PLANNING FOR
SUSTAINABLE FUTURE CITIES

Malaysian townplan

Federal Department of Town and Country Planning, Peninsular Malaysia
Ministry of Urban Wellbeing, Housing and Local Government, Malaysia

Malaysian townplan

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PLANNING FOR SUSTAINABLE FUTURE CITIES

Let's think about the future of our cities by exploring the concept and initiatives of `future cities'. The need to create sustainable and liveable urban development should be the main agenda of urban planning. This will ensure that every one from every walk of life can enjoy more harmonious, healthy and peaceful living. Future cities, for me, need to emphasize on the integration and formation of a united, caring and socially inclusive community system, generation of productive and resilient urban economy together with the adoption of green practices. In other words, future cities need to empower and generate new integrated values with regard to social, economic, environment and urban governance.

To support global efforts to overcome the phenomena of climate change and global warming, to solve the local environmental issues and other social and economic challenges, as well as to ensure our development policies and planning initiatives be implemented effectively, the Federal Department of Town and Country Planning, Peninsular Malaysia has taken serious action to achieve sustainable future cities for our urban area and settlement schemes. Since early this year, we have tried to develop a conceptual framework of future cities for Malaysia. The framework is in line with the Sustainable Development concept that seeks to balance social, economic and environmental aspects.

Planning for Sustainable Future Cities was selected as the theme for 2013 Malaysian Townplan Journal with the aim to enhance awareness among town planners and urban managers about their responsibilities and the importance to develop Malaysian cities sustainably towards attaining continuous wellbeing of society. This is in line with the aspiration of the Rio+20 Conference for the future cities outlined in `The Future We Want'. To realize the concept and initiatives of `sustainable future cities', all city stakeholders need to work together to think, create and develop suitable models for Malaysian Sustainable Cities in the future.

In this edition, among articles submitted are those addressing the concept and framework of sustainable future cities, European vision of the city of tomorrow, transit-oriented development cities, a user-friendly street, the role and significance of rooftop gardens and the disaster-resilient city. I hope this publication can be beneficial to all the readers in understanding the concept and aspiration of `sustainable future cities'.

Abdul Aziz Abdullah
Chief Editor

CONCEPT, INITIATIVE AND CONCEPTUAL FRAMEWORK FOR THE MALAYSIAN SUSTAINABLE FUTURE CITIES

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ABSTRACT

The need to create sustainable urban development should be the main agenda of urban planning. This will ensure that every one from every walk of life can enjoy a more harmonious, healthy, happy, peaceful and well preserved environment. To achieve sustainable development, cities need to emphasize on the integration and formation of a unified, caring and socially inclusive community system, the generation of a productive and resilient urban economy together with the adoption of green practices which will support the adaptation to climate change. In other words, future cities need to meet the aspirations to create liveable cities, empowered to generate new integrated values in the aspects of social, economic, environment and urban governance. The implementation of the 'future cities' concept and initiative is consistent with the objective and aspirations of the Rio+20 Conference which outlines the road map for 'The Future We Want'. In the Malaysian context, this goal can be realized through the adoption and implementation of the 'sustainable future cities' concept and initiatives in the process of urban planning and development. Against this background, this paper will discuss the concept and initiatives by Japan and European countries in promoting and implementing the concept and initiatives of future cities; highlight the sustainable development aspirations; and list adaptation opportunities to realize the implementation of the 'future cities' concept in Malaysia. This paper ends with an explanation about the conceptual framework and characteristics for the Malaysian Sustainable Future Cities.

Keywords: Sustainable Development, Future Cities, Sustainable Future Cities

INTRODUCTION

The concept of 'future cities' is one of the urban planning approaches that is currently becoming a trend in developing cities, particularly in Europe, Korea and Japan. Fundamentally, the approach and concept of 'future cities' has no specific definition or interpretation. It is implemented with the aim of addressing climate change and global warming, environmental issues, natural disasters, increase of energy and water usage, rapid development and increase of population growth in urban areas. In particular, it seeks to ensure that cities are developed with the goal of achieving sustainable development in a holistic manner with an emphasis on strengthening the rules and adding value to realize an inclusive social system (social inclusiveness), resilient and productive city's economy (economic productivity) and well preserved environment (environmental sustainability).

Implementation of the concept and initiatives of 'future cities' is in line with the goals of the **Rio+20 Conference** (the United Nations Conference on Sustainable Development, Rio de Janeiro 2012) which has outlined the road map for **'The Future We Want'** that is associated with the aspects of social justice, protection of the environment and eco-systems and promoting the implementation of the green economy. The conference also set out proposals and measures for long-term global solutions to the issues related to natural disasters, energy and water resources and food security.

JAPAN 'FUTURE CITY' INITIATIVE

The concept of 'future city' was formally introduced by the Japanese government to promote Japan 'FutureCity' Initiatives in Rio+20 Conference on 22 June, 2012. The 'Japan Future City' concept that emphasized on the attractiveness of the city was adopted and became a model of urban planning in the 11 pilot cities in Japan. It was introduced as a result of issues of environmental degradation (high carbon emissions and energy consumption), natural disasters (earthquakes and tsunamis) and continuous rising of the population aged over 65 years (super-aging) faced by major cities in Japan.

The basic concept of the Japan 'Future City' initiative is to realize 'human-centered cities' to find and produce new values aimed at solving environmental challenges and rapid urban development. The concept has a long-term goal to make the city as a habitat **where 'everybody wants to live and everyone has vitality'**. In line with the concept of sustainable development, this concept gives special attention to the improvement and production of new values in an integrated and innovative manner as follows (Murakami, 2013):

i) **Environmental values:** low carbon, biodiversity, resource circulation and 3Rs (reduce, reuse and recycle), water and atmosphere, energy-saving society, etc.;

ii) **Economic values:** knowledge accumulation, knowledge economy, employment and income, new industry, minimization of social costs, etc.; and

iii) **Social values:** super-aging, fitness culture, healthcare/nursing, disaster prevention and security, social capital, social interdependence, social equity and social cohesion.

The framework and concept of the 'FutureCity' Initiative was adapted in the New Growth Strategy as a national strategic project by the Japanese government which began in June 2010. Among the initiatives that were carried out in an integrated and holistic manner in a town are (Murakami, 2013; Cabinet Secretariat, 2013):

a) encourage participation and cooperation between local authorities, universities and corporations in urban development activities and the promotion of green lifestyle and low carbon society;

b) the creation of activity and centers for economic, social and health services for super-aging society and to promote a caring society;

c) the use of solar power, bio-mass fuels and renewable energy wholly in population settlements and urban areas;

d) the management of urban and residential water resources efficiently through the use of rain water harvesting and the practice of water recycle culture;

e) implement solid waste management (Incinerator plant, 3R program) in an efficient manner;

f) use, innovation and implementation of a comprehensive green technology starts at home (smart homes, zero-emission homes; private electric vehicles), in the local community (community of smart, low-carbon society, the solar farm) up to the city (smart city, low-carbon city, eco city, public electric vehicle);

g) the development of agriculture park, vegetable garden, mega-scaled hydroponic plant factory and community farm in urban and settlements areas to meet local needs; and

h) the regeneration of the city by implementing the concept of compact cities, transit-oriented development (TOD) and adding a rail transit system and network of pedestrian and cycling facilities.

The above 'Future City' concept and initiative were carried out in 11 selected cities in Japan where the cities selected need to set the theme and vision of the city in the future and implement certain development projects and programs as follows:
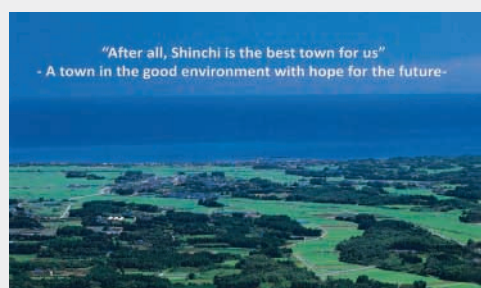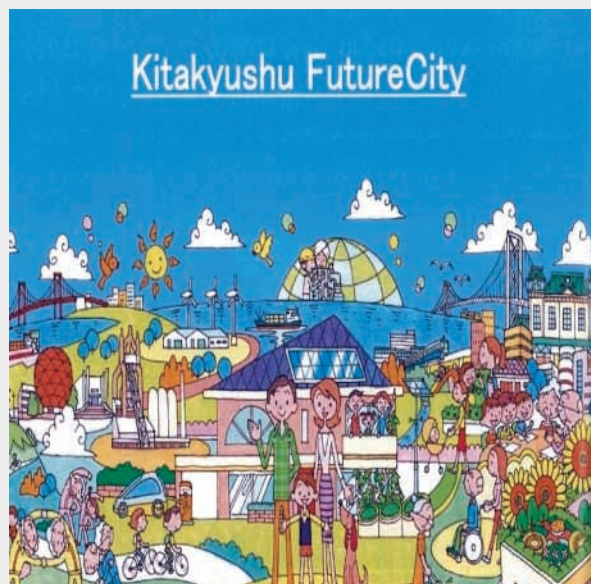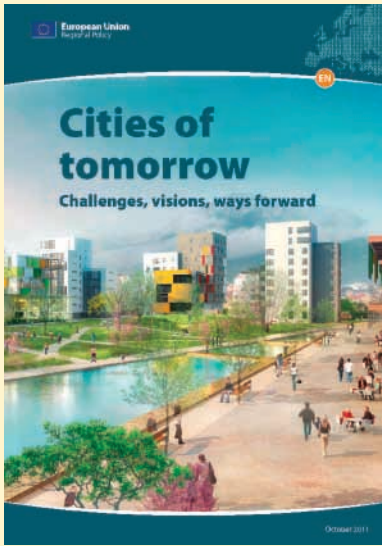
JAPAN FUTURE CITIES LOCATION (11 CITIES)

SHIMOKAWA

RIKUZENTAKATA CITY
SUMITA-CHO CITY
OFUNATO CITY

KAMAISHI

HIGASHIMATSUSHIMA CITY

IWANUMA CITY

SHINCHI CITY

MINAMISOMA CITY

TAYAMA CITY

KASHIWA CITY

YOKOHAMA CITY

KITAKSYUSHU CITY

No	Urban Name / Theme	Program of 'FutureCity Initiative'
1	Shimokawa Town, Hokkaido **Theme:** Shimokawa, Forest Future City Where People are Shining	• Comprehensive Development of Forest-related Industries. • Toward Completely Self-sufficient Energy Supply. • Creation of a Self-sustained Community via Transition to Collective Housing Model. • Development of Self-reliant and Autonomous Infrastructure.
2	Kashiwa City, Chiba Prefecture **Theme:** Autonomous Urban Management in Cooperation with Public, Civic and Academia	• Smart City • Healthy Long-life City • New Industrial City
3	City of Yokohama, Kanagawa Prefecture **Theme:** Open Yokohama – Creative Port City Where People, Things and Events Connect and Develop	• Initiatives to address two major World Environmental Challenges, "Low-carbon and Water". • A Comfortable neighbourhood where people are connected. • Creation of centers to attract industry and to disseminate culture to the world, especially to Asia.
4	City of Toyama, Toyama Prefecture **Theme:** Towards Sustainable and Value Ceating City Filed with Social Capital	• Construct LRT Network • Creation of a healthy and Sociable Town • Sixth-Order Industrialization of Agriculture Using Heat from Ushidake Hot-Spring.
5	Kitakyushu, Fukuoka Prefecture **Theme:** A Bustling, Secure and Vigorous City Where People can Shine	• Kitakyushu Smart community Creation Project. • Forest-in-town Project • Promoting a Healthy Lifestyle in the Community. • School Helper • Asian Low-carbon Center
6	City of Ofunato, City of Rikuzantakata, Sumita Town, Iwate Prefecture **Theme:** A City Comfortable For Everyone	• Building a society where energy is produced and consumed locally. • Promoting a city comfortable for everyone with measures responding to the super-aging society. • Promoting new industries
7	City of Kamaishi, Iwate Prefecture **Theme:** Town Shining on the Land of Sanriku, filled with Hope and Smiles	• Resource Recycling Society by Reducing Carbon Emission, promoting Energy Saving and Resource Saving. • Creation of Industrial Welfare City Kamaishi • City Building with the Effective Use of Historical Environment – Kamaishi Field Museum Initiative.
8	City of Iwanuma, Miyagi Prefecture **Theme:** Reconstruction with Love and Hope	• The Hill of Millenium Hope • International Medical Industry City in Harmony with Nature. • Next-generation Agribusiness
9	City of Higashimatsushima, Miyagi Prefecture **Theme:** Rebirth of Higashimatsushima, Towards the Future Together Without Forgetting That Day	• Environment • Countermeasures against Super-aging Society. • Creation of Disaster-free City where people can live in safety for generations.
10	City of Minamisoma, Fukushima Prefecture **Theme:** Recycling City Connecting to the Next Generation, Minamisoma	• Energy Cycling City by Smart City • Generation of Circulating Town that is Comfortable for All. • Creation of Material-cycling Local Industries Centered on the EDEN Plan.
11	Shinchi Town, Fukushima **Theme:** After all, Shinchi is the Best Town For Us	• Local Production/Local Consumption of Energy. • New Industry Creation • Fostering KIZUNA (ties between people)

Source : Regional Revitalization Bureau (Cabinet Office of Japan) (n.d.). Urban Development for the Future, Get it Rolling: Regional Wisdom, Power and Resources will Strengthen Cities

EUROPEAN FUTURE CITY DIRECTION

The creation of Future City aspirations in Europe started in October 2011 with the publication of the planning framework and direction for the development of cities in Europe entitled **"Cities of Tomorrow - Challenges, Visions, Ways Forward"** (Future City Challenge, Insight, Direction) by the European Commission (EU).

The Future City concept was initiated after awareness of the challenges and threats hit Europe, especially when the economic and financial crisis aggravated the existing urban areas. A special policy and an integrated planning framework was needed to preserve the European urban development model that are polycentric, balanced and inclusive.

The Cities of Tomorrow' framework has identified four (4) major threats to the European urban development model, namely:

a) demographic changes;
b) low economic competitiveness (Central Europe and Eastern Europe);
c) increasing social polarization; and
d) loss of natural resources.

In response to these threats, the concept of Future City which was introduced by the EU have identified 6 URBACT or 'Urban Act 'which is the action to be taken or can be seen as an opportunity and potential that can be derived from the challenge. In addition, the document also encourages cities to play a proactive role in finding a solution to any threat that arises.

In terms of implementation, 'Cities of Tomorrow' suggested that a model of sustainable and holistic urban development be taken through the following steps:

i) tackle the challenges of an integrated society holistically;
ii) implement 'place-and-people-based' approach correctly;
iii) combine the formal government structure and informal governance structures;
iv) develop a management system that is able to build with the development aspirations and goals; and
v) working closely to ensure consistent spatial development and the efficient use of resources.

The report 'Cities of Tomorrow' also lists a number of cities in Europe and special initiatives that have been successfully implemented that can be used as an example in developing other cities in Europe in the future.

FRAMEWORK OF ACTION OF EUROPE FUTURE CITY

Threats (CoT)

| Demographic decline | Economic development & competitiveness under pressure | Growing social polarisation | Depletion of natural resources |

Responses

6 URBACT Workstreams

Workstream 1	Workstream 2	Workstream 3	Workstream 4	Workstream 5	Workstream 6
Shrinking cities & demographic change	More jobs: better cities	Supporting urban youth through social innovation	Against divided cities in Europe	Motivating mobility mindsets	Building energy efficiency in European cities

Source : European Union (2011). Cities of Tomorrow: Challenges, Visions, Way Forward

CITY	INITIATIVE / SUCCESS
LEIPZIG, Germany	Building on the URBAN Community Initiative: consolidation of urban regeneration with decreasing subsidies.
GLIWICE, Poland	Using regional funds to support local SMEs and economic revitalisation of the city.
AMSTERDAM, Netherland	Rethinking diversity policy to strengthen social cohesion and tackle the risk of segregation.
VÄXJÖ, Sweden	Sustainable energy policies-part of a model for managing complex urban change.
BARCELONA, Spain	Linking territorial cohesion, sustainable urban transportation and the fight against spatial segregation.
BRNO, Czech Republic	Upgrading the international status of the city and its region by attracting highly qualified people and activities.
FLORENCE, Italy	Private actors as motors in revitalising the local economy and manufacturing traditions based on cultural heritage.
NEWCASTLE-GATESHEAD, UK	A long term strategy as a joint response to the financial crisis.
SERAING, Belgium	Urban foresight of residents integrated into the city Master Plan.
PLAINE COMMUNE, France	Area-based approach to encourage businesses to provide jobs to locals in deprived areas in transition.

Source : European Union (2011). Cities of Tomorrow: Challenges, Visions, Way Forward.

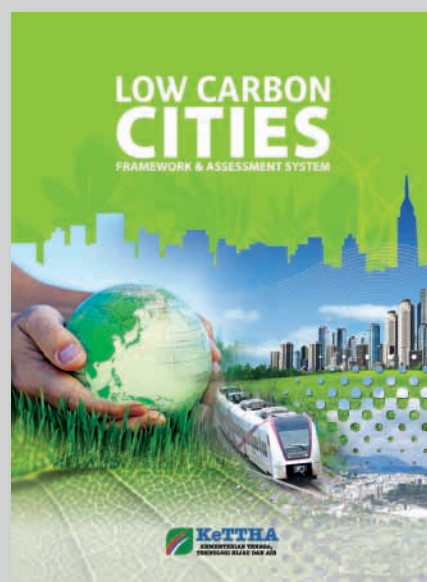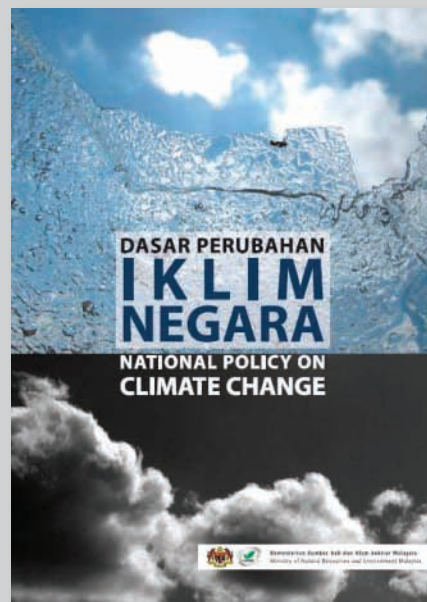## SUSTAINABLE DEVELOPMENT ASPIRATION IN MALAYSIA

Based on the experience, initiatives and actions undertaken by developed countries, Malaysia is generally not too backward in addressing environmental issues and efforts to achieve sustainable development and green growth. Various policies, initiatives and commitment have been created and implemented at the national, state and local levels involving various organizations and sectors of development.

