractiveness (ATP) was found not to positively influence public space quality (QTP) as it demonstrated negative contribution having -0.12 (Figure 2). In Figure 3, the model analysis result reflect that accessibility (ACC) and comfort derived in public space (CTP) enjoyed strong relationship with other public space attributes having demonstrated a practically significant correlation path coefficient of approximately ≥ 0.2 with other attributes. Public space attractiveness (ATP) and quality of publicspace (QTP) exhibited weak correlation path coefficient relationship of 0.03 that below the marginal and acceptable significant level(Cohen, 1992a; 1992b).

Table4
Overall model fit indices.

Measures	Fit index	Scores	Recommended value	Literature
Absolute fit measures	x^2/df.	1.622	$\leq 2^{xx}$, $\leq 3^{x}$, $\leq 5^{x}$	Browne &Cudeck, (1993)
	GFI	0.937	$\geq 0.9^{xx}$, $\geq 0.80^{x}$	
	RMSEA	0.054	$\leq 0.05^{xx}$, $\leq 0.08^{x}$	Chau& Hu, (2001)
Incremental fit measure	NFI	0.970	$\geq 0.90^{xx}$	
	AGFI	0.904	$\geq 0.90^{xx}$, $\geq 0.80^{x}$	Browne &Cudeck, (1993)
	CFI	0.977	$\geq 0.90^{xx}$	
Parsimonious fit measure	PCFI	0.739	Higher score prefer	Chow & Chan, (2008)
	PNFI	0.713		

Acceptability: Acceptable: ^{xx}, marginal: ^{x}
$P \leq 0.002$ level

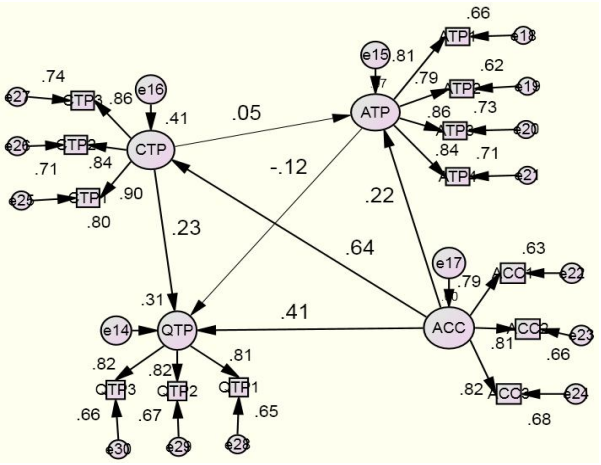

Figure 2. Results of AMOS regression analysis

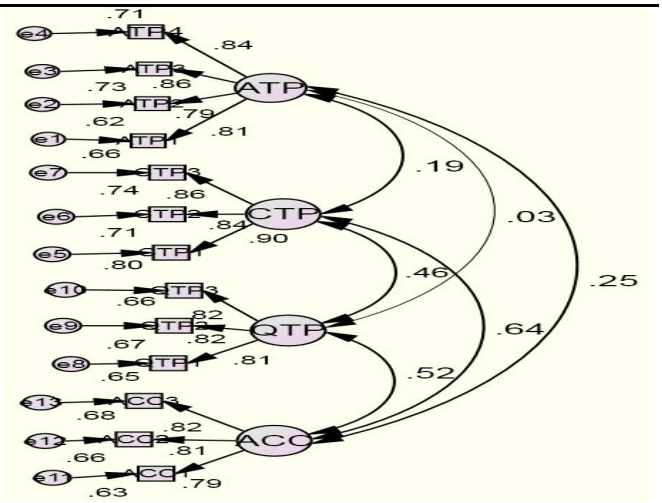

Figure 3. Results of AMOS correlation analysis

Note: Comfort =CTP, Quality =QLP, Accessibility =ACC, Attractiveness =ATP

DISCUSSION AND IMPLICATIONS

This study proposed theoretical research model for empirical studies to link public space utilization attributes. Our aim is to develop an understanding on the influence of accessibility, quality, attractiveness and comfort derived in public space on each another in their contribution to its utilization.

Reviewing the weights across all dimensions (Table 5 and 6), the findings revealed that accessibility to public space has positive influence in determining the attractiveness of public space. It equally has influencing potentials on the quality of public space and the comforts derived in it. Therefore, this research outputs strongly supported previous literature (Giles –Corti, 2005) that suggested accessibility as an attribute that contributed higher to public space utilization. In addition, Whyte (2000) posits that accessibility remain primary in determine public space utilization and that it can help in predetermine the influencing level of other public space predicting attributes.

