Principles For Sustainable Riverfront Development For Malaysia

Azlina Binti Md. Yassin [1], Sandy Bond[2], & John McDonagh[3]

mdyassia@lincoln.ac.nz[1], sandy.bond@lincoln.ac.nz[2] & mcdonagj@lincoln.ac.nz[3]

University Tun Hussein Onn Malaysia[1] & Lincoln University, New Zealand[2]

Abstract

River and water are important resources for human life, environment and national development. In Malaysia, the importance of rivers as the focal point of the city was established from early times of civilisation and remains forever. Population and economic growth, urbanisation and increased technology have transformed many Malaysian river systems from water industries into non water industries. Due to these changes, the function of the riverfront areas have also changed and the current pattern of riverfront development in Malaysia now focus more on mixed-use development and recreation. Presently, numbers of riverfront development projects were developed in Malaysia for recreation, residential, and mixed-use. Unfortunately, in most cases, the developments identified are not successful whereby, having cost effects more than economic value. For example, increases in water pollution indexes and rates of juvenile problems. The focus of this study was to examine waterfront development in Malaysia as well as to identify the attributes of waterfront development, in order to develop guidelines for waterfront development. The findings of this research were based on interviews conducted with Government officers, Property developers, and the Waterfront community from three case study areas (qualitative phase), and from questionnaires mailed and e-mailed to property development companies listed under Bursa Malaysia (quantitative phase). The findings identified 18 attributes to be used in assisting developers when undertaking waterfront projects in the future. The attributes identified were then recommended to be used as guidelines of best practices of riverfront development in Malaysia.

Keywords: Waterfront, Waterfront Development, Riverfront Development, Riverfront Development guidelines

INTRODUCTION

Since the beginning of civilisation, rivers have played a major and important role in shaping and influencing the development of the nation and the culture of its people. In fact, in Malaysia, settlements have historically sprung up along river banks, hence, many urban cities in Malaysia such as Kuala Lumpur, Terengganu, Malacca, Kuantan, Kota Bharu, and Kuching were established after waterfront settlements had developed - developed on river edges or in river valleys (Andaya & Andaya, 2001; Latip, Heath, Shamsuddin, Liew, & Vallyutham, 2010; Weng, 2005). As a consequence, some of the villages were named after the rivers that ran through them namely, Sungai Rengit, Sungai mati and Sungai Kapal in Johor (Yassin, Eves, & McDonagh, 2010a).

Rapid development and urbanisation all over the country especially following earlier civilisation and including waterfront areas is causing the deterioration of the natural environment such as by flooding, pollution and drought (Weng, 2002, 2009; Weng, Ibrahim, & Hajar, 2002). These problems disturb economic growth and the activities of life and can result in the loss of property and lives (Abidin, 2004; Malaysian Department of Environment, 2007). Also, not effective governance and inadequate regulations for the control of waterfront developments in this country (Latip, et al., 2010; Yassin, Eves, & McDonagh, 2010b) have led Malaysia to suffer with the adverse environmental and social effects.

Therefore, this paper aims to examine waterfront development in Malaysia as well as to identify the attributes which are desirable to be included in the guidelines for riverfront development in Malaysia in the future, from the waterfront development stakeholders' point of views. A sequential exploratory mixed-method strategy was adopted in specifically in this research, a qualitative method followed by a quantitative method. A qualitative method by way of case studies with one-to-one interviews and document reviews was used to investigate the relevant information for regulations and guidelines of riverfront development in Malaysia. Information gathered was then included in a questionnaire, which was then distributed to property development companies in Malaysia. The purpose of the quantitative phase (questionnaire survey) was to confirm statistically the respondents' responses about riverfront development guidelines in an effort to improve riverfront development practices in Malaysia in the future.

REVIEW OF THE LITERATURE

Waterfront and Waterfront Development

In general, the waterfront refers to land fronting on to water (Dong, 2004). Even though the word waterfront itself is clear some researchers prefer to use different words to replace the term waterfront, for example city port, harbour front, riverside, river edge, water edge and riverfront (Hoyle, 2002; H. Hussein, 2006; Mann, 1973; Tunbridge & Ashworth, 1992; Watson, 1986).

The waterfront is a zone of interaction between urban development and the water and a waterfront area is considered to be a unique and irreplaceable resource where it interfaces between land, water, air, sun and productive plants (Wrenn, 1983). Moreover, Zhang (2002) characterised waterfronts as a place integrating land with water and having a natural attraction to people. In fact, water edges are most attractive water features for human settlement and in most countries the land in front of water developed earlier than the inland areas.

In the development context, waterfront development has various interpretations depending on the characteristics of the sites and the cities (Dong, 2004). Butuner (2006) sees waterfronts as land to be reclaimed from water in order to create an extension of existing city centres.