At the national level, efforts to achieve sustainable development and green growth embedded in the Malaysia Five Year Plan (began in 8th Malaysia Plan) and the formulation of policies and plans such as the National Urbanisation Policy (2006), National Physical Plan (2005/2010), National Green Technology Policy (2009), National Climate Change Policy (2009), the National Solid Waste Management Policy and Road Map To Reduce Greenhouse Gas Emission Effect (CHG).

In addition, during the United Nations' Conference on Climate Change (COP15) in Copenhagen on 17 December 2009, Malaysia had made a commitment to reduce the intensity of carbon dioxide emission to 40% per GDP in terms of emission intensity of GDP by 2020 as compared to 2005 levels, conditional upon transfer of technology and finance from developed nations.

Efforts toward achieving sustainable and green development is also implemented at the **state, agencies and organization levels** such as Local Agenda 21 program. These include drafting guidelines for the State of Perak Smart Growth (by the State of Perak Town and Country Planning Department, 2011); formulation of Low Carbon Cities: Framework and Assessment System (by the Ministry of Energy, Green Technology and Water - KeTTHA); The Green Building Index and Green Building Index For Township (by GBI Sdn. Bhd.); Low Carbon Green City (by the Putrajaya Corporation); Low Carbon Society Blueprint for Iskandar Malaysia (by Iskandar Regional Development Authority – IRDA); the implementation of 3R (Reduce, Reuse and Recycle) (by the National Solid Waste Management Department), Solar Valley project (by the Melaka State Government), development of urban parks (by the National Landscape Department), implementation of rain water harvesting system (amendments to the Uniform Building By-Laws in 2012), 1Malaysia Green 1Malaysia Clean Campaign, My Beautiful Neighbourhood program and My Beautiful Malaysia.

Similar initiatives are being undertaken by the Federal Department of Town and Country Planning (FDTCP), Peninsular Malaysia as a custodian of town planning services in Malaysia through formulation of planning policy and guidelines, preparation of development plans and city sustainability assessment as follows:

i) National Physical Plan (NPP) and National Urbanisation Policy (NUP);
ii) Malaysian Urban Indicators Network (MURNInet – since 2002) and Malaysian Urban-Rural National Indicator Network for Sustainable Development (MURNInets – 2012);
iii) Planning Guidelines for Green Neighbourhood;
iv) Implementation of five (5) green neighbourhood initiatives, i.e. provision of pedestrian walkway, provision of bicycle lane, rain water harvesting system, waste composting and community farming;
v) Planning Guidelines for Residential Development;
vi) Planning Guidelines for Liveable and Compact City;
vii) Planning Guidelines for Ubiquitous City;
viii) Planning Guidelines for Seniors Living; and many others.

ADAPTATION OF 'FUTURE CITIES' CONCEPT IN MALAYSIA

The above efforts and initiatives that are perceived to have been done sectorally and at departmental level can and should be strengthened and broadened by exploring the concepts of Future Cities Initiative implemented in Japan, Europe and other developed countries. The strength of Japan's 'Future City' concept lies ih its emphasis on human-centered cities as well as the creation and integration of environmental, social and economic values in a holistic manner. The application of approaches to urban planning and development-oriented form of green-oriented development should become the new planning and urban development agenda in Malaysia.

The concept and initiatives of sustainable future cities can be applied and adapted in existing planning mechanisms, particularly in the preparation of special area plans (SAP) and at the stage of planning control. It can also be effectively realized in the form of 'live project' (special projects or pilot projects) involving various implementing agencies, corporate bodies and the public under supervision of FDTCP Peninsular

Malaysia and local authorities. The current modus operandi of the 'outcome-based budgeting' (OBB) system, National Blue Ocean Strategy'(NBOS), Government Transformation Program (GTP) and others can be applied in implementing the concept of sustainable future cities in Malaysia. The current modus operandi of the 'outcome-based budgeting' (OBB) system, National Blue Ocean Strategy'(NBOS), Government Transformation Program (GTP) and others can be applied in implementing the concept of sustainable future cities in Malaysia.

CONCEPTUAL FRAMEWORK OF SUSTAINABLE FUTURE CITIES

The need to create sustainable and liveable urban development and settlements should be the main agenda of urban planning. This will ensure that every one from every walk of life can enjoy more harmonious, healthy, happy and peaceful living; well preserved and sustainable environment, together with more comfortable and efficient urban environment as their place to live, work, learn and play.

To support global efforts to overcome the phenomena of climate change and global warming, to solve the local environmental issues as well as to ensure our development policies and planning initiatives are implemented effectively, the FDTCP has developed a conceptual framework for Malaysian sustainable future cities.

In general, the concept of Malaysian Sustainable Future Cities need to emphasize on the integration and formation of a unified, caring and socially inclusive community system and social structure; generation of a productive and resilient urban economy together with the adoption of green practices which will support the adaptation of climate change through the efficient use of the cities' energy and water resources as well as effective solid waste management. In other words, future cities need to meet the aspirations to create liveable cities 'for men' (human-centered cities), empowered to generate new integrated values in the aspects of social, economic, environment and urban governance towards managing the increasingly complex urban development process and challenges.

The conceptual framework and characteristics of sustainable future cities outlines efforts to achieve sustainable urban development through a combination of initiatives relating to an inclusive social system, productive economic system and green urban environment system to be used as a reference in creating and designing an appropriate model for Malaysian Sustainable Future Cities.

The framework is in line with the **Sustainable Development** concept that seeks to balance social, economic and environmental aspects. It is hoped that this conceptual framework can promote and strengthen social inclusiveness, economic productivity and a green city environment in the development of our cities.

- For **social inclusiveness**, the Malaysian Sustainable Future Cities should address the aspects of social cohesion, caring and interactive community, healthy and happy community, safe living and ensure the needs of the elderly, child and disabled groups are well taken care of in our cities.
- For **productive economy**, focus should be given to ensure resilience in the urban economy, address the issues of affordable and comfortable housing that has currently become the main agenda of the Malaysian Government and promote the concepts of smart and green city, transit-oriented development and mixed-use development.
- For a **green city environment**, in addition to other programs and initiatives by various parties in Malaysia, such as the Green

FRAMEWORK AND CHARACTERISTICS OF SUSTAINABLE FUTURE CITIES

SOCIAL INCLUSIVENESS

Healthy and Happy Community

PRODUCTIVE ECONOMY

Unified Society

Elderly, Child and Disabled Friendly

Resilient Urban Economy

Self Entrepreneur-ship

Concern to Marginalised Community

Caring and Interactive Community

BANDAR SELAMAT 2011 SAFE CITY

Affordable and Comfortable Housing

Efficient Urban Governance

Smart Technology City

SOCIAL

ECONOMY

Sustainable Development

ENVIRONMENT

Transit-Orientated Development (TOD)

Mixed-use Development

Efficient Energy (EE) and Renewable Energy (RE)

Efficient and Prudence Water Usage

Efficent Solid Waste Management (3R)

Low Carbon City and Society

Pedestrian and Cyclist Friendly

Green Transportation System

Food Security

Green Neighbourhood

Green Lifestyles

Green Buildings and Infrastructures

GREEN CITY ENVIRONMENT

Building Index (GBI) and Low Carbon Cities Framework, the focus should be given to efficient energy and renewable energy, efficient and prudent water usage, efficient solid waste management, pedestrian and cyclist-friendly green transportation system, food security, green neighbourhood, green lifestyle and green buildings and infrastructures.

CONCLUSION

To realise the concept and initiatives of sustainable future cities as an approach and direction in urban planning and development in Malaysia, urban planners, city managers, developers, professionals and the community need to work together to think, explore, invent and develop the concept, implementation framework and suitable models to be implemented in Malaysian cities in the future. The term of 'Bandar Sejahtera Malaysia' (Malaysian Sustainable Future Cities) is seen fit to put forward a new urban planning model and tagline in developing urban and settlement areas in Malaysia.

Let's Think, Plan and Act Together for the Future of Our Cities

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TOWARDS A EUROPEAN VISION OF THE CITY OF TOMORROW

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ABSTRACT

Cities are an important component in urban development, and play a key role in the lives of most Europeans. In addition, they also play a crucial role in the social and economic development of all European territories. However, cities suffer from several major drawbacks: demographic problems, social inequality, social exclusion of specific population groups, lack of affordable and suitable housing, and environmental problems. In seeking a remedy to those problems, this paper demonstrates not only the importance of cities and the challenges facing European future cities but also the crucial role that Europe has to play in their future. It will also introduce the European model of urban development that covers both internal development of cities as well as their territorial development. Therefore, the shared vision of the European City of tomorrow was chosen as a model which takes into account all dimensions of sustainable urban development in an integrated way. The European Cities of tomorrow are envisioned as places of advanced social progress; platforms for democracy, cultural dialogue and diversity; places of green, ecological or environmental regeneration; and places of attraction and engines of economic growth. This paper concludes with the implication that the increasing threats and challenges facing the Cities of tomorrow must be met collectively in order to fulfill the vision of the future cities with truly sustainable and harmonious development.

Keywords: Cities of Tomorrow, European Future Cities, Sustainable Urban Development

INTRODUCTION

'Our cities possess unique cultural and architectural qualities, strong forces of social inclusion and exceptional possibilities for economic development. They are centres of knowledge and sources of growth and innovation. At the same time, however, they suffer from demographic problems, social inequality, social exclusion of specific population groups, a lack of affordable and suitable housing, and environmental problems.'[1]

Cities play a key role in the lives of most Europeans. Not only does a majority of the population live in cities, but cities also play a key role in the social and economic development of all European territories. It seems almost paradoxical that there is no common definition for 'urban' or even 'city', and that the European Union has no explicit policy competence in urban development. However, this paper will demonstrate not only the importance of cities, but also the crucial role that Europe has to play in their future. There is, in fact, an explicit European model of urban development.

The 'European model of the city' is a fascinating issue. On the one hand, it captures essential features of European cultural history, and it is deeply rooted in the past and, hence, related to the identity question. On the other, it captures the essential aspects of the political vision of the European Union and, hence, of the future as envisaged by the underlying society.'[2]

Before arriving at the European model of urban development, this paper will briefly discuss alternative administrative and functional definitions of cities, and point to the importance of understanding urban issues in a territorial context. This paper also stress the increasing significance of cities, especially in meeting the objectives of the Europe 2020 strategy, as well as those set out in the Treaty, i.e. the promotion of economic, social and territorial cohesion. Finally, this paper describes European policy context and introduce the European model of urban development, a shared European vision of the Cities of tomorrow and a shared European vision of the territorial development of cities.

WHAT DO WE MEAN BY CITIES?

There are many definitions of a city. 'City' can refer to an administrative unit or a certain population density. A distinction is sometimes made between towns and cities – the former are smaller (e.g. between 10,000 and 50,000 inhabitants) and the latter larger (above 50,000 inhabitants). 'City' can also refer more generally to perceptions of an urban way of life and specific cultural or social features, as well as functional places of economic activity and exchange.

'City' may also refer to two different realities: the *de jure* city – the administrative city – and the *de facto* city – the larger socio-economic agglomeration. The *de jure* city corresponds to a large extent to the historic city with its clear borders for trade and defence and a well-defined city centre. The *de facto* city corresponds to physical or socio-economic realities which have been approached through either a morphological or a functional definition. For analytical purposes, a city definition based on a minimum density and number of inhabitants has been developed jointly by the European Commission and the OECD.

A **Morphological Urban Area (MUA)** depicts the continuity of the built-up space with a defined level of density. A **Functional Urban Area (FUA)**[3] can be described by its labour market basin and by the mobility patterns of commuters, and includes the wider urban system of nearby towns and villages that are highly economically and socially dependent on a major urban centre.[4] For example, the administrative city of London has a population of 7.4 million, its MUA holds 8.3 million and its FUA 13.7 million residents. Katowice has a relatively small administrative city population of 320 000, while its MUA population is sevenfold in size, i.e. 2.3 million. The FUA of Lille is 11 times larger than its administrative city – 2.6 million compared to 230,000[5] **(Table 1)**.

FUAs may be monocentric or polycentric (i.e. corresponding to networks of tightly linked cities or agglomerations with no dominating centre). Neither Morphological nor Functional Urban Areas are stable entities; as the urban landscape and

[1] *Leipzig Charter on Sustainable European Cities* (Agreed on the occasion of the Informal Ministerial Meeting on Urban Development and Territorial Cohesion in Leipzig on 24/25 May 2007).

[2] Calafati, Antonio, *Cities of tomorrow* issue paper, December 2010.

[3] An alternative but similar concept is 'metropolitan areas' – cf. Opinion of European Economic and Social Committee, *European metropolitan areas: socio-economic implications for Europe's future,* rapporteur: Joost van Iersel, April 2007

[4] Tosics, Ivan, *Cities of tomorrow* issue paper, January 2011 – reference to ESPON 1.4.3 study (ESPON, 2007).

[5] Tosics, Ivan, op. cit.

Table 1: Administrative, morphological and functional urban areas of large European cities

City	Pop ADM. city	Pop MUA	Ratio MUA/city	Pop FUA	Ratio FUA/city
London	7.43	8.27	1.1	13.71	1.8
Paris	2.18	9.59	4.4	11.18	5.1
Madrid	3.26	4.96	1.5	5.26	1.6
Barcelona	1.58	3.66	2.3	4.25	2.7
Milan	1.30	3.70	2.8	4.09	3.1
Berlin	3.44	3.78	1.1	4.02	1.2
Birmingham	0.99	2.36	2.4	3.68	3.7
Rome	2.55	2.53	1.0	3.19	1.3
Katowice	0.32	2.28	7.1	3.03	9.5
Warsaw	1.69	2.00	1.2	2.79	1.7
Frankfurt	0.65	1.46	2.2	2.76	4.2
Lisbon	0.53	2.32	4.4	2.59	4.9
Lille	0.23	0.95	4.1	2.59	11.3
Vienna	1.60	1.67	1.0	2.58	1.6
Manchester	0.44	2.21	5.0	2.56	5.8
Budapest	1.70	2.12	1.2	2.52	1.5
Liverpool	0.44	1.17	2.7	2.24	5.1
Stockholm	0.76	1.48	1.9	2.17	2.9
Bucharest	1.93	2.06	1.1	2.06	1.1
Copenhagen	0.50	1.36	2.7	1.88	3.8
Prague	1.17	1.18	1.0	1.67	1.4
Dublin	0.47	1.07	2.3	1.48	3.1
Amsterdam	0.78	1.05	1.3	1.47	1.9
Rotterdam	0.60	1.03	1.7	1.43	2.4
Helsinki	0.56	1.07	1.9	1.29	2.3
Oslo	0.60	0.71	1.2	1.04	1.7
Bratislava	0.43	0.44	1.0	0.71	1.7
TOTAL	**38.13**	**66.48**	**1.7**	**88.24**	**2.3**

Source : Tosics, Ivan (January 2011)

economic patterns evolve, so do densification and mobility patterns.

Other concepts and approaches exist to describe and define *de facto* cities. Whatever the favoured concept, it is clear that the reality of the *de facto* city has expanded far beyond the de jure city and that it is at this level that urban policy must find its long-term perspective. With the expansion of the de facto cities, the delimitation of urban and rural has become less clear or even lost its sense. "The boundary between the city and the countryside is disappearing while the rural and the urban have melted into a new urban condition".[6] This is reinforced where nearby overlapping FUAs form large complex urban systems, as is the case in Northern England, the Benelux or the Ruhr area.

There are striking differences between Member States in the way

that cities function and are governed. In some countries, there are no particular city-specific administrative units, while in others; cities have unique administrative rights and responsibilities. In this paper, European Union (EU) take a pragmatic stance and use the term 'cities' to define urban agglomerations in general, as well as the administrative units governing them. From a policy perspective it is important to understand the territorial scale of urban issues, which may range from neighbourhood or administrative city level to a larger FUA or even beyond. An urban problem may have very local symptoms but require a wider territorial solution.

The relevant governance level may, therefore, vary from local to European level, or be a combination of several tiers. In other words, urban policy needs to be understood and to operate in a multi-scalar context. By 'Cities of

[6] Allingham, Peter and Raahauge, Kirsten Marie, 'Introduction: Post City Represented' in 'Knowledge, technology and policy', Volume 21, number 6, Springer 2008.

Table 2: Defining cities according to density of the population

Population Class	Number of cities*		Population	
	absolute	in %	absolute	in %
rural population			154 125 040	32.1
towns and suburbs			156 398 720	32.6
50 000 - 100 000	387	52.9	26 690 068	5.6
100 000 - 250 000	224	30.6	35 708 402	7.4
250 000 - 500 000	62	8.5	21 213 956	4.4
500 000 - 1 000 000	36	4.9	27 041 874	5.6
> 1 000 000	23	3.1	59 292 080	12.3
TOTAL	**732**	**100.0**	**480 470 140**	**100.0**

Note: Based on a population distribution by 1 km² raster cells.[9] Cities above 50,000 inhabitants are defined as clusters of grid cells of at least 1,500 inhabitants/km². Areas outside the urban agglomerations are defined as suburbs or towns if they are located in urban clusters of raster cells with a density above 300 inhabitants/km² and a total cluster population of at least 5,000 inhabitants.[10] Rural areas are the remaining areas.[11] All figures are estimates of the 2001 population of the EU-27. Sources: European Commission (JRC, EFGS, DG REGIO).

Tomorrow', EU, therefore, refer to future urban agglomerations, cities and towns in a territorial context.

THE GROWING IMPORTANCE OF CITIES

In the last century, Europe transformed itself from a largely rural to a predominantly urban continent. It is estimated that around 70 % of the EU population – approximately 350 million people – live in urban agglomerations of more than 5,000 inhabitants. Although the speed of transformation has slowed down, the share of the urban population continues to grow.[7]

Europe is also characterised by a more polycentric and less concentrated urban structure compared to, for instance, the USA or China. There are 23 cities of more than 1 million inhabitants and 345 cities of more than 100,000 inhabitants in the European Union, representing around 143 million people. Only 7 % of the EU population live in cities of over 5 million inhabitants compared to 25 % in the USA. In addition, 56 % of the European urban population – around 38 % of the total European population – live in small and medium-sized cities and towns of between 5,000 and 100,000 inhabitants **(Table 2)**.[8]

Cities Play A Key Role In Economic Growth

The concentration of consumers, workers and businesses in a place or area, together with the formal and informal institutions that make an agglomeration 'thick' and cohesive, has the potential to produce externalities and increasing returns to scale. Sixty-seven per cent of Europe's GDP is generated in metropolitan regions,[12] while their population only represents fifty-nine per cent of the total European population. A comparison of European cities' economic performance also indicates that the major cities are doing better than the rest.[13] However, there is marked difference in performance between capital and non-capital cities. It is hard to distinguish the effects of agglomeration alone from the positive externalities of being a capital city and centre of both public and private administrations. There is also an even bigger difference between Western and Eastern non-capital cities that cannot be explained by size alone. A concentration of activity is neither a necessary nor a sufficient condition for high growth.