Considering the comfort derived in public space, it was reflected that the attractiveness of public space cannot be predicted by its comfort as the path loading below the practically significant status of loadings in relation to attractiveness (Figure 2and3). However, this factor can be justified in the context of science city physical environment that foothold to beatification and aesthetic settings (Ergazakis, 2004, Rasidiand Shinozaki, 2009). On this basis, it can be opined that the attractiveness factor of public space in science city have been somehow overshadowed by the entire science city beatification outlook. Therefore, emphases are not attached to public space aesthetic as the city beauty can be experienced at every area of its physical environment. The comfort derived in public space was found to practically significant to the quality of public space. Thisfinding is consistent with literature that associated quality of public space facilities and amenities to the expected user's comfort (Hines, 2003; Paumier, 2004). Meanwhile, the result strongly reflected that the possibility of attractiveness of public space to predict its quality was not visible.

It was observed from the analysis research model that only accessibility of public space can predict its attractiveness(Figure 3). This implies that accessible is primary among other factors that determined public space utilisation.It can therefore be suggested that for effective public space accessibility, the attractiveness and good quality attributes of the public space should be considered to trigger users comfort and embraces higher patronage.

Table 5

Summary regression result for the model constructs

Path	Hypothesis	Hypothesized	Path coefficient	Results
ACC→ATP	H1	Accessibility to public space will positively influence its attractiveness	0.22	Supported
ACC→CTP	H2	Accessibility to public space will positively influence comfort derived from it.	0.64	Supported
ACC→QTP	H3	Accessibility to public space will positively influence its quality	0.38	Supported
CTP→ATP	H4	Comfort derived in public space will influence its attractiveness	0.09	Not Supported
CTP→QTP	H5	Comfort derived in public space will positively determines its quality	0.22	Supported
ATP→QTP	H6	Public space attractiveness will positively influence its quality	-0.16	Not Supported

Note: Comfort =CTP, Quality =QLP, Accessibility =ACC, Attractiveness =ATP

Table6

Summary correlation result for the model constructs

Path		Hypothesis	Hypothesized	Path coefficient	Results
ACC	ATP	H1b	Accessibility to public space has significant relationship with its attractiveness	0.25	Supported
ACC	CTP	H2b	Accessibility to public space has significant relationship with comfort derived from it.	0.64	Supported
ACC	QTP	H3b	Accessibility to public space has significant relationship with its quality	0.52	Supported
CTP	ATP	H4b	Comfort derived in public space has significant	0.19	Supported

			relationship with its attractiveness		
CTP	QTP	H5b	Comfort derived in public space has significant relationship with its quality	0.46	Supported
ATP	QTP	H6b	Public space attractiveness has significant relationship with its quality	0.03	Not Supported

Note: Comfort =CTP, Quality =QLP, Accessibility =ACC, Attractiveness =ATP

CONCLUSION AND LIMITATIONS

Much and validated coherent data are not readily available for public space satisfaction and utilization determinant. The finding of this study is one of the maiden attempts to present empirical evidence on the interface and contributing potentials within the public space utilization measuring attributes as a precursor towards effective public space development. The study offers an insight to significantof quality, comfort, attractiveness and accessibility to public space.Hence, understanding public space utilization attributes is crucial to cities and urban designers in enabling them to provide an effective public space in science cities and urban centres. Therefore, this study has developed understanding of the interface, associations and influences exhibited among the tested public space utilization attributes. It presented the degree of each attribute potential impacts on another in relation to its usages. This finding fashioned a significant professional clues on the degree of necessity and types of attributes requires when proposing and designing public spaces in science cities. This was supported in the analysis result model that postulates the examined public space utilization attributes as contributing factor in determine its patronages. Users need to be attracted by the beauty, features and settings in public space to develop visiting interest. As such, higher efforts should tends towards developing aesthetical and nature appealing public spaces of high quality amenities and facilities that will out-stand other physical environs in the city.

Accessibility was found to haveoverriding impact on public space utilization. Therefore, urban designers should direct much of their expertise on the location, proximity and access barrier free public space as to affirm the factor of its publicness. The facilities and amenities provided in public space should be of good and users acceptance quality to strengthening user's accessibility degree and influence the comfort derived in public space. This research was carried out in technology oriented city. The study finding may not reflect the situation of public space in conventional cities where much emphasis may not be attached to city physical environment unlike in science cities. Future studies should look into a comparative study of public space in the conventional cities and the science cities.

REFERENCES

Antrop, M. (2005)Why landscapes of the past are important for the future.*Landscape and Urban Planning* 70 (2005) pp.21–34

Bagozzi, P .R andYi,Y. (1988) On the evaluation of structural equation model, Journal of Academy of Marketing Science 16 (1) (1988) pp.74–94.