Breen and Rigby (1994, 1996) considered that waterfront development may not necessarily need to directly front water but may need only to look as if it is attached to the water. They believed that a property with a commanding view of water, can be considered as a waterfront property. Similarly, Ryckbost (2005) sees waterfronts as any property that has a strong

visual or physical connection to water with the water itself being any type of water body such as a lake, the ocean, a river or a stream of all sizes (Breen & Rigby, 1994, p. 10).

For example, in China, developers classified two types of waterfront development. The first is called a "borrowed" water view which integrates buildings into an existing water system and, the second is called a "created" water view which includes man-made lakes and any other water body (Murray, 2003). In this context, by being an interface between land and water, a waterfront is considered an important resource that offers great opportunities to a city.

Therefore, waterfront development is best represented as a development directly fronting water for any purpose and the water components can include river deltas, coastal plains, wetlands, beach and dunes, lagoons and other water features. Also, the boundary of where the water and land meet is difficult to determine and depends on jurisdictional limits and the administration of the country.

Terms "Waterfront and Waterfront Development" in this Research

In this research, waterfront development is used to represent such terms as waterfront revitalisation, waterfront rehabilitation and other terminologies. The word (re) development is only used when it is necessary to differentiate between the redevelopment of a previously built-up area and a new development on a new site. Waterfront development in this research refers specifically to the development of the riverfront. This study focuses on any riverfront development use such as residential, mixed-use development or recreational.

The exclusion of the waterfront development types, for example coastal development, is because in Malaysia, the coastal areas are generally managed in a sectoral in nature (Hussein, 2008; Mokhtar & Aziz, 2003). The executive and legislative functions relating to coastal zone management has determined by Federal Constitution 1957, either been delegated to Federal and State government or remained partly shared by both, with local authorities sometimes acting as a channel for the Federal and State government. This management approach is based on a tiered structure between the Federal and State Governments and the Local Authorities. At each level of government there are staffs responsible for playing the management roles of planning and coordination, implementation and enforcement, and developmental roles, within their jurisdictions.

Principles for Successful Waterfront Development

Torre (1989) determined that the success of a waterfront development is only achieved once it can function on all levels and benefit all stakeholders. Torre (1989) expressed his view on successful waterfront development as follows:

> "No matter how unique or exciting is a riverfront development, it can only be successful if it functions on all levels. From regional access and circulation, to adequate parking capacity, to ease and comfort of pedestrian movement, to the visitors' overall experience, all levels must sequence successfully as well as meeting the capacities on peak activity days."
>
> (p. 38)

Therefore, in order to achieve the specific aims of a successful waterfront development, Torre (1989) identified 10 elements recommended to be taken into consideration while planning a waterfront development, as presented in Figure 1 below.

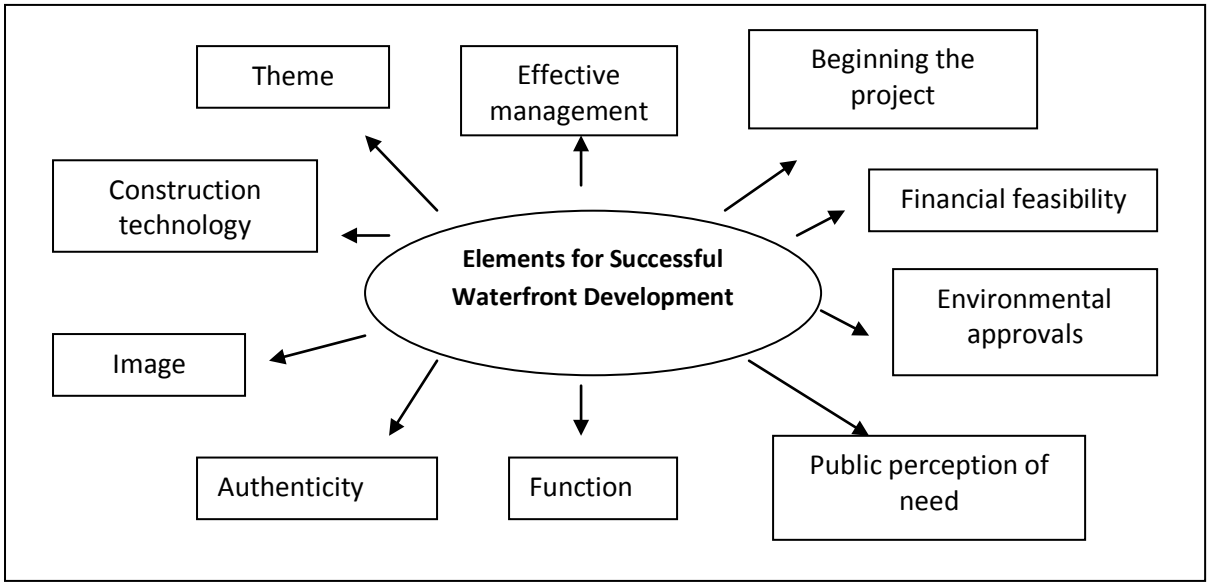

Figure 1: Elements for Successful Waterfront Development
Source: Torre, 1989

In addition, Bertsch (2008) recommended several principles that must be included while developing plans for waterfront areas, as follows:-