Agglomeration economies have come back into policy fashion after some decades, focusing attention on the general availability and diversity of resources in a location with a

[7] 10 % continued increase of urban population up to 2050, in *World Urbanisation Prospects: The 2009 Revision,* United Nations, Department of Economic and Social Affairs, Population Division, 2010.

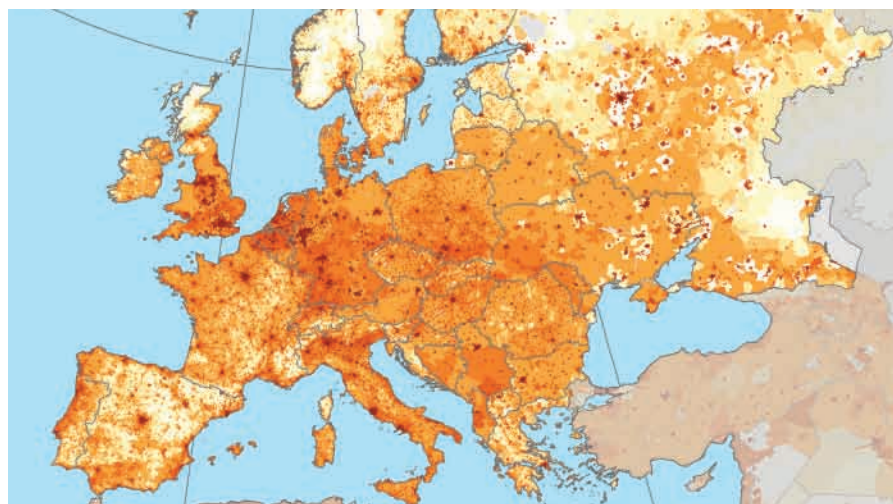[8] Figures are based on a definition of cities and towns in terms of density (Table 1 below).

[9] French overseas territories, the Azores and Madeira are not included in these figures due to unavailability of data.

[10] The cluster definition used in the urban/rural classification of NUTS 3 regions: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-HA-10-001-15/EN/ KS-HA-10-001-15-EN.PDF.

[11] 'Metro cores' are raster clusters, and often represent only part of the territory of a LAU 2 unit. Any city definition based on local administrative areas tends to include populations living outside the cities, but inside the administrative boundaries of the entity. Hence, the same city defined in terms of LAU 2 boundaries will often have a bigger population figure than its raster-core equivalent (although occasionally the opposite can happen as well).

[12] Metropolitan regions are defined as 'larger urban zones' with more than 250, 000 inhabitants (Source: DG REGIO).

[13] European Commission, *Second 'State of European Cities Report'*, RWI, DIFU, NEA Transport research and training and PRAC, Brussels, December 2010, p. 75: 'It is remarkable that in most European countries there is an exceptional agglomeration of wealth in the capital city. This verifies the dominant and unique position of capitals in a (national) economic system. In eight European capitals, the GDP per head is more than double the national average. Not surprisingly, this applies to London and Paris, but also to the capitals of the EU-12 Member States such as Warsaw, Bratislava, Sofia, Bucharest, Prague, Budapest, Riga and Tallinn.'

Population density in Europe in 2000

high density of different activities.[17] However, current research explains little about how exactly these come into play, or about the critical thresholds of different elements, making the concept difficult to operationalise.

It has been suggested that agglomeration effects have limits and that the negative externalities that can result from agglomeration[18] – such as traffic congestion, price increases and a lack of affordable housing, pollution, urban sprawl, rising costs of urban infrastructure, social tensions and higher crime rates – may outweigh the benefits. Apart from the direct economic costs of a decrease in the efficiency of the economy, there is also the additional cost of a degraded environment, health problems and a reduced quality of life. According to the OECD, the relationship between income and population size becomes negative at around 6-7 million, suggesting diseconomies of agglomeration due to congestion and other related costs.[19]

BOX 1: THE IMPORTANCE OF SMALL AND MEDIUM-SIZED CITIES

The importance of small and medium-sized cities should not be underestimated. A large part of the urban population live in small or medium-sized cities spread across the continent. These cities play a role in the well-being and livelihood not only of their own inhabitants but also of the rural populations surrounding them. They are centres for public and private services, as well as for local and regional knowledge production, innovation and infrastructure. (a)

Small and medium-sized cities often play a pivotal role within regional economies. They constitute the building blocks of urban regions and lend character and distinctiveness to their regional landscapes (b). It has been argued that their growth and development structure in Western Europe constitutes the most balanced urban system in the world (c).

The generic features of small and medium-sized cities – particularly their human scale, liveability, the conviviality of their neighbourhoods, and their geographical embeddedness and historical character – in many ways constitute an ideal of sustainable urbanism (d). Small and medium-sized cities are, therefore, essential for avoiding rural depopulation and urban drift, and are indispensable for the balanced regional development, cohesion and sustainability of the European territory.

Source:
a) References based on Mahsud, A. Z. K., Moulaert, F., *Prospective Urbaine – Exploring Urban Futures in European Cities,* (background paper and questionnaire, Urban Futures workshop – November 9th 2010, Leuven)
b) Knox, Paul L. and Mayer, Heike, *Small Town Sustainability: Economic, Social, and Environmental Innovation,* Birkhauser Verlag, Basel 2009.
c) *The Role of Small and Medium-Sized Towns (SMESTO),* final report, ESPON 1.4.1, 2006 ; ref. to Sassen, S., *Cities in a world economy,* second edition, Sociology for a new century, London, New Delhi, 2000.
d) Farr, D., *Sustainable Urbanism: Urban Design with Nature,* John Wiley & Sons, New Jersey, 2008.

[17] 'Agglomeration economies, the benefits that firms and workers enjoy as a result of proximity, make it likely that output density will increase more than proportionately with employment or population density.' *Reshaping Economic Geography,* World Development Report 2009, p. 85.

[18] *Barca, Fabrizio, An agenda for a reformed Cohesion Policy – A place-based approach to meeting European Union challenges and expectation,* independent report, April 2009 http://ec.europa.eu/regional_policy/policy/future/pdf/report_barca_v0306.pdf.

[19] *OECD Territorial Reviews: Competitive Cities in the Global Economy, Paris,* 2006, quoted in *An agenda for a reformed Cohesion Policy.*

Cities Contribute Both To Problems and To Solutions

Cities are places of high concentration of problems. Although cities are generators of growth, the highest unemployment rates are found in cities. Globalisation has led to a loss of jobs – especially in the manufacturing sector – and this has been amplified by the economic crisis. Many cities face a significant loss of inclusive power and cohesion and an increase in exclusion, segregation and polarisation. Increasing immigration combined with loss of jobs has resulted in problems of integration and increasing racist and xenophobic attitudes, which has amplified these problems.

It is clear that European cities merit special interest and that the future of our cities will shape the future of Europe. For example, cities are key players in the reduction of CO2 emissions and the fight against climate

BOX 2: CITIES' CONTRIBUTION TO EUROPE 2020

Cities are expected to play a key role in the implementation of Europe 2020 and its seven flagship initiatives. (a)

Smart Growth: Cities concentrate the largest proportion of the population with higher education. They are at the forefront in implementing innovation strategies. Innovation indicators such as patent intensity demonstrate that there is a higher innovation activity in cities than in countries as a whole. Innovation output is particularly high in the very large agglomerations (b). The three flagship projects – the 'Digital Agenda for Europe' (c), the 'Innovation Union' (d) and 'Youth on the Move' (e) – address a series of urban challenges such as: exploitation of the full potential of information and communication technology for better health care, a cleaner environment and easier access to public services ; the development of innovation partnerships for smarter and cleaner urban mobility ; the reduction of the number of early school leavers and the support for youth at risk, young entrepreneurs and self-employment.

Green Growth: Cities are both part of the problem and part of the solution. The promotion of green, compact and energy-efficient cities is a key contribution to green growth. Cities have an important role to play in implementing the agenda of the two flagship projects 'Resource-Efficient Europe' (f) and 'An Integrated Iindustrial Policy for the Globalisation Era' (g). These energy and industrial policies are based on strategic, integrated approaches, building inter alia on the clear support and involvement of local authorities, stakeholders and citizens.

Inclusive Growth: Social exclusion and segregation are predominantly urban phenomena. Cities are the home of most jobs, but also have high unemployment rates. Cities can contribute to inclusive growth, notably in combating social polarisation and poverty, avoiding the segregation of ethnic groups and addressing the issues of ageing. The European Platform against Poverty and Social Exclusion (h) sets out to reach the EU target of reducing poverty and social exclusion by at least 20 million by 2020. It will help to identify best practices and promote mutual learning between municipalities. An additional flagship initiative, 'An Agenda for new skills and jobs'(i), has been launched to reach the EU employment rate target for women and men of 75 % for the 20–64-year-old age group by 2020.

Source:
a) http://ec.europa.eu/europe2020/index_en.htm.
b) *Second 'State of European cities report',* op. cit.
c) Communication from the Commission to the Council and Parliament, *A digital agenda for Europe,* Brussels, COM(2010) 245 final/2.
d) Europe 2020 Flagship Initiative 'Innovation Union', European Commission COM(2010) 546 final.
e) Communication from the Commission, *Youth on the move – An initiative to unleash the potential of young people to achieve smart, sustainable and inclusive growth in the European Union,* Brussels, COM(2010) 477 final.
f) Communication from the Commission, *A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy,* Brussels, COM(2011) 21 final.
g) Communication from the Commission, *An integrated industrial policy for the globalisation era – Putting competitiveness and sustainability at centre stage,* Brussels, COM(2010) 614.
h) Communication from the Commission, *The European Platform against Poverty and Social Exclusion: A European framework for social and territorial cohesion,* Brussels, COM(2010) 758 final.
i) Communication from the Commission, *An Agenda for new skills and jobs: A European contribution towards full employment,* Brussels, COM(2010) 682 final.

change. Energy consumption in urban areas – mostly in transport and housing – is responsible for a large share of CO_2 emissions. According to worldwide estimations,[20] about two thirds of final energy demand is linked to urban consumptions and up to 70 % of CO_2 emissions are generated in cities.[21] The urban way of life is both part of the problem and part of the solution.

In Europe, CO_2 emission per person is much lower in urban areas compared to non-urban areas.[22] The density of urban areas allows for more energy-efficient forms of housing, transport and service provision. Consequently, measures to address climate change may be more efficient and cost effective in big and compact cities than in less densely built space. The impact of measures to reduce CO_2 emissions taken in a single big metropolis like London may have a great effect.

EUROPEAN POLICY CONTEXT

Urban planning per se is not a European policy competence. However, economic, social and territorial cohesion all have a strong urban dimension. As the vast majority of Europeans live in or depend on cities, their developments cannot be isolated from a wider European policy framework. The EU has had a growing impact on the development of cities over recent decades, notably through cohesion policy.

The 'Acquis Urbain'

An on-going intergovernmental process of more than two decades, coupled with the practical experiences gained through the URBAN pilot projects and two rounds of URBAN Community Initiatives,[23] have led to an explicit European consensus on the principles of urban development, the 'Acquis Urbain'.

Successive EU Council Presidencies have recognised the relevance of urban issues and urban development policies at all levels of government. In particular, a series of informal ministerial meetings on urban development – in Lille 2000, Rotterdam 2004, Bristol 2005, Leipzig 2007, Marseille 2008 and Toledo 2010 – have shaped common European objectives and principles for urban development. These meetings have helped to forge a culture of cooperation on urban affairs between Member States, the European Commission, the European Parliament, the Committee of the Regions and other European Institutions, as well as urban stakeholders like the Council of European Municipalities and Regions (CEMR) and EUROCITIES.
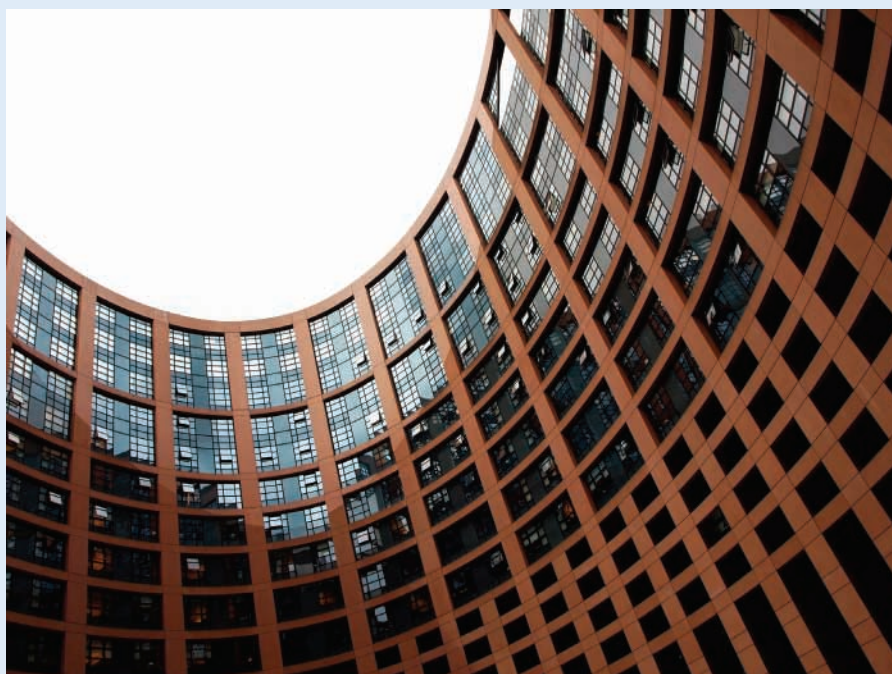
The 2007 Leipzig Charter on Sustainable European Cities has been the chief outcome of this process. It stresses the importance of an integrated approach to urban development and a focus on deprived neighbourhoods in order to remedy vicious circles of exclusion and

[20] There are various estimations of urban consumption of energy and related emissions. According to the World Energy Outlook (November 2008) http://www.worldenergyoutlook.org/index.asp, much of the world's energy – an estimated 7 908 M tonnes of oil equivalent in 2006 – is consumed in cities. Cities today house around half of the world's population but account for two thirds of global energy use. City residents consume more coal, gas and electricity than the global average, but less oil. Because of their larger consumption of fossil fuels, cities emit 76 % of the world's energy-related CO_2. However, according to D. Satterthwaite (International Institute of Environment and Development, UK), cities contribute much less to greenhouse gas (GHG) emissions than assumed, particularly in poorer countries (*Environment and Urbanisation*, September 2008).

[21] It is difficult to give a precise measure of CO_2 emissions as some figures are estimates on the basis of urban consumption of energy produced elsewhere.

[22] A rural resident would consume an average of 4.9 tonnes of oil equivalent/year in Europe while a city resident would consume 3.5 tonnes of oil equivalent. Source: IEA, 2008 and World Energy Outlook, 2008, International Energy Agency, Geneva.

[23] URBAN I (1994–99) and URBAN II (2000–06) were two Community Initiatives of the European Regional Development Fund (ERDF) focused on the sustainable integrated development of deprived urban districts.

deprivation. In 2010 this was taken further with the Toledo Declaration, which not only underlines the need for an integrated approach in urban development, but also promotes a common understanding of it. The Toledo Declaration effectively links the Leipzig Charter to the objectives of Europe 2020.[24] Europe 2020 has seven flagship initiatives in which both the EU and national authorities will coordinate their efforts.

The political process has been mirrored on the ground by the support for urban development from the European Regional Development Fund (ERDF), notably via the Urban Pilot Projects (1989–99) and the URBAN and URBAN II Community Initiatives (1994–2006). These EU initiatives focused on four core objectives: (i) strengthening economic prosperity and employment in towns and cities; (ii) promoting equality, social inclusion and regeneration in urban areas; (iii) protecting and improving the urban environment to achieve local and global sustainability; and (iv) contributing to good urban governance and local empowerment. The URBAN Community Initiatives demonstrated the virtues of the integrated approach, focusing on both soft and hard investments. They also showed that the involvement and ownership of projects of stakeholders, including citizens, was an important success factor. Another success factor was the relatively high share of per capita investment, i.e. targeted investments with a sufficient critical mass.

The urban dimension has been mainstreamed in the current ERDF programming period, which has given all Member States and regions the possibility to design, programme and implement tailor-made, integrated development operations in their cities. City networking and exchange of urban integrated development experiences is being promoted by the URBACT programme (2002–13).[25]

The Territorial Agenda

With the Lisbon Treaty, territorial cohesion was recognised as a key objective of the European Union. This resulted from a policy process that ran parallel to and was linked with that of urban development. The adoptions of the European Spatial Development Perspective[36] (ESDP) in 1999 and

the Territorial Agenda of the European Union[37] (TAEU) and Leipzig Charter in 2007 have been significant milestones. The TAEU was revised in 2011 to better reflect European challenges and policy priorities – notably Europe 2020 – leading to the adoption of the Territorial Agenda of the European Union 2020 (TA2020). It builds on the principle that an integrated and cross-sectoral approach is needed to transform the main territorial challenges of the European Union into potentials to ensure balanced, harmonious and sustainable territorial development.

TA2020 effectively links territorial cohesion with the Europe 2020 strategy. It provides strategic orientations for territorial development and stresses that most policies can be more efficient and can achieve synergies with other policies if the territorial dimension and territorial impacts are taken into account.

TA2020 promotes balanced, polycentric territorial development and the use of integrated development approaches in cities as well as rural and specific regions. It points to the need for territorial integration in cross-border and transnational functional regions and stresses the role of strong local economies in ensuring global competitiveness. It also highlights the importance of improving territorial connectivity for individuals, communities and enterprises, as well as managing and connecting the ecological, landscape and cultural values of regions.

TOWARDS A SHARED EUROPEAN VISION OF URBAN DEVELOPMENT

Can We Agree Upon A Shared Vision?

A vision can be defined as a shared image of a desirable future described in precise terms. There is no single vision of the European model city. In fact there might be as many visions as there are Europeans. Many cities have developed, through more or less participative processes, their own visions of what they would like their future to look like. These visions are diverse as they build on different realities, different strengths, weaknesses, opportunities and threats, as well as different values.

To develop a European normative

[24] cf. http://ec.europa.eu/regional_policy/newsroom/pdf/201006_toledo_declaration_en.pdf.