Beck , H. (2009) Linking the quality of public spaces to quality of life.*Journal of place management and development*.Vol 2 No. 3 pp. 240-248

Bertolini, L andDjist, M (2003) Mobiity environments and network cities.*Journal of Urban Design* 8(1), pp.27–43.

Browne, M.W andCudeck,R. (1993) Alternative Ways of Assessing Model Fit,SagePublications, Newbury Park, 1993.

Buchecker, M. (2005) Public space as a resource of social interaction.Inp.Turner and E.Davenport (Eds). Spaces, Spatial and Technology . pp. 76-79

CABE-Space. (2005; 2007) http://www.cabe.org.uk/AssetLibra ry/2314.pdf

Carr, S., M. Francis, L.G. RivlinandStone, A.M. (1992)*PublicSpaces*. Cambridge: CambridgeUniversity Press.

Carmona, M., T. Heath.,Oc, TandTiesdell, S. (2003) Public Places, Urban Spaces: The Dimensions of Urban Design, Oxford, Architectural Press.NY Oxford OX28DP ,ISBN 0 7506 3, pp.96-102. www.architecturalpress.com

Carmona, M., Oc, T andSTiesdell. (2007)Urban Design Reader; Published by Architectural Press, uk .ISBN-13:978-0-7506-6531-5, 10:0-7506-6531-9 pp.103-104

Carmona,M., Magalhães.C and Hammond.L.(2008) Public Space: The management dimension Firstpublished 2008 by Routledge, 2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN. Simultaneously published in the USA and Canada by Routledge 270 Madison Avenue, New York, NY 10016, USA. ISBN 0-203- 92722-2 Master e-book ISBN.

Carrillo,F.j. (2004) Capital cities. A taxonomy of capital accounts for knowledge cities. Jounalof knowledge management". Special issue on knowledge based development in knowledge cities vol 8 number 5, Pp 28-46.

Carti, B., Donovan, R.J and Holman, C.D.J (1996). Factors influencing the use of physical activity facilities results from qualitative research. *Health Promotion Journal*(6) PP.16-21.

Cerin E, Cain K, Conway TL, et al., (2014). Neighborhood environments and objectively measured physical activity in 11 countries. Med Sci Sports Exerc 2014;44:2253–64.

Chau, P.Y.K andHu, .P.J.H. (2001) Information technology acceptance by individual professional: a model comparison approach, Decision Sciences 32 (4) pp.699–719.Child, M.C. (2004). Squares ; A public design Guide for urbanist. U.S.A .University of New Mexico Press.

Chiesura,A. (2004) The roles of urban parks for the sustainable city.Landscapeurban plan.(68) pp. 129-138.

Chow.S.W.& Chan. S.L. (2008) Social network, social trust and shared goals in organizational knowledge sharing. Information and Management 45 pp.458-465

Cohen, J. (1988)*Statistical Power Analysis for the Behavioral Sciences* (2nd ed.), New Jersey: Lawrence Erlbaum Associates, ISBN 0-8058-0283-5, retrieved 10 July 2010.

Cohen, J. (1992a) A power prime, *Psychological Bulletin*112 (1): pp.155–159, DOI:10.1037/0033- 2909.112.1.155, retrieved 10 July 2010

Cohen, J. (1992b)Statistical power analysis", *Current Directions in Psychological Science*1 (3), retrieved 10 July 2010 JSTOR link.

Ergazakis, K., Metaxiotis, K. &Psarras, J. (2004) Towards knowledge cities: conceptual analysis and success stories, *Journal of knowledge management*, vol. 8.no 5,pp5-15.

Erkip, F. (1997) The distribution of urban public services: the case of parks and recreational services in Ankara. *Cities* 14(6), PP.353–361.

Ester C et. at. (2015) BMJ Open 2016;6:e010384. doi:10.1136/bmjopen-2015-010384

Federal Department of Town Planning.(2000)The physical plannibg guidelines for the multimedia super corridor. Kuala lumpur: ministry of housing and local government Malaysia.

Fornell, C andLarcker,D.F. (1981) Evaluating structural equation models with unobservable variables and measurement error, *Journal of Marketing Research* 18 (1) PP. 39–50.

Gehl, J. (2001) three types of outdoor Activities and quality of outdoor space in Gehl(1996).life between Buildings using public space,ArkitektensForlag, skive, pp. 11-40

Gobster P. (2002) Managing urban parks for a racially and ethnically diverse clientele. Leisure Sci ;24: pp.143–59.

Golicnik, B & Thompson, W.C. (2010)Emerging relationship between design and use of urban park spaces.*Landscape and Urban Planning*. (94) pp. 38-53

Giles-Corti et al.,(2005).Increasing Walking: How Important Is Distance To,Attractiveness, and Size of Public Open Space? *American Journal of Medicine.*Published by Elsevier Inc. 28 (252) pp.169-176

Joreskog, K.G. andSorbom, D. (1996) LISREL 8: Structural Equation Modeling, Scientific Software International Corp., Chicago, IL.