i. Accessibility – the waterfront should not be isolated or separated from the development, so that the public can access the waterfront easily (convenient means for visitors to access the waterfront area).
ii. Integrated – integration of the history, culture and existing architecture are recommended for a new waterfront development.
iii. Sharing benefits – a balance between public benefit and developer profitability must be found. A public-private partnership is essential for realising the inspiration of the design.
iv. Stakeholder participation – the involvement of multitudes of interested parties is compulsory: government agencies, developers, community organisations, environmental groups and the public all have a stake in the development of a waterfront property and all must be involved in the process.
v. Construction phase – breaking down a huge project into several phases and allowing all stakeholders and the general public to see this provides a vision for the future.

Thus, apparently, the harmonies of waterfront development could be achieved through combinations of people, nature and technology (Mann, 1973).

Principles for Sustainable Waterfront Development
Waterfronts are one of the most valuable resources for the country – being limited, precious and non-renewable assets. To secure long-term growth of the resource, it is important for waterfront areas to be used strategically to maintain their economic value and enhance their specific features or image (Bruttomesso, 2006). For this reason, Bruttomesso (2006) recommended 10 principles for securing excellence in waterfront redevelopment projects. The sustainable[1] principles are presented in Table 1 below.

[1]The widely accepted definition of sustainability is that proffered in the Brundtland Report which states; "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland Commission, 1987).

Table 1: Principles for Sustainable Waterfront Development

Ten principles for a sustainable waterfront development	Secure the quality of water and the environment. Waterfronts are part of the existing urban fabric. The historic identity gives character. Mixed-use is a priority. Public access is a prerequisite. Planning in public-private partnerships speeds the process. Public participation is an element of sustainability. Waterfronts are long term projects. Revitalisation is an ongoing process. Waterfronts profit from international networking.

Source: Bruttomesso, 2006

METHODOLOGY

A mixed methods research strategy - Sequential exploratory mixed method strategy, consisting of a qualitative approach followed by a quantitative approach, was employed in this study. The qualitative phase in this study was a case study, which was followed by a survey questionnaire in the second phase (quantitative approach). In this study, three case study areas were selected namely: Kuching Waterfront in Sarawak, Malacca Waterfront in Malacca and Glenmarie Cove Riverfront in Selangor.

A key requirement in the selection of the case studies was that they comprise a well known waterfront development project. The other selection criteria for the cases were as follows:

i. Waterfront area – development at the front of a river.

ii. Type of waterfront project – specifically recreational and residential.

iii. Willingness of all parties involved in the development to be personally interviewed.

iv. Availability of documents related to the development projects.

v. Project reputation as successful waterfront development.

Selection of a number of case studies with similar characteristics between them enabled literal replication to be better achieved. Moreover, it helped to ensure an adequate cover of different perspectives. The location plan of each case study area is presented in Figure 2.