[25] cf. http://urbact.eu

vision of the city of the future may seem like a futile exercise; cities must develop their own visions, engaging their inhabitants, organisations, administrations and other local resources and stakeholders. But Europe has a role to play in setting the framework, providing guiding principles and enabling the cities to shape their future. A vision could be described in terms of four main elements:

i) its aims, i.e. the general goals perceived as an ideal that can be achieved;
ii) its major projects and their expected outcomes, which will plot the future path chosen by the city;
iii) a system of shared values[26], traditional and current values, that needs to be cultivated to unite and manage our differences, as well as 'qualities to be acquired' which will help to achieve the vision if supported collectively; and
iv) a collective desire to achieve the objectives which must have the potential to be expressed symbolically.[27]

In each of these elements, Europe has a role to play. In terms of aims or objectives, as well as values, there is an explicit agreement on the character of the European city of the future and the principles on which an ideal European city should be based. The same goes for the principles of urban development in the European territory. These principles can be found in the

objectives of the Treaty, in the Charter of Fundamental Rights of the European Union, in the European Social Model and in the objectives of the Territorial Agenda. They reflect the values on which the EU was founded.

Furthermore, there is a consensus among the ministers responsible for urban development on more specific city objectives and values, how these objectives should be attained and the instrumental role cities can play in implementing Europe 2020. This has been achieved through a continuous intergovernmental process marked by the Bristol Accord, the Leipzig Charter and the Toledo Declaration.

A European Vision of the Cities of Tomorrow

The shared vision of the European City of tomorrow is one in which all dimensions of sustainable urban development are taken into account in an integrated way.

i) European Cities of tomorrow are places of advanced social progress:

• with a high quality of life and welfare in all communities and neighbourhoods of the city;
• with a high degree of social cohesion, balance and integration, security and stability in the city and its neighbourhoods, with small disparities within and among

[26] By value we mean a type of belief representing and leading to ideal modes of conduct.

[27] Destatte, Philippe, contribution to Workshop 1 Cities of tomorrow – *Urban challenges,* Brussels, June 2010.

neighbourhoods and a low degree of spatial segregation and social marginalisation;

- with strong social justice, protection, welfare and social services, with no poverty, social exclusion or discrimination, and a decent existence for all, with good access to general services, preventive health care and medical treatment;
- with socially-balanced housing, and decent, healthy, suitable and affordable social housing adapted to new family and demographic patterns, with high architectural quality, diversity and identity;
- with good education, vocational and continuing training opportunities, including for those living in deprived neighbourhoods; and
- where the elderly can lead a life of dignity and independence and participate in social and cultural life, where neighbourhoods are attractive for both young and old people, where people with disabilities have independence, are socially and occupationally integrated and participate in community life, and where men and women are equal and the rights of the child are protected.

ii) European Cities of tomorrow are platforms for democracy, cultural dialogue and diversity:

- with rich cultural and linguistic diversity, and a social and intercultural dialogue;
- where the rights to freedom of expression, of thought, conscience and religion, and the right to manifest religion or belief, in worship, teaching, practice and observance are respected; and
- with good governance based on the principles of openness, participation, accountability, effectiveness, coherence and subsidiarity, where citizens have opportunities for social and democratic participation and are involved in the urban development together with other stakeholders.

iii) European Cities of tomorrow are places of green, ecological or environmental regeneration:

Source : Routier-Menoret, Ville de Nantes

- where the quality of the environment is protected, eco-efficiency is high and the ecological footprint small, where material resources and flows are managed in a sustainable way, and economic progress has been decoupled from the consumption of resources;
- with high energy efficiency and use of renewable energies, low carbon emissions, and resilience to the effects of climate change;
- with little urban sprawl and minimised land consumption, where Greenfields and natural areas are left unexploited by the recycling of land and compact city planning; and
- with sustainable, non-pollutant, accessible, efficient and affordable transport for all citizens at the urban, metropolitan and interurban scale with interlinking transport modes, where non-motorised mobility is favoured by good cycling and pedestrian infrastructure, and where transport needs have been reduced by the promotion of proximity and mixed-use schemes and the integrated planning of transport, housing, work areas, the environment and public spaces.

iv) European Cities of tomorrow are

places of attraction and engines of economic growth:

- where creativity and innovation take place and knowledge is created, shared and diffused, excellence is stimulated with proactive innovation and educational policies and ongoing training for workers, and sophisticated information and communication technologies are used for education, employment, social services, health, safety, security and urban governance;
- with a high quality of life, high-quality architecture and high-quality functional user-oriented urban space, infrastructure and services, where cultural, economic, technological, social and ecological aspects are integrated in the planning and construction, where housing, employment, education, services and recreation are mixed, attracting knowledge-industry businesses, a qualified and creative workforce and tourism;
- with regenerated urban local economies, diversified local production systems, local labour market policies, and development and exploitation of endogenous economic forces in the neighbourhoods, which consume local green products

Source : Patrick Garçon, Nantes Métropole

and have short consumption circuits; and

- where the heritage and architectural value of historic buildings and public spaces is exploited together with the development and improvement of the urban scene, landscape and place, and where local residents identify themselves with the urban environment.

A European Vision of the Territorial Development of Cities

The European Union aims to promote economic, social and territorial cohesion. The key role of cities in all aspects of cohesion is undeniable in terms of not only their internal but also their territorial development. Again, although the EU lacks a formal competence in spatial planning, there is a consensus on key principles which may form the basis of a shared European vision.

The future urban territorial development pattern:
- reflects a sustainable development of Europe based on balanced economic growth and balanced territorial organisation with a polycentric urban structure;
- contains strong metropolitan regions and other strong urban areas, such as regional centres, especially outside the core areas of Europe, which provide good

accessibility to services of general economic interest;
- is characterised by a compact settlement structure with limited urban sprawl through a strong control of land supply and speculative development; and
- enjoys a high level of protection and quality of the environment around cities – nature, landscape, forestry, water resources, agricultural areas, etc. – and strong links and articulation between cities and their environments.

CONCLUSIONS – SHARED EUROPEAN URBAN DEVELOPMENT OBJECTIVES

There is no denial of the importance of cities for our present and our future Europe. A large majority of the European population is urban. Cities play a crucial role as motors of the economy, as places of connectivity, creativity and innovation, and as service centres for their surrounding areas. Cities are also places where problems such as unemployment, segregation and poverty are concentrated. The development of our cities will determine the future economic, social and territorial development of the European Union.

The European Union does not have a direct policy competence in urban and territorial development, but the last two decades have witnessed an increasing

importance of the European level in both urban and territorial development. In this chapter we have demonstrated that there is an explicit European model of urban development that covers both the internal development of cities as well as their territorial development. The shared vision of the European model of urban development is one in which all dimensions of sustainable development are taken into account in an integrated way.

The European Cities of tomorrow are places of advanced social progress; they are platforms for democracy, cultural dialogue and diversity; they are places of green, ecological or environmental regeneration; and they are places of attraction and engines of economic growth.

The future European urban territorial development should reflect a sustainable development of Europe based on balanced economic growth and balanced territorial organisation with a polycentric urban structure; it should contain strong regional centres that provide good accessibility to services of general economic interest; it should be characterised by a compact settlement structure with limited urban sprawl; and it should enjoy a high level of protection and quality of the environment around cities.

However, there are many signs that the European model of urban development is under threat. As the urban population has increased, so has the pressure on land. Our present economies cannot provide jobs for all, and social problems associated with unemployment accumulate in cities. In even the richest of our cities, spatial segregation is a growing problem. Cities are ideally placed to promote the reduction of energy consumption and CO_2 emissions, but urban sprawl and congestion due to commuting is increasing in many of European cities. A series of challenges must be met collectively to fulfil serious ambition of truly sustainable and harmonious development of European cities.

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AN OVERVIEW ON THE PLANNING OF TRANSIT-ORIENTED DEVELOPMENT CITIES

ABSTRACT

The high-density commercial and business development in the central part of cities would eventually attract a high number of work and business trips during working days of the week. In many middle-income countries including Malaysia, these trips have been overwhelmingly and frequently made by private vehicles, especially private cars, while patronage of public transport is low. It results in increase in traffic congestion, lack of parking, increase in pollution and lengthy travel delays. On the contrary, the central part of many developed cities is well connected by both rail and bus-based public transportation system to cater to the high number of trip attractions. The positive effects on the developed cities due to increase in modal share by public transportation system are well documented in many literatures. In this context, transit-oriented development has been gaining momentum in many developing countries because of the benefits it renders to the city areas. This paper addresses the importance of planning cities through the provision of an efficient public transportation system to address the growing problems of pollution, traffic congestion and parking. The roles, principles and characteristics of transit-oriented development in making cities green, sustainable and liveable are discussed in this paper. The effects of transit-oriented development on passenger ridership, total number of trips, vehicle and person miles traveled, pedestrian and bicycle use and property values around the station in a few countries are highlighted. Finally, this paper also highlights measures to encourage the use of public transportation through effective land use planning to realize the benefits of a liveable city in the future.

Keywords: Public Transportation System, Transportation Planning, Transit-Adjacent Development

INTRODUCTION

The increase in the migration of population from rural to urban areas has been reported in many literatures over the past years. The search for better employment, quality of life, improved infrastructure, better education and health facilities are some of the many reasons for the immigration into big cities and metropolitan areas both in developed and developing countries. As a result, it has induced tremendous pressure on the existing infrastructure and facilities in the cities, where demand outpaces the supply, paving way for increase in congestion, air pollution, and other related environmental degradation. The realization of sustainable development, in general, and transportation, in particular, is in serious jeopardy in many developing cities. In some instances, the expansion of towns and cities, due to increase in population, has shifted the growth in residential development outside the urban areas. But the employment and business centres are predominately concentrated within the urban areas which eventually increases the travel distance of the commuters from residential areas to offices and business activities. The increase in travel distance coupled with affordability of owning private vehicles has induced commuters to

use private transportation especially motorcars to accomplish work and business activities. The poor public transportation system in terms of lack of coverage, frequency, fleet size and exclusive bus infrastructure has further increased the use of private transport into the urban areas. The effects of this paradox are two-fold: firstly, the continued deterioration of towns and cities with increase in population and creating enormous pressure on infrastructure and facilities and secondly the dilemma between the future of compact, smart, intelligent cities and urban sprawl. It is important to highlight that many theorists have suggested the prospects of future cities lie in the way the concept of a smart and intelligent city shapes and functions for a better quality of life and liveable communities. However, the major cities in developing countries have been witnessing a decline in the quality of life due to increase in congestion, pollution and poor infrastructure and facilities. Thus, it raises the question of whether the bandwagon of "sustainable transportation" can be realized to make the future cities "liveable".

It is widely agreed that transit-oriented development can increase the use of public transit systems through careful planning and design of the public transportation system, pedestrian

and bicycle facilities and high-density mixed-use development around the rail stations. The reduction in the number of trips, trip length (person and vehicle miles) by private transport and increase in passenger ridership by public transportation through transit-oriented development has been realized in many developed countries. In the recent past, transit-oriented development has gained momentum in many developing countries because of the benefits that it renders in relieving congestion, pollution and protecting from further environmental degradation. In Malaysia, new initiatives and multiple efforts have been taken by the government authorities to improve the public transportation system under the National Key Result Areas (NKRA) especially in Kuala Lumpur in an attempt to shift from the use of private to public transportation. The ongoing construction of the Mass Rapid Transit (MRT) and Bus Rapid Transit (BRT) in Klang Valley are some of the major public transportation projects which are undertaken to address the growing travel demand of the population. The location of the stations and design characteristics around the stations are important indicators which should be considered to encourage users to shift from private to public transportation. Transit-oriented development revolves around the ideas

of 3-D concept - density, diversity and design (Cervero and Kockelman, 1997) in developing high density (density), mixing land uses (diversity) and planning for pedestrian and bicycle-friendly or oriented facilities (design) near the transit stations.

In an attempt to understand the importance of planning transit-oriented development in cities in Malaysia, this paper looks into the roles, principles and design characteristics of transit-oriented development which are being practiced in a few developed cities. The effects of transit-oriented development in reducing the number of trips and trip length by private vehicles, increasing the number of passenger ridership by public transport and on parking provision are also discussed. Urban growth and motorization, interaction between land use and transport, definition and evolution of transit-oriented development, differences between transit-oriented and transit-adjacent development and impacts of transit-oriented development on trip characteristics and parking form the structural framework of this paper. Each of these components of the framework is discussed in the following sections of this paper.

URBAN GROWTH AND MOTORIZATION

Increase in population coupled with migration into the urban areas for better employment opportunities is one of the significant factors for the growth in motorization. Since 2008, more than half of the world's population is living in urban areas (Wong, T.C and Yuen, B., 2011). The number of urban residents is expected to continue

to grow, especially in developing countries. In Asia, some 1.1 billion are anticipated to move to cities in the next 20 years (Kallidaikurichi and Yuen 2010) as reported in Wong and Yuen (2011). This includes 11 megacities, each with a population exceeding 10 million, for example, Beijing, Shanghai, Kolkata (Calcutta), Delhi, Jakarta and Tokyo (Wong, T.C and Yuen, B., 2011). The expanding urban population will require a whole range of infrastructure, services, housing and jobs, not to mention land (Wong, T.C and Yuen, B., 2011). The urban land expansion could threaten agricultural land supply, cause growth in traffic volumes and increased pressure on the environment, and be massively unsustainable for the country and the rest of the planet. It is vital that sustainable urban development be pursued as cities continue to grow (Wong, T.C and Yuen, B., 2011).

The increase in motorization especially private vehicles indicates economic strength of a nation. But, at the same time, the extent to which the level of motorization is acceptable is very much crucial. The increase in motorization has been seen in many countries with the only exception being the extent to which it is growing. The increase in the use of vehicles, actually, depends on the demand to accomplish various purposes. Population is seen as one of the dominant factors for increased motorization in any country. Cities exceeding 1 million populations especially in Asia have also increased to a greater extent. Almost 200 cities with populations over 1 million including 98 cities in China and 35 in India were located in Asia (Singh, 2005). As the population of a city rises, demand for transportation also

rises proportionately. To exacerbate further in terms of meeting demand for transportation in the absence of adequate public transportation provisions, most of these cities' roads are congested with two-wheelers and other motorized para-transits which cannot substitute for a mass transit system appropriate to the demand volumes of these cities (Hossain, 2006; Singh, 2005; Hoque and Hossain, 2004). Cities such as Kuala Lumpur, Bangkok, Beijing and Shanghai are going through rapid motorization at an alarming rate (Hossain, 2006; UN ESCAP, 2005). Though these cities invested heavily on road-based infrastructure, the rate of motorization always outpaces the supply of road network (Hossain, 2006).

The level of motorization has been increasing at an alarming rate in Malaysia over the years. Increase in population, economic growth, affordability to purchase vehicles, low fuel price, attractive vehicles financing system are some of the factors causing growth in motorization. Although major cities in Malaysia had invested heavily in road-based infrastructure, the rate of motorization always outpaces the supply of road network (Hossain, 2006; UN ESCAP, 2005). As a result, cities in Malaysia have been facing the problems of congestion, safety, traffic-related air and noise pollution, and excessive (80% to 90% in Asia) commercial energy consumption in the transport sectors (Hossain, 2006; UN ESCAP, 2005).

Table 1 indicates growth in vehicle registration in Malaysia and Kuala Lumpur. The annual growth rate of vehicle registration in Malaysia and

Table 1: Vehicle registration in Malaysia and Kuala Lumpur, (2008-2013) in Million

| YEAR | MALAYSIA | | KUALA LUMPUR | |
	NUMBER IN MILLIONS	% GROWTH	NUMBER IN MILLIONS	% GROWTH
2008	17.97	-	4.04	-
2009	18.76*	4.40	4.25	5.20
2010	20.19	7.62	4.64	9.18
2011	21.40	6.00	4.96	6.90
2012	22.70	6.07	5.32	7.26
2013	23.38**	3.00	5.50**	3.38

Source : Ministry of Transport, Malaysia, www.mot.gov.my/en/Statistics/Pages/Land.aspx accessed on 18th September 2013
Note : * - 3rd Quarter;
      ** - 2nd Quarter

Kuala Lumpur has increased steadily from 2008 to 2010 and again from 2011 to 2012. The average annual growth rate of vehicle registration in Malaysia was 5.42% and 6.38% in Kuala Lumpur between 2008 and 2013. The total number of vehicles registered in Kuala Lumpur was 5.32 million in 2012 and in Malaysia 22.70 million. The growing number of vehicles on the roads has induced deteriorating effects on the mobility and affects the environment of the locality. It is obvious to witness growing traffic congestion, increase in delay and air pollution in Kuala Lumpur and many major cities in Malaysia. Not surprisingly, the ownership of motorcars outpaces (63%) other modes of transport not only in Kuala Lumpur **(Table 2)** but also other major cities in Malaysia. It clearly demonstrates the increasing use of motorcars on the road network in Kuala Lumpur and other cities. Table 3 shows increase in vehicle ownership in almost all states in Malaysia. The average number of vehicles owned by an individual is almost one vehicle to one person in the year 2000 **(Table 3)** and more than one vehicle per person in 2005 in Kuala Lumpur.