Kline, J.D. (2006). Public demand for local preserving of open space. Society and Natural Resources.19 pp. 645- 659.

Kong, F., Yin, H &Nakagoshi, N. (2007) Using GIS and landscape metrics in the hedonic price modelling of the amenity value of urban green space: A case study in Jinan City, China. *Landscape and Urban Plannning.* 79 pp.240-252

Kurniawati, W. (2012) Public space for marginal people.Procedia-social and behavioural science 36 pp. 476-484 www.sciencedirect.com

Landry, S. M., &Chakraborty, J. (2009). Street trees and equity: Evaluating thespatialdistribution of an urban amenity. *Environment and Planning A*, 41(11),pp. 2651–2670.

Lawrence, H.W. (1993). The greening of the square of London: Transformation of urban landscape and ideas. Annals of the Association of American Geographers 83 pp. 90-118

Low, S., Taplin, D &Scheld, S. (2006)Rethinking urban parks.Public space and cultural diversity. Austin University of Texas

Lynch, K. (1960)The Image of the City,MIT Press, Cambridge, MA.

Nunnally, J.H &Bernstein,I.H. (1994) Psychometric Theory, McGraw-Hill, New York,

Oguz, D. (2000) User survey of Ankara's urban parks.*Landscape and Urban Planning.*52 pp. 165-171.

Pasaogullari, N and Doratli, N. (2004) Measuring accessibility and utilization of public spaces in Famagusta. *Cities*, Vol. 21, No. 3, Pp. 225–232.

Paumier, M. (2004) Creating a vibriantcity centre: Urban design and Regeneration principle.Washoning ,D.C: Land Institute.

Rasidi, M.H andShinozaki, M. (2009) Physical Environment and Need of Community in High Tech Park Development: Case study of Cyberjaya,

Malaysia and Tsukuba Science City, Japan: *Journal of Habitat Engineering*, vol.1, no.1 pp249-250.

Rogers, W. (2003) The excellent city park system. In What Makes it Greatand How to Get There, (ed) P Harnik. The Trust for Public Land Pub,Washington, DC.

Sallis, J, Bauman A,and Pratt M. (1998) Environmental and policy interventions to promote physical activity. *Am J Prev Med*.;15 pp.379 –97.

SetiaHerumanSdn. Bhd. (2007). SetiaHarumanSdn. Bhd. – The country intelligent city Malaysia.RetrivedDecember 13th 2009. www.cyberjaya-msc.com

Scazzosi, L. (2004) Reading and assessing the landscape as culture and heritatage.Landscape Research. 29 (4) pp. 335-355.

Shuhana, S andNursidah, U (2008) Making places: The Role of Attarchmentin creating the sense of place for tradition streets in Malaysia. Habitant Interenational 1, 4 pp.1-11.

Stephenson, H and Hepburn, J. (1955) Plan for the metropolitan region perth and fremantle.Perth, Western Austrialia; Government printing office.

Talen, E. (2000) Measuring the public realm : a preliminary assessment of the link between public space and sense of community. *Jjournal of Architectural and planning Research* 17 (4). Pp.344-359.

Talen, E., andAnselin, L. (1998) Assessing spatial equity: An evaluation of measures of accessibility to public playgrounds. *Environment and Planning* A, 30(4), pp.595–613.

Tinsley H, Tinsley, D andCroskeys, C. (2002) Park usage, social milieu and psychosocialbenefits of park use reported by older urban park users from four ethnic groups. *Leisure Sci* ;24: pp. 199 –218.

Townshend , T.G andMadanipour, A.(2008) Public space and Local Diversity: The case of North East England. *Journal of Urban Design* (13) pp. 317- 328.

Tweed, C & Sutherland, M. (2007)Built Cultural Heritage and Sustainable Urban Development. *Landscape and Urban Planning* (83) pp.62-69.

Tsou, K. W., Hung, Y. T., and Chang, Y. L. (2005) An accessibility-based integratedmeasureof relative spatial equity in urban public facilities.*Cities*, 22(6),pp.424–435.

Ward Thompson, C. (2002) Urban open space and contemporary needs.*Landscape Journal.*17 (1) pp. 1-25.

Whyte, W.H. (1980) The social life of small urban spaces. Washington DC. Conservation Foundation,1980.

Whyte, H.W. (2000) How to Turn a Place Around.Projects for Public Space Inc.

Wu, J.J andPlantinga, J.W. (2003)The influence of public open space on urban spatial structure.*Journal of Environmental Economics and Management* (46) pp.288-309.