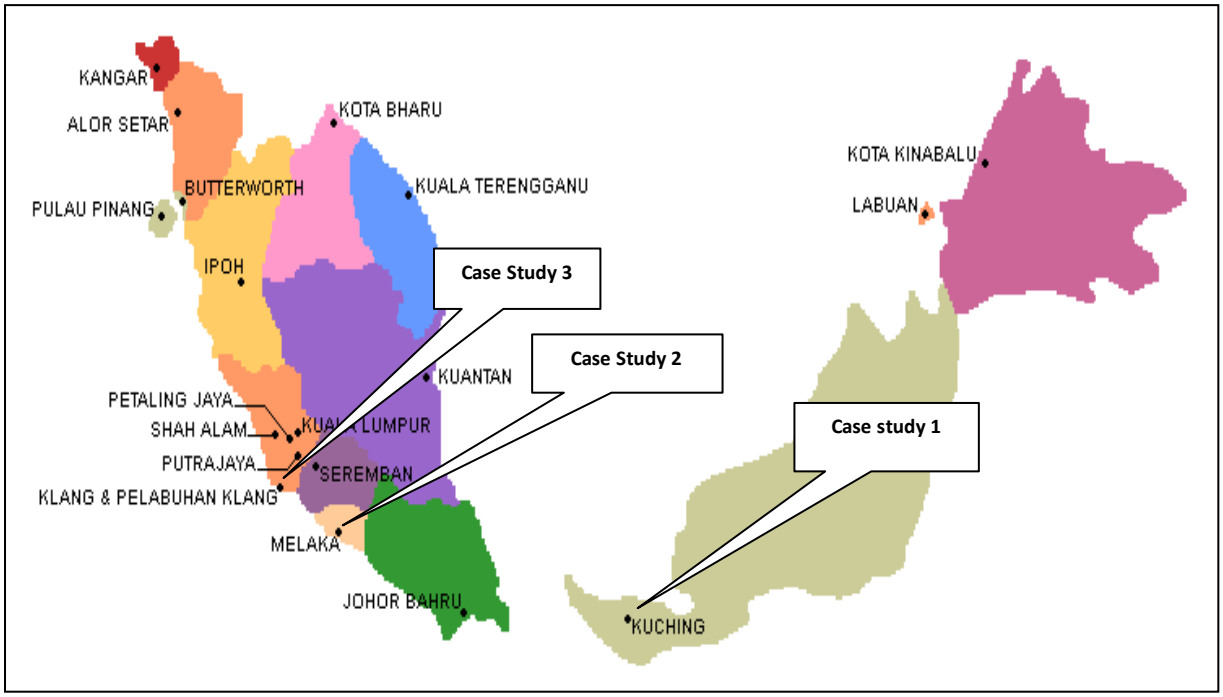

Figure 2: Location map of the case study areas

Source: Selangor State Government, 2009

For the quantitative approach, the sample data comprised of property development companies listed at Bursa Malaysia during 2009. The strengths of both qualitative (identification of new considerations) and quantitative methods (confirmation of statistical significance of newly identified considerations) were combined in order to provide more robust and comprehensive results. The use of multiple methods within a single study offered wide perspectives and more extensive results through the combination of a variety of data sources (Creswell, Clark, Gutmann, & Hanson, 2003, p. 11; Morse, 2003, p. 195; Tashakkori & Teddlie, 2003, p. 16).

RESULTS AND DISCUSSION

This section presents results derived from the exploratory analysis and the statistical analysis. In the qualitative result based on response rate and recommendation for best practice for waterfront development.

Qualitative Results

- **Response Rate**

Interviews were sufficiently well answered to allow a response rate of 100% to be obtained. A total of 25 face-to-face interviews were conducted within the 10 weeks from the 10th of May to the 20th of July 2009. Input was obtained from three different sources: (i) Federal, State and Local Governments, (ii) Private developers, and (iii) waterfront community. Table 2 present the diversification of the interviewees who participated in the interviews.

Table 2: Composition of the interviews

Organisation	Number of Interviewee	Percent (100)
Federal Government	3	12
State Government	5	20
Local Authority	10	40
Private Sector	2	8
Waterfront community	5	20
TOTAL = 25		

Waterfront Development in Malaysia

From the interviews it appears that the majority of interviewees were aware about the transformation of waterfront areas – from the abandoned spaces to developed areas and public uses. Observation of the case study areas show that waterfront functions had changed to recreation and mixed-use development. From interviews, several factors led to the transformation of waterfront areas in Malaysia were identified, as presented in Table 3.

Table 3: Transformation factors for waterfront areas

Factor	n = 25	Percentage (%)
Development and redevelopment.	16	64
Urbanisation.	11	44
Improved quality of life.	7	28
Industrialisation.	6	24
Increase in population.	6	24
Increased environmental concerns.	5	20
Tourism activities.	5	20
Upgrading transportation system.	5	20
Resettlement programmes.	4	16

Waterfront Development – in the Future

From the interviews, it appears that the majority of interviewees (84%) agreed that waterfront development in Malaysia will be increased in terms of numbers. On the other hand, about 16% were not sure whether the number of waterfront development projects will be increased in the future. The interviewees who indicated not sure responses thought that waterfront development require more resources (human and capital) and that they also have the potential for costs to outweigh benefits.

Recommendations for Best Practice for Waterfront Development in Malaysia

All 25 respondents gave useful feedback that resulted in eighteen recommended statements. From the eighteen recommendations, 44% of the respondents thought that all waterfront development projects should require compulsory approval for Environmental Impact Assessment (EIA). Moreover, 56% of the respondents thought that new guidelines for waterfront development in Malaysia should emphasise the river reserves beautification aspect and that the river be continuously rehabilitated. Respondents also thought that the guidelines for waterfront development should include provision for sufficient public facilities and amenities such as

pedestrian paths, toilets, landscaping and recreation areas, which accounted for 52%. Respondents' suggestions about which statements that should be included in new guidelines for waterfront development in Malaysia are presented in Table 4 below.

Table 4: Statements for Waterfront Development guidelines

No.	Statement	(100%)	No.	Statement	(100%)
1.	Environmental Impact Assessment (EIA) is compulsory.	44	10.	Continuous river rehabilitation.	20
2.	Environment protection and awareness.	40	11.	River reserve beautification.	36
3.	Maintenance and rehabilitation costs are shared between stakeholders.	32	12.	Upgrading and maintaining sewage systems.	12
4.	Use environmentally friendly materials in construction.	16	13.	Restrict type of developments.	28
5.	Provide flood mitigation (e.g. by planting more trees).	16	14.	Integrate both modern and heritage aspects into developments.	24
6.	Protection of natural resources (water and environment).	24	15.	Encourage economic activities.	8
7.	Provision of sufficient public facilities and amenities (such as pedestrian paths, landscaping, access ways, recreation areas, etc.).	52	16.	Sharing waterfront benefits (such as view, financial rewards, etc.) among stakeholders (e.g. community, government, property developer).	16
8.	Personal security is maintained by means of policing, surveillance cameras, etc.	20	17.	Continuously educate public about environmental concerns.	4
9.	Upgrading and maintaining established settlements along the waterfront areas.	4	18.	Provide regulations and policies that mitigate market speculation for waterfront properties.	4