The increasing use of private vehicles in Kuala Lumpur and other major cities has induced tremendous pressure on road infrastructure. **Table 4** shows traffic volume trends along few major roads in Kuala Lumpur. Generally, the total traffic volume along major roads heading to city centre of Kuala Lumpur has been increasing every year. Though construction of many

Table 2: Breakdown of vehicle registration in Kuala Lumpur, 2012

Types of Vehicle	Number (in millions)	Percentage
Motorcar	3.33	62.6%
Motorcycle	1.54	29%
Goods and Commercial Vehicle	0.30	5.6%
Others	0.15	2.8%
Total	5.32	100%

Source : Ministry of Transport, Malaysia, www.mot.gov.my/en/Statistics/Pages/Land.aspx accessed on 18th September 2013

Table 3: Vehicle ownership rate for every 1000 persons in Malaysia by States

STATES	1995	2000
Johor	432.9	523.4
Melaka	458.8	555.9
Negri Sembilan	398.4	476.2
Perak	375.3	459.5
Penang	651.8	807.7
Selangor	399.4	367.9
Kuala Lumpur	616.3	985.7
Kedah	269.7	310.0
Kelantan	180.5	211.9
Pahang	260.8	306.1
Terengganu	181.4	221.0
Perlis	276.4	324.8
Sabah	101.0	111.4
Sarawak	215.0	255.0
Malaysia	339.2	421.9

Source : Eighth Malaysia Plan 2000-2005, Economic Planning Unit

Table 4: Traffic volume (16 hours) count along a few major roads heading to Kuala Lumpur

Location	1998	1999	2000	2001	2002	2003	Average Annual Growth Rate (%)
Jalan Damansara	148,443	153,752	186,443	211,801	247,427	239,620	10.42
Jalan Kepong	105,040	101,587	101,048	104,719	102,424	115,144	2.00
Jalan Kuching	160,804	181,669	180,714	157,792	160,445	176,312	1.32
KL-Rawang	135,432	141,407	152,906	143,634	156,842	164,701	4.14
KL-Kajang	42,050	53,095	54,971	65,259	56,695	60,077	8.27
KL-Puchong	23,158	27,206	33,289	61,196	112,231	NA	51.77

Source : Ministry of Work, Highway Planning Unit, Road traffic volume 2003

new roads and expansion of existing roads has been taking place in Kuala Lumpur and other cities, however, it is widely accepted that the supply of road infrastructure cannot outpace the increasing motorization and travel demand. As a result, traffic congestion associated with increase in delay, decrease in speed of the vehicles, noise and air pollution, increase in discomfort and inconveniences of the commuters are also in the upsurge. This situation is further exacerbated by decreasing use of public transportation in many major cities including Kuala Lumpur. The present share of public transportation use in Kuala Lumpur stands only at 14% of the total daily travel (Kuala Lumpur Structure Plan, 2020). However, the use of public transportation during peak hours is slightly higher than 14% of the total travel. Some of the main reasons for low patronage of public transportation include: inadequate coordination of policies concerning public transport and public/private transport modes, low coverage of bus and train routes serving Kuala Lumpur and surroundings, frequency of bus services, lack of feeder routes from residential areas to the nearest LRT stations, lack of park and ride facilities near the LRT stations at the outskirts of the central area and common ticketing facilitating users to shift from one mode of transport to another (Kuala Lumpur Structure Plan, 2020).

INTERACTION BETWEEN LAND USE AND TRANSPORT

Land use planning and transport are inextricably entwined and impact on each other by new developments altering travel and traffic patterns enormously, and new roads and public transport routes providing new pressure and opportunities for future developments.

Figure 1 illustrates the cyclic interaction between land use and transport. It can be started at any stage along the cycle. The number of generated trips will be high when modified land uses takes place. When land use changes from agricultural to residential or other activities, more number of person and vehicle trips will be generated to accomplish various trip purposes. To cope with the increase in the number of trips, additional transportation infrastructure in the form of new roads,
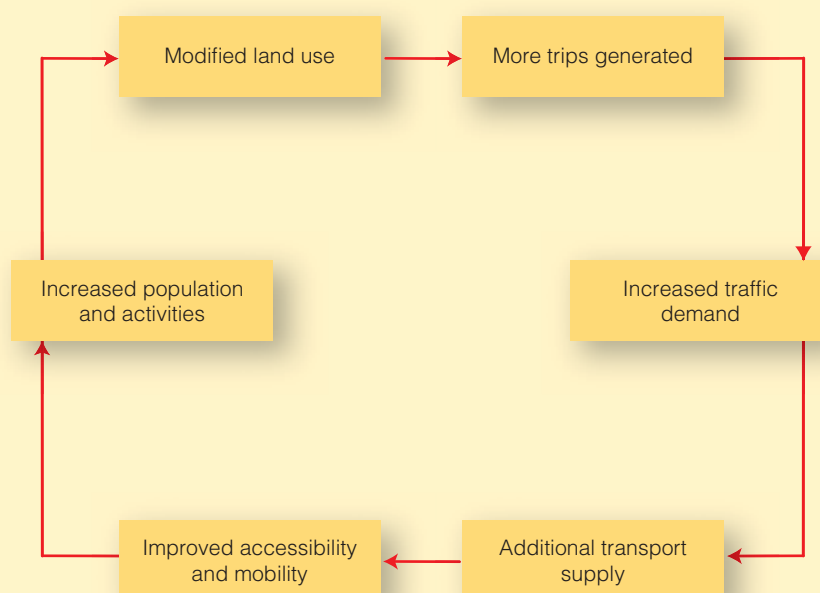
expansion of existing roads and public transportation infrastructure is required. As a result, the mobility and accessibility of the population improves which in turn attracts new residential, commercial and other activities and thus increasing population. The increase in population creates additional demand to accomplish activities which should be accommodated by modifying the existing land use and the cycle goes on. It is important to intervene in this cycle especially in arresting the growth in the number of private vehicle trips through appropriate policies and strategies to protect the environment from further damages.

Stefano Gori, *et.al.,* (2012) has stated that important changes in urban features strongly modified the quantity and quality of the mobility system: the continuous spread of residences and activities have increased the length of trips and the use of private transport; the usual mobility habits have been changed by more complex behaviours (trip chaining) (Stefano Gori, *et.al.,* 2012). The automobile is often considered the only transport mode while transit became less and less used with strong impacts on environment and sustainability (Stefano Gori, *et.al.,* 2012). The interaction between land-use and the transport system has been heavily dealt with by the research community

recently and, in this section, the literature review represents the synthesis of some interesting analysis about this interaction focusing on the relationships between land use characteristics (such as urban densities, neighborhood design schemes and mixed land-use) and transit ridership (Stefano Gori, *et.al.*, 2012). This is a very controversial topic because different theses are already present: some studies establish that such variables seem to have an impact on auto ownership and use, but other studies quantify the impact as, at best, marginal (Stefano Gori, *et.al.*, 2012).

Literature review about transportation and land-use interaction can be found in Badoe and Miller (2000) and also in Ewing and Cervero (2001). As reported in Stefano Gori, *et.al.,* (2012), the reviews are conducted to understand if travel variables as trip frequencies, trip lengths and mode choices are correlated with the built-in environment in the studies analyzed. The studies provide an example of the complexity of the connection between land use and transport system, involving a very large number of social, economic, technical and historical elements not easy to measure and to compare. About the opportunities provided by the public transport systems to develop a sustainable mobility, Bernick and Cervero (1997) and Cervero (1998) show, as reported in Stefano

Figure 1: Land use and transport interaction

Source : IIT article (n.d.)

Gori, et.al. (2012), introducing the concept of the "transit metropolis", examples of transit services that provide respectable alternatives to travel by car. This is the case of Zurich and Melbourne, where the cities are formed by a unique central and compact business area or Stockholm and Copenhagen, where new urban areas have appeared concentrated around railway stations connecting them with the historic central nucleus. In other cases, accepting spread-out and lower density areas, it has been chosen to appropriately adapt transit services even through the help of new technologies as track-guided buses or small vehicles ("adaptive" public transport). This is the case of cities like Adelaide and Mexico City. In the case of Munich, Ottawa and Curitiba it was chosen to realize an efficient transit system through "hybrid schemes". These try to balance concentration of urban development, along the main corridors of the public transport services, and adapting transit services to serve the spread-out suburbs. All these examples of transit success are characterized by strong interactions between the land use policy and the transport system planning. Similar conclusions are made also by Beimborn *et al.* (1992), as reported in Stefano Gori, *et.al.* (2012), about the requirements for successful transit. Land use design could be sensitive to transit needs to develop "transit corridors" divided by 0.4–0.8 km from the automobile networks, in order to separate the automobile oriented land-use from the transit oriented land-use. Such areas would have a mix of land uses and higher densities to reach a concentration of trip ends along the transit service, with a high quality access system to transit stops (Stefano Gori, *et.al.*, 2012).

The importance of a high quality access system to transit stops is underlined also by Schlossberg and Brown (2004), as reported in Stefano Gori, *et.al.* (2012). Extensive debates are also related to the role played by the population and activities densities to explain the level of car and public transport use. Sinha (2003), as reported in (Stefano Gori, *et.al.* (2012), demonstrates, with the collection of different data from 46 cities in United States, Australia, Canada, East Europe and Asia, that a high urban population density seems to be a primary element to increase transit boardings. The

transit boardings per capita per year increase with the rise of the number of persons per hectare, while the car kilometers of travel per capita per year decrease. About the impact of the density, an important observation is highlighted by Eidlin (2005), as reported in Stefano Gori, *et.al.* (2012). According to this contribution, the critical issue is not the density values, but its distribution within an urban area. This consideration derives from the analysis of the city of Los Angeles that is characterized by an average density of activities and residences higher than many other Americans cities, but these values are correlated with one of the lower levels of transit share. The comparison with the data of New York and San Francisco, characterized by the largest level of transit use in the US but by an average value of population density lower than Los Angeles, permits to underline that this condition derives from the low variation of population and activities density within the territory, that is what the author defines as "the worst of all worlds".

Mees (2009), as reported in Stefano Gori, *et.al.* (2012), from the comparison between urban densities and transport mode shares of Australian, Canadian and United States urban areas, highlights the following results: Australian cities, that have similar densities to those of Canadian cities and the more densely-populated US cities, report variations in density with little or no relationship to transport modes share, which seems more closely related to different transport policies. These findings are very different from those on which current urban policies are based, and suggest the need for a radical rethinking of those policies. Other interesting contribution about the determinants of the mode choice is from Buehler (2011), as reported in Stefano Gori, et.al. (2012), with the comparison of the results of national travel surveys in Germany and in the USA. Germans are considerably more likely to walk, bike, and use public transport than Americans even if socioeconomic, demographic and spatial development variables are quite similar. Travel behaviour choice seems to be more related with other factors such as transport and land-use policies as well as cultural preferences.

A synthesis of the main characteristics that could identify a sustainable

city is made by Banister (2000) and Banister (2005), as reported in Stefano Gori, *et.al.* (2012), especially for the European context, where the scarcity of space and the protection of not built-up space are key issues. The total amount of population level (ranging from 50,000–100,000 inhabitants) has to be distributed so as to guarantee medium densities (40– 200 persons per hectare), as shown by empirical studies. The city should also present mixed use developments mainly oriented to public transport accessible corridors and near to highly public transport accessible interchanges. Moreover, Banister (2000; 2005) underlines the importance of the implementation of appropriate policies in order to develop high-quality liveable cities to be the basis for sustainable urban development. One of the elements in identifying the role, importance and the impact of the interaction between land use policy and transportation planning is density. The density has to be high in order to concentrate trips along a high capacity, high speed and high reliable transit service, so increasing the accessibility at the start and at the end of the trip and as a consequence, the door-to-door travel speed (Stefano Gori, *et.al.,* 2012).

DEFINITION AND EVOLUTION OF TRANSIT-ORIENTED DEVELOPMENT

Transit-oriented development (TOD) is a planning technique that aims to reduce automobile use and promote the use of public transit and human-powered transportation modes through high density, mixed use, environmentally-friendly development within areas of walking distance from transit centres (Wann-Ming Wey and Yin-Hao Chiu, 2013). In a nut-shell, transit-oriented development is a compact, pedestrian-friendly high-density development near transit stations (Ming Zhang et.al., 2012The transit services provided in transit-oriented development could be bus-based or rail-based. Countries are engaged in constructing BRT as the main rapid transit mode for cities with populations under five million and rail-based technologies for cities with populations over five million (Vimal Gahlot *et.al.,* 2012). Anastasia Loukaitou-Sideris (2010) has reported, as stated in Calthorpe, 1993; Cervero, 1993; Bernick &

Cervero, 1997, that when the idea of transit-oriented development entered the lexicon of planning in the late 1980s, it was enthusiastically endorsed by some planners and academics who viewed TODs as a way of mitigating the ubiquity of sprawl and as a strategy for smart growth. Actual implementation of projects, however, was slow to follow as developers and funding institutions were hesitant about the level of public acceptance and marketability of such projects especially in regions that seemed to be married to the private automobile. Twenty years later the concept of TOD is no longer 'academic'. Many housing and mixed-use projects have appeared in close proximity to stations and more are on the drawing boards or at various stages of the approval and development process (Dittmar & Ohland, 2004), as reported in Anastasia Loukaitou-Sideris (2010).

There are two possible transit-oriented developments to better use a rapid mass transit service (high speed and high capacity transit system, usually a rail system):

(1) transit-village - with a strong concentration of activities and residences in an area of about 500 m of radius (considered as the maximal pedestrian distance); (2) compact island - with lower densities, different possible configurations and a maximum extension of about 300– 400 ha (roughly a 2km by 2 km area), in which the access to the mass rapid transit system is guaranteed by the introduction of an effective feeder public transport service which ensures a large area coverage as well. While the first TOD suggested is the classic transit village, proposed firstly by Calthrope, the second one is proposed by Gori et.al. (Gori, *et.al.*, 2012) and derived from the analysis of the Italian city of Venice where travel is possible, without particular problems, using ferry services along the main city canal and walking. In both cases the access phase to the mass rapid transit system becomes fundamental. In fact accessibility can penalize the "door-to-door" speed, increasing the total travel time. For the "transit village", the access phase has to be identified at the pedestrian level working on the configuration of the road network (in fact the road network is also the network used by pedestrians, while for the "compact island" the problem

is to identify the optimal layout of transit routes balancing directness and service coverage (Gori, *et.al.,* 2012).

TRANSIT-ORIENTED DEVELOPMENT (TOD) AND TRANSIT-ADJACENT DEVELOPMENT (TAD)

It is imperative to understand the distinctions between transit-oriented and transit-adjacent development. The former emphasizes greatly on the use of public transit but the latter not necessarily. As TOD encourages the use of public transit, the design of pedestrian walkways, crossings and development density around the transit stations should be very distinct, whereas these features and design are not seen in TADs as development is only located adjacent or proximate to the transit station. Renne, J.L. (2009) draws some salient distinctions between transit-oriented and transit-adjacent development which is shown in **Table 5**.

Transit-oriented development focuses mainly on mixed-use high density developments, well connected and user-friendly pedestrian networks and bicycle paths, less or limited parking provision to facilitate users to shift from private to public transportation. On the other hand, transit-adjacent development emphasizes on developments nearer to or in close proximity to mass rapid transit system, but not necessarily encourages the use of mass rapid transit, with features such as low density, adequate parking spaces, limited or no pedestrian and bicycle access around the transit stations.

PRINCIPLES OF TRANSIT-ORIENTED DEVELOPMENT

Transit-oriented development has gained significant momentum in the recent past because of the benefits that it provides to transportation system. To enjoy the benefits that it renders, it is important to observe certain principles while planning transit-oriented development in cities and its surroundings. Some of the principles (Calthorpe, 1993) as reported in Yibo Zhang (2011) are listed below:

i) Organize growth on a regional level to be compact and transit-supportive;
ii) Place commercial, housing, jobs, parks and civic uses within walking distance of transit stops;
iii) Create pedestrian-friendly street networks which directly connect local destinations;
iv) Provide a mix of housing types, densities and costs;
v) Preserve sensitive habitat, riparian zones, and high quality open spaces;
vi) Make public spaces the focus of building orientation and neighborhood activity; and
vii) Encourage infill and redevelopment along transit corridors within existing neighborhoods.

Under the guiding principles of transit-oriented development, the basic ideas are to design an urban form in a relatively high density, compact and mixed form, and to provide high quality, efficient mass transportation services, together with a pedestrian friendly environment (Becky, P.Y. Loo, Cynthia

Table 5: Distinction between transit-oriented development and transit-adjacent development

Transit-oriented development	Transit-adjacent development
Grid street pattern	Suburban street patterns
High densities	Low densities
Mostly underground or structured parking	Dominance of surface parking
Pedestrian-focused design	Limited or no pedestrian access
Bicycle access/parking	Limited or no bicycle access/parking
Multi-family homes	Single-family homes
Office and retail land uses, especially along main streets	Industrial land uses Segregated land uses
Vertically and horizontally mixed land uses	Gas stations, car dealerships, drive-through stores and other auto-focused land uses

Source : Renne, J. L. (2009)

Chen, and Eric T.H. Chan, 2010). Accordingly, a number of strategies for development such as smart growth, transit-joint development, neo-traditional development, and transit-focused development have been proposed. Although the meaning of these terms are not exactly the same, they share some common elements, such as the promotion of mixed development close to transit (Cervero *et.al.,* 2002) as reported in Becky, P.Y. Loo, Cynthia Chen, and Eric T.H. Chan (2010). Research findings have shown that residents living in TOD neighbourhood used transit more frequently than people having similar socio-economic characteristics but living elsewhere. Studies on TOD and transit ridership at city level (such as New York and Hong Kong) shows that a combination of variables in different dimensions including land use, station characteristics, socio-economic and demographic characteristics, and inter-modal competition, are important in accounting for the variability of rail transit ridership (Becky, P.Y. Loo, Cynthia Chen, and Eric T.H. Chan, 2010).