QUANTITATIVE RESULTS

Response Rate The sample data comprises property development companies listed under Bursa Malaysia during 2009. Only 91 property development companies were listed in 2009 (Bursa Malaysia, 2009). Of the 91 questionnaires mailed and e-mailed to the respondents, 61 were returned within three months of the response period (survey was conducted between April and July, 2010). This resulted in a total of 67% useable response rate.

Profile of Property Development Companies

Information of the property development companies who were respondents to the survey questionnaire was supplied as background information in order to provide more detail about the respondents. The profile of property development companies in Malaysia are presented in Table 5 below.

Table 5: Profile of Property Development Companies

Variables	Details	n = 61	Percent (%)
Location of operations	National (within Malaysia)	49	80.3
	International (outside Malaysia)	0	0
	Both national and international	12	19.7
Year of operating	Below 1 year	0	0
	2 - 5 years	0	0
	6 – 10 years	4	6.6
	Over 10 years	57	93.4
	Not sure	0	0
Number of employees	0 – 10 people	0	0
	11 – 50 people	6	9.8
	51 – 100 people	10	16.4
	Over 100 people	42	68.9
	Do not know / Not sure	3	4.9
Type of development projects	Residential: Yes	61	100
	Commercial: Yes	53	86.9
	No	8	13.1
	Industrial: Yes	25	41
	No	36	59
	Others: Yes	7	11.5
	No	54	88.5

From the results, it appears that the range of the respondents represented in the sample were similar: is that they were property development companies that had been actively practising property development for many years and were listed in Bursa Malaysia.

Waterfront Development in Malaysia

The overall finding in this study is that nearly a third (32.8%) of the property development companies undertook waterfront development projects in Malaysia, while the rest (67.2%) were not involved in waterfront development in Malaysia or internationally.

Of the 67.2% of respondents who did not undertake waterfront development projects, more than half (58.6%) of the respondents are now motivated to undertake waterfront development in the future, 14.6% have decided not to undertake waterfront development in the future and 26.8% are still not sure whether to undertake waterfront development or not, depending on the financial support and demand for waterfront property at the time. Based on these responses it appears that waterfront development in Malaysia may increase in the future.

Of the one third of respondents who undertake waterfront development, over half (60%) of them only incorporate between 1-20% of waterfront development in their projects. Twenty-five percent of respondents undertake waterfront development projects between 21-40% of the time, while 15% of them incorporate 41-60% of waterfront development in their projects.

From the 32.8% of respondents who undertake waterfront development, 75% of them had undertaken waterfront development for residential use, 70% were developed for mixed-use and 25% were developed for recreational purposes. However, the results indicated that no companies developed waterfront projects for industrial use, while only five percent developed them for 'other' uses.

The results indicated that "a profit/financial benefit" and "to diversify property type of development" considerations greatly influence the respondents' decisions as to whether to undertake waterfront development in Malaysia, accounting for 35% for each response. Twenty

percent of the property development companies undertake waterfront development for the conservation of natural resources, while 10% undertake waterfront projects for 'other' reasons such as public benefit use such as to provide public amenities for locals and visitors. Table 6 summarises results for waterfront development in Malaysia.

Table 6: Waterfront Development in Malaysia

Variable	n=61	Percent (%)
Undertake waterfront development projects:		
Yes	20	32.8
No	41	67.2
Undertake waterfront development projects in future:		
Yes	24	58.6
No	6	14.6
Not sure	11	26.8
Percentage of waterfront development projects:		
1-20%	12	60
21-40%	5	25
41-60%	3	15
Type of waterfront development projects:		
Residential	15	75
Commercial	8	40
Mixed-use	14	70
Industrial	0	0
Recreational	5	25
Other	1	5
Primary motive for undertaking waterfront development:		
Profit/financial benefits	7	35
To diversify property type of development	7	35
Conservation of natural resources	4	20
Other	2	10

Recommendations on the Statements for Waterfront Development Guidelines

In the final part of the questionnaire form, a question was included to determine the respondents' levels of agreement about various statements in future waterfront development guidelines for Malaysia. Eighteen statements were provided as outlined in Table 7 below. These statements were obtained from the interviews conducted in the first phase of data collection to determine if there were statistically significant statements to be recommended for future waterfront development guidelines for Malaysia, based on the mean scores. Table 7 below summarises the responses.

Table 7: Statements for Waterfront Development Guidelines

Statements	Mean score	Ranking
River reserve beautification.	4.39	1
Participation among stakeholders should be compulsory at every stage of the development.	4.36	2
Environmental Impact Assessment (EIA) is compulsory.	4.33	3
Sharing waterfront benefits (such as view, financial rewards, etc.) among stakeholders (e.g. community, government, developer).	4.31	4
Continuous river rehabilitation.	4.28	5
Upgrading and maintaining sewage systems.	4.26	6
Maintenance & rehabilitation costs are shared between stakeholders.	4.21	7
Provide flood mitigation (e.g. by planting more trees).	4.20	8
Should use environmentally friendly materials in construction.	4.18	9
Encourage economic activities.	4.13	10
Protection of natural resources (water and environment).	4.07	11
Provision of sufficient public facilities and amenities (such as pedestrian, landscaping, access ways, recreation areas, etc.).	3.93	12
Integrate both modern and heritage aspects into developments.	3.92	13
Personal security is maintained by means of policing, surveillance cameras, etc.	3.90	14
Restrict type of development.	3.89	15
Continuously educate public about environmental concerns.	3.85	16
Upgrading and maintaining established settlements along the waterfront areas.	3.64	17
Mitigate property speculation.	3.54	18
	Average mean score = 4.08	

* Scale: from strongly disagree = 1 to strongly agree = 5

Interpretation of the Exploratory Factor Analysis

A principal component factor analysis specifying six factors that included all variables for waterfront development guidelines was attempted with a VARIMAX normalised rotation, to highlight a simple structure amongst the six factors identified.[2] Table 8 below summarises the results of the exploratory factor analysis. The six factors extracted by factor analysis explained 66.26% of the variation in the data.

All factor loadings ranged from 0.548 to 0.821. Each factor was named according to the salient themes among the items (Hair, et al., 2006). The final factors were identified as Environment (Factor 1), Waterfront benefits (Factor 2), Mitigation (Factor 3), Beautification (Factor 4), Security (Factor 5), and Type of development (Factor 6). Hair et al. (2006) determined that items with higher loadings had a greater influence on the name selected to represent a factor and the name assigned to the factor should accurately reflect the items loaded on that factor.

Factor 1 was named '*Environment'* and was strongly correlated with variables associated with environmental matters. The variables included in Factor 1 are listed in Table 8 below such as 'Environment Impact Assessment (EIA) is compulsory', 'maintenance and rehabilitation costs are shared between stakeholders' and 'upgrading and maintaining established settlements along the waterfront areas'.

The second factor was named '*Waterfront benefits'*. This Factor included several variables such as 'sharing waterfront benefits such as views, financial rewards, etc. among stakeholders (e.g. community, government officers and developers)' and 'encourage economic activity'.

Factor 3 was named '*Mitigation'* and correlated highly with variables associated with public and developer awareness on waterfront development. Two variables were loaded in Factor 3 namely, 'mitigate property speculation' and 'continuously educate the public about environmental concerns'.

Factor 4 was named '*Beautification'* which was related to protecting natural resources close to waterfront development areas. This Factor included two variables namely, 'river reserve beautification' and 'protecting of natural resources e.g. water and environment'.

The collective name for the correlated variables loaded in Factor 5 was '*Security'* and relates to both waterfront users (community) and developers. Two variables loaded within this factor were 'personal security is maintained by means of policing, surveillance cameras, etc.' and 'should use environmentally friendly materials in construction'.

Factor 6 posed a challenge as most variables with high loadings were categorised with other factors. In the end, this Factor was called '*Type of development'* as this was the only variable that remained.

[2] In this research, an orthogonal rotation (VARIMAX) was conducted. The latent root criterion and the scree test criterion, which state that only factors with Eigenvalues greater than one should be used, was also considered in the choice of the number of factors to include (Hair, Black, Babin, Anderson, & Tatham, 2006).

Table 8: Factor Analysis Results: Principal Component Extraction

Factor number / Factor name / Factor variables	Factor					
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
	Environment	Waterfront benefits	Mitigation	Beautification	Security	Type of development
(1) Environment Impact Assessment (EIA) is compulsory.	.703					
(2) Maintenance & rehabilitation costs are shared between stakeholders.	.697					
(3) Upgrading and maintaining established settlements along the waterfront areas.	.674					
(4) Provision of sufficient public facilities and amenities (such as pedestrian paths, landscaping, access ways, recreation areas, etc.).	.670					
(5) Provide flood mitigation (e.g. by planting more trees).	.636					
(6) Continuous river rehabilitation.	.586					
(7) Integrate both modern and heritage aspects into development.	.574					
(1) Sharing waterfront benefits (such as views, financial rewards, etc.) among stakeholders (e.g. community, government, developers).		.827				
(2) Encourage economic activity.		.691				
(3) Upgrading and maintaining sewage systems.		.656				
(4) Participation among stakeholders should be compulsory at every stage of the development.		.551				
(1) Mitigate property speculation.			.799			
(2) Continuously educate public about environmental concerns.			.718			
(1) River reserve beautification.				.745		
(2) Protection of natural resources (water and environment).				.600		.821
(1) Personal security is maintained by means of policing, surveillance cameras, etc.					.737	
(2) Should use environmentally friendly materials in construction.					.548	
(1) Restrict type of development.						
Percentage Variation Explained	25.201%	9.875%	8.993%	8.552%	6.897%	6.742%
Cumulative Percentage Variation Explained	25.201%	35.076%	44.069%	52.620%	59.518%	66.259%