IMPACTS OF TRANSIT-ORIENTED DEVELOPMENT

Literature reviews on the impacts of TOD in Western cities, in general, give us an idea that urban design factors and a pedestrian-friendly design are positive planning factors in reducing automobile use through the reduction of automobile traffic speed and enhancing pedestrian accessibility to a transit centre. Pucher and Dijkstra (2000), as reported in Wann-Ming Wey and Yin-Hao Chiu (2013), state that transportation and land use policies have made walking "less feasible, less convenient and more dangerous". Research in the US has shown that residents of compact, mixed use neighborhoods are three times more likely to walk (to a store, restaurant, or local park) than those living in more spacious automobile oriented neighborhoods (Cervero and Radisch, 1996) as reported in Wann-Ming Wey and Yin-Hao Chiu (2013). Cervero and Gorham (1995), as reported in Wann-Ming Wey and Yin-Hao Chiu (2013), also hypothesized that transit-oriented neighborhoods generate more pedestrian and transit trips. A major focus in the United States cities regarding TOD planning has been

centred on increasing development intensity (density) as well as mixing land uses (diversity) and creating pedestrian-friendly urban design (design) near transit centres (Wann-Ming Wey and Yin-Hao Chiu, 2013). It shows the importance of three "D's" in TODs – density, design and diversity (Cervero and Kockelman, 1997).
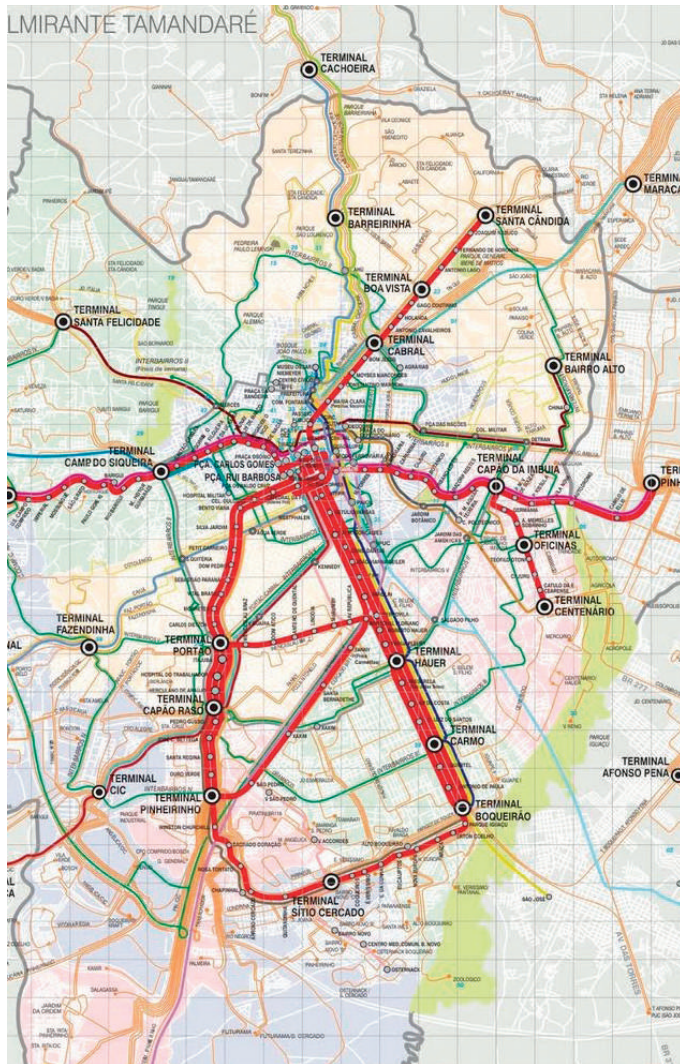
The literature on empirical studies of TOD planning factors in American cities, Ewing and Cervero (2001), as reported in Wann-Ming Wey and Yin-Hao Chiu (2013), identified that the application of the 3-D planning factors (density, diversity and design) tend to reduce total trips and total vehicle-miles traveled by 3-5%. A comparative analysis between an automobile-oriented city and a transit-oriented city shows that the latter has about 30% fewer total trips and vehicle-miles travelled than the former (Cervero, 1996). The United States and other Western countries, where the TOD concept was first developed and applied, tend to generally emphasize the 3-D planning factors around a transit centre (Wann-Ming Wey and Yin-Hao Chiu, 2013). However, in Taiwan, where the transit network has already been well developed, the quality and quantity of transit service, in addition to the 3-D planning factors, can be expected to contribute to achieving TOD objectives such as relieving traffic congestion and consuming fewer land resources (Wann-Ming Wey and Yin-Hao Chiu, 2013).

The Curitiba bus system "exemplifies a model of BRT and plays a larger role in making Curitiba a liveable city (Goodman *et.al.*, 2005). Curitiba, Brazil is considered the birthplace for BRT and the service includes the following features: bus only right-of-way (bus lanes), comprehensive coverage, diverse user market, bus preferential treatment (over other modes of transportation including private vehicle), frequent high capacity, integrated single-fare system, improved security for bus riders, and enclosed high quality bus stations (tube stops) (Ming Zhang *et.al.*, 2012) **(Figure 2).** Curitiba has one of the most used, low cost transit systems in the world. Around 70%-75% of commuters use the BRT to travel to work resulting in congestion reduction and superior air quality (Goodman *et.al.,* 2005).

Arlington County, Virginia, USA has one of the most outstanding TODs in the United States (Ming Zhang *et.al.,* 2012). Each Metrorail station along Rosslyn-Ballston corridor in Arlington County represents an urban village with medium to high density mix uses and surrounded by low-to-moderate density neighborhoods (Ming Zhang et.al., 2012). These urban villages are supported by a variety of multi-modal transportation facilities including pedestrian pathways, bicycle lanes, bus services and the Metrorail. These urban villages experience high rate of transit ridership (Cervero, 2006) as reported in Ming Zhang et.al. (2012). The increase in ridership seems to be boosted by the office-retail development around and a walking distance from the Metrorail stations. Models estimated that every 100,000 square feet of additional office and retail floor increased average daily boardings at stations by around 50 commuters (Cervero, *et.al.*, 2004) as reported in Ming Zhang et.al. (2012). A study showed that the portion of congested roadway in one of the regions in US is estimated to decrease by nearly 770 lane miles, daily vehicle-miles travelled are reduced by 10 to 12 million or by 3.5 to 4.5 person-miles traveled per person (Ming Zhang, 2010). This magnitude of congestion relief for peak-hour commuting indicates a potentially significant amount of savings in highway investments through TOD practice. TOD's role as a congestion relief strategy largely lies in the concentrated development that shortens average trip length and hence generates less vehicle-miles traveled (VMT) and person-miles traveled (PMT) than low-density sprawl. **Figure 3** and **Figure 4** show the characteristics and design features of TODs in Hong Kong and Portland, USA respectively.

The effect of a new railway line would have impact on the property value surrounding the proposed new railway stations. Stephen B. Billings (2011) highlights that LRT provides a neighborhood impact of 4.0% for single-family properties and 11.3% for condominiums sold within 1 mile of LRT stations. The study also suggests that LRT investment may be used more as an economic development tool for specific neighborhoods rather than a transportation amenity in cities containing sparser development patterns (Stephen B. Billings, 2011).

Figure 2: BRT line, development and pedestrian design in Curitiba, Brazil

A map showing BRT line in Curitiba, Brazil

Source : Skyscrapercity.com, accessed on 18 September, 2013, http://www.skyscrapercity.com/showthread.php?t=1397572&page=2

A picture showing design of bus stop and passengers boarding the BRT system

Source : Brazil's vision of an eco city: Curitiba, accessed on 23 September 2013, http://architextsassociation.com/2012/10/29/brazils-vision-of-an-eco-city-curitiba/

Mixed-use, high density neighborhoods along the BRT line

Source : Global Transport Knowledge Practice, accessed on 23 September 2013, http://www.gtkp.com/themepage.php&themepgid=4ç5

A pictorial illustration of BRT line

Source : Lindau, Hidalgo and Facchini (2010), accessed on 24 September 2013

Figure 3: TOD design features around Central transit station in Hong Kong

Transit station and its surroundings in Hong Kong

Source : Hong Kong Street Maps, accessed on: 19/9/13
http://www.chinaodysseytours.com/hongkong/maps/big/Central_Admiralty.png

Pedestrian crosswalk adjacent to Central MTR station.

Pedestrian bridge connecting from Central MTR station to nearby land use.

Pedestrian bridge connecting from MTR station to nearby buildings.

Hong Kong trams passes through the Central Business District

Source : http://www.hong-kong-traveller.com/hong-kong-tram.html, accessed on 24 September 2013.

High rise buildings near the Central MTR station.

Source : Bukowski et.al, (2013), accessed on 19 September 2013.

Figure 4: Characteristics of TOD at Portland, USA

CENTRAL CITY

——	Red Line MAX (Beaverton/Airport)
——	Yellow Line MAX (Expo Center)
——	Blue Line MAX (Hillsboro/Gresham)
——	Green Line MAX (Clackamas)
○	MAX stop
——	Westside Portland Streetcar
——	Eastside Portland Streetcar
○	Portland Streetcar stop
●	Destination
ⓘ	Portland Information Center

1000 feet
200 m

N

Map of MAX Light Rail and Streetcar corridors in Portland, United States

Source : http://www.travelportland.com/maps/portland-city-center-map-pdf, accessed on 22 September 2013.

Pedestrian and bicycle crossing design near the LRT station in Portland

Source : A review of best practices – U.S case study, accessed on 21 September 2013, available: http://www.fltod.com/case_studies.html

Mixed-use neighborhoods near the station in Portland

Source : http://portlandcondoloftsearch.com/streetcar-lofts/, accessed on 21 September 2013.

Pedestrian bridge design providing access to the station

Source : http://www.flickr.com/photos/40396973@N00/501630587/, accessed on 22 September 2013.

The alignment of LRT lines provides opportunities for high-rise residential development including condominiums around the station for easier, convenient access to the station and thus encourages the use of rail transit among the residents living near the stations.

A number of studies dealt with TOD initiatives and its potential positive impact on surrounding land development, traffic congestion and benefits to the users at large. Few such studies include:

i)   Green TODs: marrying transit oriented development and green urbanism (Cervero and Sullivan, 2011).
ii) Rail-based transit-oriented development: lessons from New York city and Hong Kong (Loo, BPY *et.al.,* 2010).
iii) Rethinking urban land use and transport planning: opportunities for transit-oriented development in Australian city case study Perth (Falconer and Richardson, 2010).
iv) The geography of advanced transit-oriented development in metropolitan Phoenix, Arizona, 2000-2007 (Atkinson-Palomboa and Kuby, 2011).
v)   Transit-oriented development in a high-density city: Identifying its association with transit ridership in Seoul, Korea (Sung and Oh, 2011).

A substantial number of studies have shown increase in transit ridership as a result of high development density and land use mix near the transit stations (Cervero, 1996; Ewing *et.al.,* 2008; Ewing *et.al.,* 2002; Beaton, 2006; Ewing and Cervero, 2010). The high development density and mixed land use near KL Sentral and Terminal Gombak Station (along Kelana Jaya LRT line) has substantially increased transit ridership (Muslihah Mustapha, 2011). Transit Planning Zones are also pursued in Johor Bahru and Nusajaya city centre promoting the development of commercial and housing on the same site to support the strategy of encouraging city living and transit-oriented development (Ho C.S and Fong W. K., 2011). Sung and Oh (2011), as reported in Stefano Gori, *et.al.* (2012), as a result of analyzing the association between transit-oriented development and transit ridership in Seoul, suggest focusing the attention more on increasing

density to strengthen transit service network, developing mixed land-use and creating a more pedestrian-friendly environment around rail stations.

TRANSIT-ORIENTED DEVELOPMENT AND PARKING PROVISION

Successful integration of parking is vital for capturing the benefits of TODs and achieving all its goals (Boroski *et.al.*, 2005) such as improving transit accessibility, transit ridership, economic development, enhancing livability, broadening housing choices, improving safety, reducing parking requirements, improving intermodal integration, and increasing pedestrian-friendly development (Willson, 2005; Cervero *et.al.,* 2004; Lund *et.al.*, 2004; Cervero *et.al.*, 2002; Higgins, 2007) as reported in Ming Zhang *et.al.* (2012). Applying suitable parking standards in TODs can improve the overall performance of the TOD and shape travel behaviour, community design and development economics (Willson, 2005) as reported in Ming Zhang *et.al.* (2012). Striking a balance between parking supply and development is a crucial challenge in developing the character of TOD (Ming Zhang *et.al.*, 2012).

TOD offers an opportunity to improve connectivity and safe walkways for the betterment of communities (Calthorpe, 1993) as reported in Ming Zhang *et.al.* (2012). Parking design plays a key role in making safe pedestrian-friendly communities (Ming Zhang *et.al.,* 2012). When examining physical-design principles behind TOD and its relationship to transit ridership, it was found that TOD residents' proximity to a rail station "was a much stronger determinant on transit use than land use mix or quality of walking environment" (Cervero, 1993; Lund *et.al.,* 2004) as reported in Ming Zhang *et.al.* (2012). Thus residents will use transit as long as they live near a transit station regardless of the physical-design factors (Ming Zhang *et.al.,* 2012). Cervero found that transit ridership declines if residents have access to a private vehicle and parking is free at a resident's workplace (Ming Zhang *et.al.,* 2012). Parking layouts have the potential to detract TOD from quality of walking and undermine TOD regional land use benefits (Cervero and Landis, 1997; Cervero *et.al.,*

2002) as reported in Ming Zhang *et.al.* (2012). Parking standards for TOD are unique in nature, and if done right, enable residents to get by with fewer automobiles, improve safety of pedestrian circulation and influence land use development (Cervero *et.al.*, 2002) as reported in Ming Zhang *et.al.* (2012). Parking reduction plays a key role in shaping these urban villages and developing a walkable community. The county does not allow park and ride facilities near the transit stations (Ming Zhang *et.al.*, 2012). Best practices for TOD-parking include 1) Reductions - Parking requirements can typically be reduced around 20% and up to 50% in areas with good transit; 2) Deregulate parking - to allow developers to assess parking demand, provide market-priced parking to meet average demand, and use shared parking to accommodate peaks.

CONCLUSIONS

The potentials and benefits of transit-oriented development are well documented in many literatures. The impact of transit-oriented development on trip characteristics, environment, land resources and use of public transportation system has shown positive signs to explore further on this important concept. Studies have indicated transit-oriented development brings reduction in the number of private vehicles trips, vehicle-miles and person-miles traveled, increased use of public transportation and protection to the environment in cutting down pollution and land requirement for transportation infrastructure. To realize the benefits of transit-oriented development on improvement of cities and communities, it is imperative to improve key indicators such as pedestrian infrastructure including walkways and crossings for easier and comfortable access to the transit stations, plan for high density and mixed land uses around the transit stations and enhance the efficiency and reliability of public transit system. In this paper, the definitions, evolutions, principles and likely impact of transit-oriented development are discussed by taking into account some key examples and practices especially in developed cities both in Western and Asian countries.

In Malaysia, the travel demand has been increasing and most of the trips

are made by private transport. This has resulted in increase in congestion, travel delays, pollution and other related negative effects. It is important to meet the growing travel demand of the community but at the same time it is also equally important to preserve and protect the environment. Although it sounds like a huge challenge, it could possibly be achieved if the investment focuses on improving public transportation infrastructure and non-motorized transport facilities to induce modifications or changes in the way people travel. Undoubtedly, the increase in the use of public transport and other alternative modes of transport other than motorcars would not only help to provide alternatives to travel but most importantly to achieve "sustainable transportation" and make the cities "liveable". With the current emphasis more focused on the improvement of public transportation systems in major cities under the National Key Result Areas (NKRA), there is an optimistic belief that the realization of sustainable transportation to make cities liveable can be achieved in the long-run.

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TOWARDS SUSTAINABLE FUTURE CITIES: WHAT MAKES A USER-FRIENDLY STREET

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ABSTRACT

Streets are an important component of the urban form and regarded as the main contributor of urban public spaces in the city. However, rapid urbanisation and development in the city centres which give priority to vehicular traffic have led to a reduction in urban public spaces and resulted in streets not being friendly to their users, especially pedestrians. This paper examines the factors that lead to a user-friendly street within the context of a fast developing city of Kuala Lumpur, Malaysia. It seeks to examine the elements and qualities associated with a user-friendly street and variations between the perceptions according to their socio-demographic background. A case study approach was employed on a main street in the Kuala Lumpur city centre where questionnaire survey, field observation and in-depth interviews were conducted. The results suggest that the needs of users on the street depend on various factors such as attractions; activities and reasons for using the street; proximity, lack of congestion (crowding); and familiarity and length of engagement with the public spaces, greenery/trees, public amenities and freedom of action. The user needs of Malaysians are found to be influenced more by functional factors rather than physical factors. The findings also show that in general, the user needs of a user-friendly street in Kuala Lumpur are mostly similar to the needs of people in other countries in respect of urban public spaces.

Keywords: User-friendly, Streets, Pedestrians, Urban Space, Users and City Centres.

INTRODUCTION

Streets are a vital component of the urban form and the most important element of urban public spaces that are utilised by the people. Currently, with the lack of urban public spaces; the user friendliness of a street is an important factor in order to bring people onto the street to mingle and socialise. Previous research has shown that people are prepared to use the space if there is an improvement to the street space (Papaionimou *et al.*, 2007). However, most of the urban areas (especially streets) around the world suffer from the domination of private vehicles (Tsourlarkis, 2005) and many drivers often ignore pedestrians by claiming through exclusive use of the road networks (Papaionmou *et al.*, 2007). This is probably because there is still a lack of understanding concerning the needs of the current users in specific contexts (Moughtin, 1992; Knox, 2005). Southworth (2002) argued that public spaces such as streets are the most important form of social infrastructure in urban settlements, particularly in the lives of poorer people, whose housing is often too small for household needs. Moughtin (1992) and Gehl (2008) argued that the task of the city builder is to understand and express in built

form, the needs and aspirations that best serve the needs of the community to ensure that the end product is culturally acceptable. Therefore, this research seeks to identify the current needs of street users in the context of a fast growing economy in Asia – Malaysia.

BACKGROUND

In Malaysia, streets play an important role as a major public place due to the lack of other types of urban public spaces in the city centre (DBKL, 2003). The weakening of pedestrian linkages, lack of legible pedestrian patterns, weakening of the continuity of pedestrian and urban space linkages, lack of amenity and provision for pedestrians in urban spaces are cited among the most important urban issues addressed in the Kuala Lumpur City Plan 2020 (DBKL, 2003). This is supported by Yaakub (2006) that in Malaysia, it is rather difficult to find examples of street environments that are friendly and accommodating to the needs of the users.

The focus of this paper is to discuss the factors that make a street friendly, to examine the attributes and characteristics that make a

street friendly and to determine the similarities and differences of a friendly street in respect of users from different backgrounds. One of the issues that relates to user-friendly streets is that the streets in Kuala Lumpur city centre have been developed in a piecemeal fashion (DBKL, 2003). In relation to this, the streets in Kuala Lumpur lack clarity in terms of linkages between the major and minor roads in movement pattern, which also has an effect on the quality of the streetscape, that is, the overall character and continuity of streets, as represented by pavements, building frontages, street lighting and other street furniture. Apart from the growth in the population, the process of urbanisation erodes the urban qualities and character of the urban areas (Shamsuddin, 2011).

The rate of urbanisation in Malaysia increased from 54.3% to 65.4% between 1991 and 2000 and is expected to increase to 75% by 2020 with the majority of the population being urbanised (Jusoh *et al.*, 2006). Urbanisation has resulted in the erosion of the street as a public space, which has also had an effect on public life and urban users (Sulaiman *et al.*, 2001). The increasing population in the city centre every year has a major influence on demand on urban open spaces in urban areas (Bavani. M, 2008) and consequently, community spaces have been lost in the urbanisation process (Lim. G, NST, 2011). This issue constitutes one of the most important concerns of the Kuala Lumpur City Plan 2020 where a population increase from 1.6 million today to 2.2 million by 2020 has been estimated. According to JBPD (2006), the increase in population has contributed to the decrease in the quality of the urban environment and the quality of the life of the inhabitants. This means that Kuala Lumpur City Hall (DBKL) would be forced to make controversial compromises, such as intensifying development and sacrificing open spaces, to accommodate another 600,000 residents in Kuala Lumpur within 12 years. Therefore, the streets will become a vital space for the public and need to be governed effectively and efficiently to promote an environment that is conducive, sustainable and friendly to all. As the population increases, the number of elderly and people with disabilities will also increase. In Malaysia, there are

more elderly people (above the age of 65 years) now than 30 years ago. By 2020, it is estimated that the elderly will make up 7.5% of the total population (Yaakub *et al*., 2009). As a city that responds to the changing needs, it will be 'inclusive'; where it enables people to participate fully in the city life of Kuala Lumpur, where social inclusion and liveability are important elements of this city (Kuala Lumpur City Plan 2020, pp. 2.15).