* Factor loadings in the range of ± .30 to ± .40 are considered to meet the minimal level for interpretation of structure. Loadings ± .50 or greater are considered practically significant, and loadings exceeding ± .70 are indicative of well defined structure (Hair, et al., 2006).

CONCLUSION

This paper examined the waterfront development practices in Malaysia and, the principles that important for sustainable waterfront development in Malaysia. From the results, it can be concluded that only a small number of property development companies had undertaken waterfront development projects in Malaysia, even though they had more than 10 years experience in property developments and employed sufficient numbers of staff. Moreover, although the results showed that only a small number of property development companies have undertaken waterfront development projects, however, the number of waterfront development projects in Malaysia is forecasted to increase in the future. These reasons are supported by the literature that indicate that the growing number of waterfront development and redevelopment projects throughout the world are attributed to several factors such as environmental awareness and smart growth, preservation and adaptive reuse, recreation, increased tourism and enhanced federal assistance (Gaffen, 2004; Tumbde, 2005). An increasing demand for recreational activities and a number of other factors have become determinants in the redevelopment process and waterfronts have been mostly designed as new public open spaces of cities that are totally different from their former structures (Butuner, 2006; Tsukio, 1984). To secure long-term growth of the waterfront resource, it is important for waterfront areas to be used strategically to maintain its economic value and enhance its specific features or image. Therefore, inclusion all of the principles (as presented in Table 8) in the planning for waterfront development for Malaysia is appropriate. Thus, apparently, the harmonies of waterfront development could be achieved through combinations of people, nature and technology (Mann, 1973). Further, it was considered that these principles should be used with modification to suit the current regulations and guidelines for the control of waterfront developments in Malaysia.

REFERENCES

Abidin, R. Z. R. Z. (2004). Water resources management in Malaysia: The way forward. Paper presented at the Asia Water 2004 (30th March-02rd April 2004), retrieved 24th July, 2008, from http://www.epu.gov.my/html/themes/epu/images/common/pdf/.../txtspeech.pdf.

Andaya, B. W., & Andaya, L. Y. (2001). A history of Malaysia (2nd ed.). Hampshire, Britain: Palsgrave

Bertsch, H. (2008). The key elements to successful waterfront design. Real Estate Weekly, 54.39.

Breen, A., & Rigby, D. (1994). Waterfronts: Cities reclaim their edge. United State: McGraw-Hill.

Breen, A., & Rigby, D. (1996). The new waterfront: A worldwide urban success story. New York: McGraw-Hill.

Brundtland Commission. (1987). Report of the World Commission on Environment and Development: Our common future: UN General Assembly, retrieved 16th April, 2010, from www.un-documents.net/wced-ocf.htm.

Bruttomesso, R. (2006). Waterfront development: A strategic choice for cities on water. Paper presented at the Waterfront Development Forum: China Maritime (02nd March 2006), Hong Kong, retrieved 24th January, 2009, from www.harbourbusinessforum.com/download/060303_transcript.pdf.

Bursa Malaysia. (2009). Products and services. Retrieved 20th January, 2009, from http://www.bursamalaysia.com/website/bm/

Butuner, B. (2006). Waterfront revitalisation as a challenging urban issue in Istanbul. Paper presented at the 42nd ISoCaRP Congress: Waterfront Revitalisation as a Challenging Urban Issue, retrieved 17th May, 2010, from www.isocarp.net/Data/case_studies/792.pdf.

Creswell, J. W., Clark, V. L. P., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed-methods research designs. In A. Tashakorri & C. Teddlie (Eds.), Mixed methods in social & behavioral research (pp. 209-240). Thousand Oaks, California: SAGE Publications, Inc.

Dong, L. (2004). Waterfront development : A case study of Dalian, China. Unpublished master thesis, University of Waterloo, Canada, retrieved 2nd June, 2008, from uwspace.uwaterloo.ca/bitstream/10012/988/1/I2dong2004.pdf.

Gaffen, Y. G. (2004). Cities riding waves of success with well-planned waterfront restoration. Public Management, 86(10).

Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tatham, R. L. (2006). Multivariate data analysis (6th ed.). New Jersey: Pearson Prentice Hall.

Hoyle, B. (2002). Urban waterfront revitalisation in developing countries: The example of Zanzibar's Stone town. The Geographical Journal, 168(2), 141-162.