The rapid growth in the urban areas has also led to an increase in the number of vehicles on the street. One of the dilemmas in the Malaysian townscape today is that the streets are overrun by vehicles and unfriendly to pedestrians (Shamsuddin *et al*., 2001). The effect of rapid urbanisation in Kuala Lumpur city centre has compromised the priorities of the pedestrians in the city centre to the dependence on both private and public vehicular transportation (Shamsuddin *et al*., 2010). As vehicular traffic has greater freedom of movement, and people depend too much on cars, designers have assumed that the movement of vehicular traffic is a primary concern of urban planning. As a result, urban spaces have been torn down to widen streets for cars and market places have been converted to car parks (Mijan, 2000); the entire existing street network has been destroyed with the notion that fast traffic is the priority (Shamsuddin *et al*., 2001). Sulaiman (2000) found that one of the reasons for the poor quality of urban spaces in Malaysia is the limited appreciation of the context and the people. Dolbani (2000) argued that Malaysian planners and urban designers have failed to provide a broader range of activities and a user-friendly environment that is appropriate for the climatic, physical social and economic circumstances of Malaysian cities. Many streets all over the world suffer from being inhuman and unfriendly to the users (Gehl, 2008) and Malaysia is not an exception.
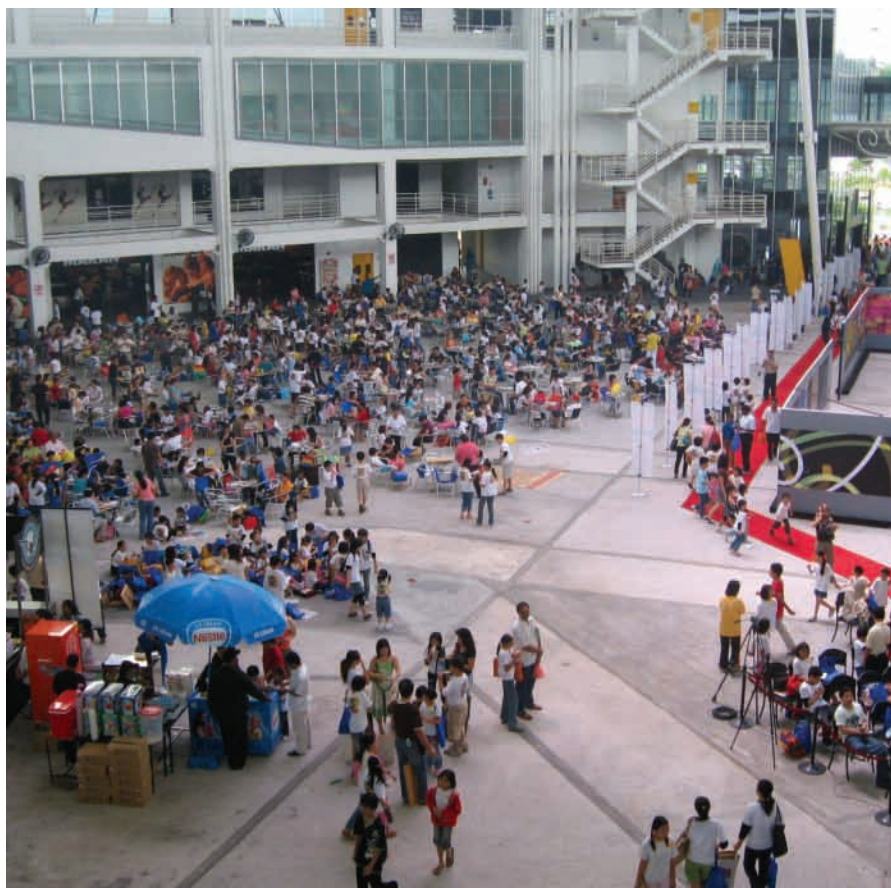
LITERATURE REVIEW

The actual needs and preferences of the urban users are very important and should be given more attention in order to re-evaluate the quality and design of the space over time and to create a successful urban space (Jansson

et al., 2010). Today, urban spaces are frequently designed to support the interest of corporate clients and they do not contribute much to the vitality of public usage. With the fast pace of development, such as in Kuala Lumpur, there is a danger that the city will end up having privatized islands of public open spaces including streets that eventually do not provide support to the various user groups (Mijan, 2000). By creating a good pedestrian environment, it will provide a well functioning public domain; invite more people to walk, stay longer and offer a variety of attractive public activities. This will enhance people to socialise more in public spaces (Gehl, 2004).

Carr *et al*. (1992) identified five primary needs that people seek to satisfy in a public space: comfort, relaxation, passive engagement with the environment, active engagement with the environment, and discovery. Comfort is a basic need of people in urban spaces, as it is one of the indicators of successful public spaces. According to Carmona et al. (2003), the length of time that people spend in a public space depends on the function and indicators of its comfort. Hence, without comfort it is difficult to

perceive how other needs can be met (Carr *et al*., 1992). Another primary need in public space is relaxation, which is a more developed state of the body and mind at ease. Passive engagement is another need in a public space that could lead to a sense of relaxation (Carr *et al*., 1992). Active engagement on the other hand involves a more direct experience with the place and also people in the space (Carmona *et al*., 2003, Carr *et al*., 1992). Discovery, according to Lynch (1963), is the reason for people's presence in public spaces and represents the desire for stimulation, which involves a break of the normal and routine that may require a 'sense of surprise' in the space (Carmona *et al*., 2003).

The needs of the users in the street depend on their activities in the street. Tang et al. (2009) argued that, *'the lack of consideration on the human scale activity had led into the lack of characteristics of the city. As a result, humanity is being ignored subjectively and objectively in the planning and designing our living and work space. In such a car dominant city, people would have less and less choice to experience the daily life on foot'.*

Street activities are more visible and prominent than activities that occur inside the building and concentration of the activities on the street and their visibility from the street are important in order for the place to be noticeable and more attractive (Shamsuddin, 2011).

Outdoor activities in public space can be divided into three categories: necessary activities, optional activities and social activities (Gehl, 1987; Turel et al., 2007). However, Rapoport (1987) divided pedestrian activity into two types: dynamic and static. Gehl (1986) argued that the categories of outdoor spaces are influenced by the quality and character of the outdoor space in which activities and functions will be developed when the qualities of the space are improved (Gehl, 1986). Frick (2007) posited that the interactive relationship between the activities and behaviour in the public space and the construction of public space, is imparted by its practical 'functionality' in space.

Shamsuddin (2011) opined that cultural values affect the behaviour in streets and reflect the direct human response to the environment where climate also plays an important role in influencing behaviour patterns. Based on previous studies, it has been proven that different cultures and groups of people tend to do different behaviours and activities in the street. Things that

might be the supportive characters to activities and behaviour in Western and European countries might not be the supportive elements that affect the activities and behaviour in the Malaysian context.

METHODOLOGY

A case study approach is used in this research in which Jalan Tuanku Abdul Rahman (JTAR) in Kuala Lumpur was chosen as the case study. This is for four reasons: it is located in the city centre of Kuala Lumpur; its attributes and characteristics as a shopping street are relevant to be examined to see if it contributes to being a friendly street; it is identified as one of the foremost traditional main streets in the city centre due to its inherent socio-cultural stronghold; as well as its historical significance of being among the earliest high streets in the city centre of Kuala Lumpur (Shamsuddin et al., 2008). Finally, it also receives the highest concentration of shoppers, visitors and pedestrians (DBKL, 2004).

The different types of users of the street will help to identify the variation of their needs and preferences towards a friendly street and the demographic characteristics will help to identify the variations of needs, preferences and perception towards a friendly street among different socio-demographic backgrounds. Field observations of

activities using schedule checklists, photos and maps procedures were designed to provide information concerning the physical characteristics and quality of the environment of the street study and pedestrian users and space use: number of people using the different space areas during weekdays and weekends, the peak used periods and types of activities taking place on the streets, and types of activities engaged by the different users.

Mijan (2000) found that there are seven types of users who use the open space in the city centre of Kuala Lumpur. A sample of 346 respondents consisting of daily users, occasional users and non-users were surveyed using quota sampling methods. The sampling strategy is to cluster the street users according to two distinct groups, namely, the static (those who are constantly engaged with the street) and mobile (those who are not dependent on the study area) users. The response from the non-user group is important to identify the reasons for not using the street studied and to identify their perceptions of a friendly street. In this case, quota sampling is used in which the respondents were broadly divided into daily users and occasional users. The daily users were selected based on the systematic sampling method using the interval of unit spaces on the ground level of the street (shopping space, restaurants, stalls, stores and shop premises).

For occasional users, a multi stage cluster sampling was used on the four types – low cost housing, medium low cost housing, medium-cost housing and high-end housing schemes within the City Centre. Within these clusters, the selection of the respondents was done voluntarily by households, and only one respondent was selected within each premise. In-depth interviews were conducted after the questionnaires had been collected from 20 street users.

RESULTS AND DISCUSSION

User-friendly Street and the Influencing Factors

Three main factors influence people's use of a street – physical, functional and social aspects. The needs of users on the street depend on the following factors: attractions; activities and reasons for using the streets; proximity, lack of congestion (crowding); and familiarity and length of engagement with the place. The Malaysian users' needs tended to be more functional compared to the physical factors. However, there was not much difference between the user needs of a user-friendly street with the needs of users of other urban spaces or if compared with research findings from other countries. However, the level of importance of the factors does vary due to the environment, climate or cultural differences.

The attraction of the street is one of the significant factors for users to use the street. In the case of JTAR, the main attractions for users to come here are for shopping as well as a place to earn their living. This emphasises the dominant role of the street as a shopping and a commercial area. Another factor that attracts people to use the street is the physical environment, such as public spaces, greenery/trees and buildings. This finding is similar to Jacobs (1996), who discovered that qualities engaged with the eyes can attract people to the street. The other factor concerns the necessary activities in which activities relating to relaxation and leisure are slightly low compared to others. This also contradicts the findings from previous research from other countries. This is probably due to the constraints in terms of microclimate, such as unsuitable temperature and lack of shade and shelter from the sun and rain, and a culture that limits outdoor activities.

The feelings of crowding and congestion on the street through the density of people on the street (crowding) and the number of cars on the road also affect the level of friendliness to the users. In the case of a shopping street, crowdedness results from the speed of pedestrians. People will use the street when there are other people using it and avoid it when there are too many people there. This is related to the feelings of safety and comfort, where the presence of people and cars can increase the natural surveillance on the street. This is in line with Krupart's (1984) theory that relates to the feeling of 'stress'. The issues relating to the conflict between pedestrians and vehicles on the road and conflicts between pedestrians and street vendors on the sidewalk are considered serious in Malaysian's commercial streets. This contributes to the congestion on the street, which causes the street to become unfriendly thereby creating a feeling of stress, as well as being an unsafe and uncomfortable environment.

The findings also highlight that proximity/distance from origin to destination is another factor that relates to a user-friendly street. Carney (2000) and Burton et al. (2006) argued that this factor contributes to the accessibility and comfort to users of the street. However, Al-Azzami (2004) contended that in certain cases, people have to avoid the shortest route due to obstacles and the presence of too many people on the street. Familiarity and length of engagement with the place affect the level of a friendly street to the users where a strong sense of familiarity to the place is developed through constant engagement and long-term association. The daily users who are engaged with the street for a longer period feel more comfortable and safer on the street, which concurs with Ujang's (2008) view that familiarity can strengthen the attachment to the place. Public space, greenery/trees, public amenities, maintenance and freedom of action are other supportive factors that contribute to a user-friendly street thus improvements in these areas will increase the street's friendliness. This is supported by the statement by Knox (2005), who stressed that in

creating ordinary places, creating and increasing the qualities of the factors mentioned above is very important.

These factors were influenced by the functional and emotional factors compared to the physical factors where they are related to satisfying the users' needs and supporting their desired activities on the street. In conclusion, the factors that make the streets friendly in this research were mostly similar to the previous theories. However, the attributes that contribute to the factors vary for each context. Different types of users (daily and occasional) have their own uses and activities on the street. This affects their level of need and the factors that make the street friendly to them. The group of occasional users were more concerned with the necessary activities on the street that make them use the street while daily users need greater improvement of site conditions, site facilities and a site environment that is comfortable and conducive. As for the non-user group the lack of the factors mentioned above are the main reasons why the streets are not friendly to them. Hence, a user-friendly street is more affected by the uses and activities, familiarity with the street and the time spent on the street.

Qualities of the Street that Contribute to a User-Friendly Street

Safety and security are the most important attributes (mean value: 1.50) followed by comfort and convenience (mean value: 1.52) and accessibility and proximity (mean value: 1.56). The implications from the survey show that the majority of the respondents have a positive perception of the attributes that contribute to a user-friendly street. However, the results based on the mean value between qualities are slightly different **(Table 1)**.

Based on the survey, the scale of 1.50 for the overall mean value under safety and security attributes shows that it is a very significant factor that makes a friendly street **(Table 2)**. This is parallel with Burton (2006) who found that safety is an essential characteristic for street life. In Malaysia itself, the National Urbanisation Policy (NUP) 2006 was formulated among others to create a safer environment in Malaysian towns and cities.

Safety and security attributes that are important from respondents' perceptions are the presence of surveillance; free of accidents and low crime statistics; safe crossing devices; safe environment for the elderly, disabled and children; and free of the presence of anti-social behaviour. The presence of strangers (migrants) in a public area will cause a feeling of insecurity to the users. Familiarity with the place makes the users feel more secure and safe. This finding shows that Malaysians still depend on the police and safety officials to feel safe when using public spaces. Safe crossing devices are the facilities most needed in a commercial street like JTAR. These findings confirm that feeling of safety is important to attract people to use the street, and the presence of people on the street makes the city become safer and

inviting (Gehl, 2010). People prefer to walk where there is a low risk of being involved in an accident or crime. In addition, the streets in Malaysia are not inclusive or friendly to the users, particularly to people with disabilities. Thus, if the street is not friendly to the normal users it is not friendly to all.

In terms of comfort and convenience, the users are more concerned with the psychological comfort rather than physiological comfort, which is something to do with enhancing the microclimate of the space, especially the presence of pollution, local temperature and shelter from the sun and rain. Comfort and convenience attributes – free of pollution, noise, smell and vibration, a lot of covered ways/shade and other protection from the sun and rain, availability of dustbins, telephones and toilets and

Table 1: Summary of mean values concerning the importance of street qualities starting with the most important quality

Qualities	Occasional	Daily	Non user	Mean Value
Safety and security	1.47	1.51	1.57	1.50
Comfort and convenience	1.42	2.02	2.02	1.52
Accessibility and proximity	1.56	1.58	1.55	1.56
Mean Value	1.48	1.70	1.71	1.53

Source: Field survey (2009)

Table 2: Degree of safety and security attributes based on mean values based on the most important attributes

	Safety qualities	Occasional	Daily	Non-user	Mean value
a	Presence of security officials and police patrols	1.19	1.24	1.19	1.21
b	Low crime statistics	1.25	1.44	1.25	1.34
c	Free of accidents	1.26	1.39	1.35	1.34
d	Safe crossing devices	1.36	1.39	1.46	1.39
e	Safe environment for elderly, disabled and children	1.42	1.45	1.32	1.41
f	Free of presence of anti-social behaviour	1.36	1.47	1.37	1.41
g	No graffiti and vandalism	1.39	1.51	1.49	1.47
h	Low traffic flow and speed	1.58	1.51	1.74	1.57
i	Presence of people	1.74	1.74	1.93	1.77
j	Presence of activities	1.76	1.72	1.98	1.78
k	Full of activities day and night	1.91	1.78	2.18	1.89
	Mean Value	1.47	1.51	1.57	1.50

Response format
1= strongly important
 4= strongly unimportant

Source : Field survey (2009)

Table 3: Degree of comfort and convenience attributes based on mean values

	Comfort and Convenience qualities	Occasional	Daily	Non user	Mean Value
a	Free of pollution, noise, smell and vibration	1.18	1.25	1.28	1.23
b	A lot of covered ways/shade and other protection from the sun and rain	1.38	1.34	1.37	1.36
c	Availability of dustbins, telephones and toilets	1.48	1.41	1.61	1.47
d	Breezy	1.45	1.54	1.51	1.50
e	Suitable temperature	1.43	1.56	1.46	1.50
f	Very clear direction of the place	1.62	1.49	1.77	1.58
g	Very clear pedestrian signage	1.66	1.52	1.84	1.62
h	A lot of recreational facilities	1.66	1.57	1.79	1.64
i	A lot of banking and communications centres	1.69	1.59	1.81	1.66
j	A lot of convenient places for shopping	1.66	1.64	1.95	1.70
k	A lot of greenery (trees/shrubs/flowers and grass)	1.80	1.69	1.84	1.75
l	Very attractive building facades	1.76	1.70	1.91	1.76
m	A lot of outdoor cafes, refreshment kiosks	1.85	1.64	1.96	1.77
n	A lot of rest areas and seating places	1.95	1.67	2.14	1.85
	Width of the walking space	2.0	1.7	2.12	1.87
o	A lot of spots for entertainment	1.85	1.98	1.91	1.92
p	Comfortable and sufficient seating	2.07	1.74	2.16	1.92
q	Seating places adjacent to pedestrian flow	2.09	1.85	2.32	2.01
	Mean Value Response format 1= strongly important 4= strongly unimportant	1.42	2.02	2.01	1.53

Source : Field survey (2009)

Table 4: Degree of accessibility and proximity attributes based on mean values

	Accessibility and proximity	Occasional	Daily	Non user	Mean Value
a	Easy to get to by foot	1.43	1.49	1.39	1.45
b	Easy access by public transport	1.55	1.49	1.49	1.51
c	Distance to the area from the parking area	1.58	1.61	1.58	1.53
d	Meeting places for people from different cultures	1.66	1.55	1.67	1.56
e	No physical barrier, wall, building, fence, curb	1.59	1.56	1.63	1.58
f	Well connected to paths of circulation or other places	1.58	1.62	1.49	1.58
g	Distance to the area from public transport	1.58	1.67	1.63	1.60
g	Visibility of different activities	1.48	1.57	1.53	1.61
h	Sufficient parking	1.58	1.63	1.58	1.61
	Mean Value Response format 1= strongly important 4= strongly unimportant	1.56	1.58	1.55	1.56

Source : Field survey (2009)

also breezy and suitable temperature. The findings reveal that people will use the streets that are free from pollution, noise, smell and vibration **(Table 3).** In the context of Malaysian streets, the main contribution to this pollution is the number of cars on the street where reducing the numbers of cars on the street and giving priority to the pedestrians can reduce this problem. People will sit in areas that have a variety of activities/ lots of trees and shelter. In the Malaysian climate, the use of outdoor space is strongly related to the microclimate of the environment. People will use the street in the areas that have a variety of activities and lots of trees and shelter. Even when the facilities provided are safe, comfortable and sufficient, if the environment is not conducive people will not use the place. It has been proven that social activities can only exist in places that are conducive and safe to them. In a country like Malaysia, the microclimate plays an important role in creating a conducive environment. The findings confirm the theory that in urban areas, there is a strong relationship between microclimate conditions and the use of open space (Rapoport, 1990; Jacobs, 1996; and Nikolopoulou *et al.,* 2007).