Hussein, H. (2006). Urban recreational riverfronts: Successful revitalisation elements. Journal of Design and the Built Environment, 2 (1).

Hussein, J. (2008). Opportunities and challenges in sustainable construction. Paper presented at the International Conference and Expo on Environment Management and Technologies (ICEEMAT 2008) on (10th-12th December 2008), PWTC, Kuala Lumpur, retrieved 16th May, 2009, from www.puncakniaga.com.my.

Latip, N. S. A., Heath, T., Shamsuddin, S., Liew, M. S., & Vallyutham, K. (2010). The contextual integration and sustainable development of Kuala Lumpur's city centre waterfront: An evaluation of the policies, law and guidelines. Paper presented at the The World, Engineering, Science and Technology Congress (ESTCON 2010) (15th-17th June 2010), Kuala Lumpur Convention Centre, Malaysia, retrieved 29th January, 2011, from eprints.utp.edu.my/2811/1/SBI-06-CI-07.pdf.

Malaysian Department of Environment. (2007). Environmental quality report. Kuala Lumpur, Malaysia: Department of Environment, Ministry of Natural Resources and Environment Malaysia, retrieved 10th December, 2008, from www.doe.gov.my.

Mann, R. (Ed.). (1973). Rivers in the city. Newton Abbot: David & Charles.

Mokhtar, M., & Aziz, S. A. A. G. (2003). Integrated coastal zone management using the ecosystems approach, some perspectives in Malaysia. Ocean & Coastal Management, 46, 407-419.

Morse, J. M. (2003). Principles of mixed-method and multi-method research design. In A. Tashakorri & C. Teddlie (Eds.), Handbook of mixed method in social and behavioral research (pp. 189-208). Thousand Oaks, California: SAGE Publication, Inc.

Murray, G. (2003). A Room with a Water View. Beijing Review, 46(19), 26.

Ryckbost, P. (2005). Redeveloping urban waterfront property, retrieved 19th June, 2008, from www.umich.edu/~econdev/waterfronts/.

Selangor State Government. (2009). History: Location map of Selangor. Retrieved 10th August, 2009, from www.selangor.gov.my

Tashakkori, A., & Teddlie, C. (2003). Mixed methods in social and behavioral research. California: SAGE Publications Inc.

Torre, L. A. (1989). Waterfront development. New York: Van Nostrand Reinhold.

Tsukio, Y. (1984). Waterfront. Tokyo: Process Architecture Publishing Company.

Tumbde, D. (2005). Conceptual model for economically viable urban riverfront revitalization in United States. Unpublished master thesis, University of Cincinnati, retrieved 18th August, 2010, from rave.ohiolink.edu/etdc/view?acc_num=ucin1123542011.

Tunbridge, J., & Ashworth, G. (1992). Leisure resource development in cityport revitalisation: The tourist-historic dimension. In B. Hoyle & D. Pinder (Eds.), European port cities in transition (1st ed., pp. 177-199). London: Belhaven Press.

Watson, J. S. (1986). Ross's landing: A river edge park opportunity. Paper presented at the 2nd International Conference on Making Cities Liable, retrieved 10th June, 2008, from www.livablecities.org/documentationsets/15-waterfront-design.

Weng, C. N. (2002). Sustainable management of rivers in Malaysia: Involving all stakeholders. Paper presented at the Regional Symposium on Environment and Natural Resources (10^{th}-11^{th} April 2002).

Weng, C. N. (2005). Sustainable management of rivers in Malaysia – Involving all stakeholders. International Journal River Basin Management, 3(3), 147-162.

Weng, C. N. (2009). Issue and challenges in water governance in Malaysia. Environmental Health Science Engineering, 6(3), 143-152.

Weng, C. N., Ibrahim, A. L., & Hajar, A. R. (2002). The role of non-governmental organisations in water resources management in Malaysia. Paper presented at the Regional Symposium on Environment and Natural Resources (10^{th}-11^{th} April 2002), Hotel Renaissance Kuala Lumpur, Malaysia.

Wrenn, D. M. (1983). Urban waterfront development. Washington, D.C.: The Urban Land Institute.

Yassin, A. M., Eves, C., & McDonagh, J. (2010a). An evolution of waterfront development in Malaysia. Paper presented at the 16^{th} Pacific Rim Real Estate Society Conference (24^{th}-27^{th} January 2010), Intercontinental Hotel, Wellington, New Zealand.

Yassin, A. M., Eves, C., & McDonagh, J. (2010b). Waterfront development in Malaysia: Do we have sustainable governance? Paper presented at the PhD. Colloqium Program for 16^{th} Pacific Rim Real Estate Society Conference (24^{th}-27^{th} January 2010) Intercontinental Hotel, Wellington, New Zealand.

Zhang, L. (2002). An evaluation an urban riverfront park, Riverfront Park, Spokane, Washington – Experience and lessons for designer. Unpublished master thesis, Washington State University, United States.