Based on the mean value, accessibility by foot, easy access by public transport and distance to destination from the parking area are shown to be the most important criteria that can encourage users to use the street. This is supported by Shamsuddin *et al.* (2010) in their statement that accessibility provides users with travel choices and the absence of this quality may cause the increase of cars and other vehicular traffic on the street. Based on **Table 4,** sufficient parking is the least important attribute according to the respondents, particularly for daily users as they always come to the street early and still have sufficient parking.

In this research, a user-friendly street is related to the quality of the environment that causes the street to be used and significant to the users. It is assumed that attributes that are preferred by the users constitute the qualities that create a user-friendly street. It was found that the physical elements, activities, types of user and socio-cultural attributes strongly contribute to the uses of the street that relate to a user-friendly street. Attributes associated with safety and

security play the most significant role in supporting the user-friendly street in this research, followed by comfort, convenience and accessibility. Under safety and security aspects, the presence of police surveillance, free of accidents and low crime statistics, safe crossing devices, safe environment for elderly, disabled and children, as well as free of anti-social behaviour are the most important attributes that contribute to a user-friendly street. In Malaysia, the users still rely on the presence of police and safety officers to make them feel safe, which also reflects that streets in Malaysia are still not safe for their users.

The comfort and convenience attributes include free of pollution, noise, smell, vibration, a lot of covered ways/shade or other protection from the sun and rain, availability of dustbins, telephones, toilets and breezy or suitable temperature are considered as important attributes. The attributes of accessibility are the least important attributes compared to the safety and security, and comfort and convenience attributes. Easy access by foot is the most important attribute for users. This explains that safety and security are the attributes that users prefer and need to make the street friendly to them. It was also discovered that some of the attributes that are

important in urban spaces based on previous theories are not that important to the users in Malaysia. Aspects such as seating locations are important attributes in Western and European countries but not so important in the context of a commercial street in Malaysia. This is in comparison to other attributes that involve the environmental qualities, such as pollution and protection from the sun (shades and suitable temperature or breezy environment). This also shows that in a hot humid country like Malaysia, the issues relating to microclimate and psychological comfort are important.

There is a slight variation in the pattern of use of the street and users' needs of the street between different socio-economic backgrounds. The findings suggest that there is a slight variation in the users' preferences and the way of use and activities in JTAR. Based on the results, there are also variations in the use pattern of JTAR according to "age group". There is also a slight variation between users' age group and the reasons they use the street in their free time. More variations are shown according to the types of user group, age group, distance of the street from their place of residence and length of engagement. Surprisingly, the level

of education and occupation show some variations in some attributes. There is only a slight difference in gender group as well as the ethnic group. Between the three groups of users, the occasional groups are the group that perceive the qualities of the street more positively. Age group, distance from residence and length of engagement to the place affects their variety of perceptions and shows different preferences in the perceptions towards the attributes of a user-friendly street. In conclusion, this research substantiates that a user-friendly street makes a significant contribution to a successful street, which contribute to a liveable, walkable, useable and sustainable street. Hence, the findings fulfil the gap in knowledge by identifying the most important needs and users' perceptions of a friendly street in Malaysia, which has a different environment, climate, social activities and cultural context.

Variation in Needs and Perception Between Types of Users and Socio-Demographic Background

Streets in a city centre are used differently and for different reasons. These differences show that users' needs and preferences are not general, but context bound and are affected by local physical characteristics and environment as well as the social connection between inhabitants in a local context. These findings suggest that street planning and design and management should give greater consideration to users' needs and the local context.

It was discovered that different types of users influence the variation in the factors that make a street friendly to them. In this research, the users of the streets are represented by daily users (those who are constantly engaged with the street studied), occasional users (those who occasionally and seasonally use the street studied) and non-users (the respondents who do not use the street studied). The attraction to daily users concerns the environmental quality, such as public spaces, buildings, the landscape and public facilities on the street. However, the attraction to occasional users is more dependent upon functional activities on the street. This may relate to the reasons why they use the street. It was also discovered that daily users are the group that spend the most time

on JTAR. Hence, this group is more aware of the environment and need more facilities for leisure and relaxing activities such as good urban space, nice buildings, beautiful landscape, good maintenance, cleanliness, and public facilities. For the non-user group, the lack of factors and attributes mentioned above were the reasons they do not use the street. Based on the findings, it was revealed that different types of users obviously have different needs.

The findings also highlight that among the three types of users, the occasional user group shows a more positive response towards the importance of safety and security, as well as attributes of comfort and convenience which make them use the street. In terms of safety aspects, the level of feeling safe to use the street is much higher for the daily group than the other two groups. This may be because of their familiarity with the street where they are more engaged, and their expectations and needs are different from other groups.

In the variations of perception based on socio-demographic backgrounds, more variation was observed in the age groups and distance from the residence group compared to other factors. There was no significant variation revealed in respect of the ethnic group. Age group shows a significant difference in the strength of correlation with attributes of safety and security, especially the presence of people, presence of activities day and night, safe crossing devices, being free of accidents and low crime statistics. However, for distance from residence, the group showed more variation concerning the attributes under accessibility. Based on the findings, it was shown that ethnicity does not influence the variations towards a user-friendly street.

CONCLUSION

The research has examined the issues of an urban commercial street from the perspectives of the users' needs and perceptions in respect of the physical, functional and social dimensions of streets in Kuala Lumpur. It has established ten key factors that make the streets friendly to the users in JTAR – attractiveness, activities, crowding/congestion,

proximity, familiarity, public space, greenery/trees, public amenities, maintenance and freedom of action, which contribute to user-friendly streets in Malaysia. The users' needs depend on attractions; activities and reasons for using the streets; proximity, lack of congestion (crowding); and familiarity and length of engagement with the public spaces, greenery/trees, public amenities, maintenance and freedom of action. They are influenced more by the functional compared to the physical factors. There are similarities in the general user needs of user-friendly streets in Kuala Lumpur with those from other countries. The issues of commercial streets in Malaysia relate to the conflict between pedestrians and vehicles on the roads and the conflicts between the pedestrians and street vendors on the sidewalks. This contributes to the effects of crowdedness causing the street to become unfriendly by creating an unsafe and uncomfortable environment.

The different types of users, both daily and occasional, have their own uses and activities on the street. Whereas the occasional users are more concerned with the activities, especially necessary activities, on the street which attract them, the daily users need greater improvement of

site conditions, site facilities and a site environment. However, the non-users cited the above factors mentioned as the reasons why the streets are not friendly to them. Hence, the needs of users with regard to a friendly street are more affected by the uses and activities, familiarity with the street and the time they spend on the street. This research also examined the qualities of the street based on users' perceptions of what makes a street friendly. From the findings, it has been identified that between safety and security, comfort and convenience, as well as accessibility, the qualities of safety and security are the most important criteria that make a street friendly. Safety and security include the presence of police surveillance; being free of accidents, low crime statistics; safe crossing devices; safe environment for elderly, disabled and children; and absence of anti-social behaviour. Meanwhile, comfort and convenience include being free of pollution, noise and vibration; covered walkways, shades, availability of dustbins, telephones and toilets; breezy environment and suitable temperatures as the main attributes. Finally, easy access by foot is an important quality of streets in respect of accessibility.

In conclusion, although the factors that make the streets friendly in this

research are mostly similar with the previous theories, the attributes that contribute to the factors vary for each context. The different climate and economic levels (between developing and developed countries) are thought to have an influence on this variation. These are the factors that need to be considered in future guidelines and policies for planning and design of urban public spaces, especially streets. The research also suggests that even though the factors and attributes revealed are based on the local issues and setting, the findings are also applicable to the global urban street context especially other places that have similar kinds of user behaviour, climate and culture. Fulfilling the needs of the urban users will increase the use of streets for the 'necessary' purposes as well as for 'optional' and 'social' purposes (to use Gehl's terminology). This will also support the Government's objectives in the Malaysian Economic Transformation Programme, which is to spur economic development and improve the quality of the living environment in the city.

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THE ROLE AND SIGNIFICANCE OF ROOFTOP GARDENS TOWARDS SUSTAINABLE URBAN DEVELOPMENT IN MALAYSIA

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ABSTRACT

The rooftop garden is a modification of modern landscape which has the potential to contribute towards sustainable urban development. Many countries have highlighted the role of rooftop gardens which are seen not only as recreational areas, but have also played significant roles; as a tool to assist urban area to solve environmental issues effectively. Mitigating urban heat island phenomenon, energy saving, maintaining thermal comfort, managing storm water and also improving the ecological value of the site through preserving habitat for small species of animal especially birds and insects are among their greatest impact towards the environment. These roles are well documented and recognized in Europe as well as several Asian countries, especially Singapore, Hong Kong and Japan. However, this article attempts to explore the role and significance of this landscape in Malaysia and how this landscape can assist cities to improve the living environment of urban dwellers. It is hoped that the research information from this article will be useful to promote the rooftop garden or green roof as one of the ways to create a healthy living environment and a balance between the physical development and preservation of urban green space in the city.

Keywords: Rooftop Garden, Sustainable Urban Development, Urban Living Environment

INTRODUCTION

Urbanization in urban areas has a great impact on the environment. Rapid development, particularly in the housing and infrastructure sector has affected the urban temperature due to the destruction of green areas (Farhana, Saito and Ismail, 2011). This change has resulted in the rise of city temperature, where the temperature of the city is much warmer than the rural areas. Furthermore, the building design that is not environmentally friendly has also contributed to the forming of the urban heat island (UHI) phenomenon which affects the quality of life of urban dwellers. Therefore, the importance of sustainable urban development in terms of building design as well as preservation of green space in urban areas becomes crucial.

The rooftop garden is a modification of modern landscape which has the potential in contributing towards sustainable development. The impact of the rooftop garden to the environment has been proven to minimize and solve many environmental issues occurring in urban areas. Therefore, the rooftop garden is recognized as one of the key elements that can contribute to several green building rating systems such as Green Mark (Singapore), LEED (United States), CASBEE (Japan), BREEAM (United Kingdom), HK-BEAM (Hong Kong) as well as GBI (Malaysia).

The focus of this article is to answer the question of how this form of landscape can assist cities to improve the living environment of urban dwellers. Hence, this article will highlight the effectiveness of rooftop gardens in solving several environmental issues in urban areas, particularly in Malaysia. The significance of this development is analyzed as well as some experiences from other countries are described.

It is hoped that the research information from this article will be useful in promoting the rooftop garden or green roof as one of the ways to create a healthy living environment and a balance between the physical development and preservation of urban green space in the city.

THE DEFINITION OF ROOFTOP GARDEN

The rooftop garden can be defined as a landscape built on the roof of multi-storey buildings in addition to the provision of open space as provided under the development standards for multi-storey residential building with limited development area. According to the Rooftop Garden Planning Guidelines (2012) issued by the Federal Department of Town and Country Planning, Peninsular Malaysia, the landscape can be located at any intermediate floor level, as podium deck or on top of the building. Generally, a rooftop garden play the same function as the neighborhood park in residential areas, except the physical location of the landscape is situated higher than the ground level. Therefore, this form of landscape is

also known as 'sky garden' because of its high location (Hui, 2010).

This landscape is also designed as an amenity for passive recreational purposes for the building occupants such as for walking, sitting and viewing. Some of the facilities provided include benches, children playground, swimming pool, barbeque area, indoor game facilities and many others. Besides, this landscape is also complete with landscape elements such as various types of plants, artificial fountains and also sculptures which are meant to provide visual enjoyment to the occupants.

In terms of use, rooftop gardens can be enjoyed and utilized by the public (Osmundson, 1999). However, in Malaysia it depends on the type of building where the rooftop garden is located. If the landscape is placed on a residential building, then it can only be utilized by the occupants of the building. This is due to the fact that they have paid some amount of money

to the Management Corporation (MC) to maintain and manage the landscape on their behalf. Thus, they are fully entitled to the use of the landscape without any interference from the outsider (Norazmin Adibah, 2007). Otherwise, it is considered as a public amenity if it is located on a public building such as a shopping complex. **Figure 1** shows the example of rooftop garden development as described in this article.

ECOLOGICAL BENEFIT OF ROOFTOP GARDENS

In Malaysia, basically this landscape is used to solve issues concerning the limited provision of public open space for a development area (Department of Town and Country Planning of Selangor, 2008). Due to the high land value in several areas that are experiencing rapid development, the provision of open space for the community fail to meet the guidelines set by the planners.

Therefore, this landscape is used as an alternative to fulfill the community needs to be provided by the developer appropriately. For example, some residential buildings in the Sentul East area have applied this landscape on the apartments or condominiums building as an additional space for the occupants to enjoy because of its limited development area and the high land value. The Saffron and The Maple are two such buildings, to name a few **(Figure 2).**

In Damansara, the development of this landscape is not only implemented on residential buildings, but has also been established on some of the commercial buildings such as 1Utama shopping complex in Damansara. Besides its role to provide interesting visual effects to the occupants, a space to relax and relieve stress, this landscape can also be used to optimize land use and at the same time preserve greeneries within the concrete jungle of the city.
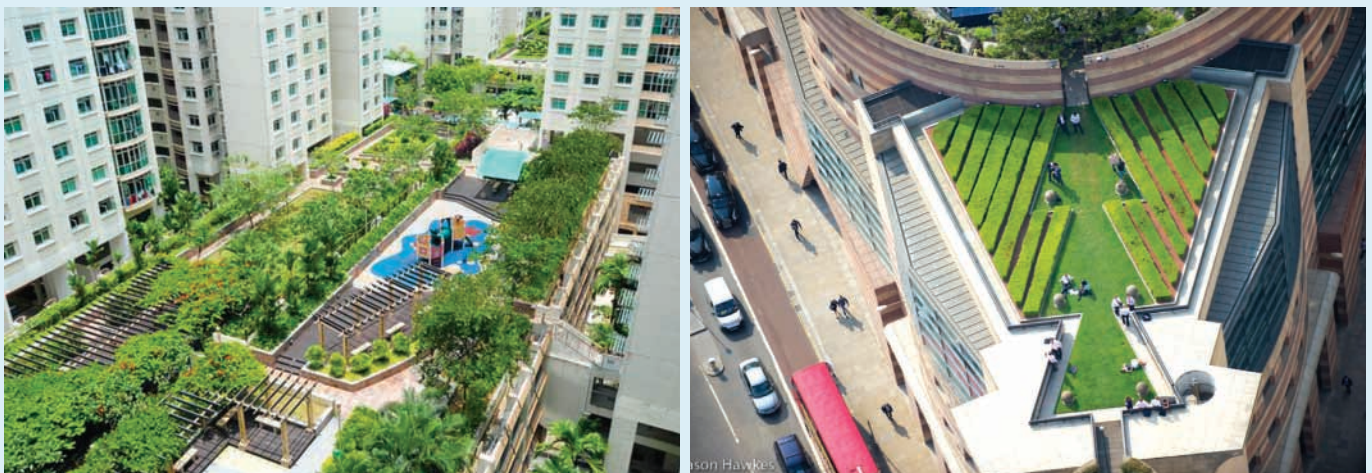
Figure 1: Examples of rooftop garden development

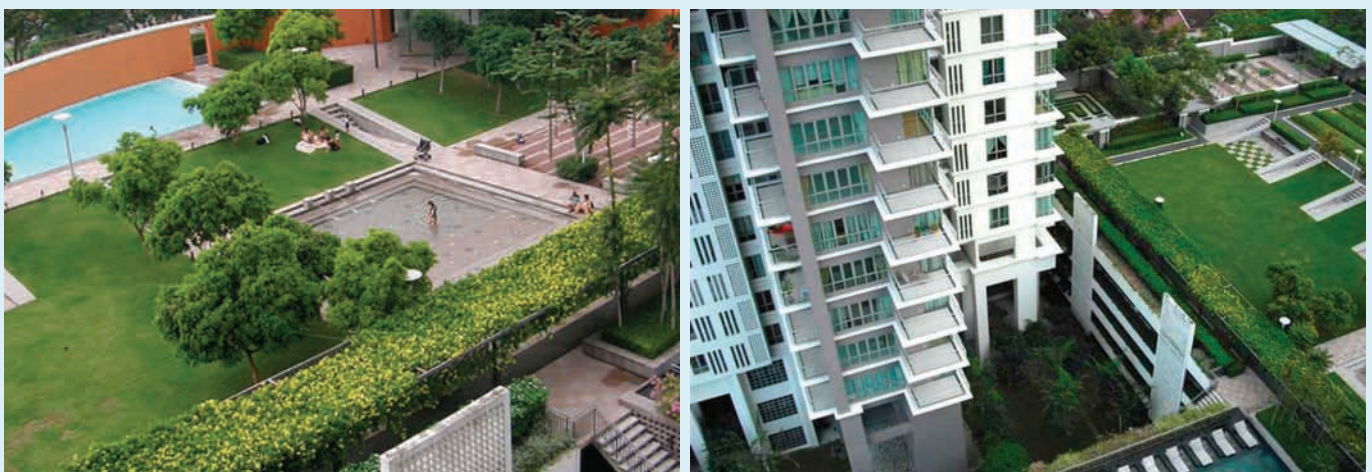**Figure 2:** Examples of rooftop garden development at The Maple (left) and The Saffron (right)

Table 1: The contribution of rooftop garden based on conducted researches

	Researcher	Rooftop garden contribution	Case study
1.	Roslina Sapawi (2009) from UTM	Mitigating urban heat island	1Utama Damansara roof garden
2.	Sabariah et al. (2008)	Managing storm water	Green roof prototype
3.	Wong et al., 2003a	Improving thermal comfort	Commercial building in Singapore
4.	Wong et al., 2003b	Energy saving	Commercial building in Singapore
5.	Getter and Rowe, 2006; Canero and Redondo, 2010	Preserving habitat for small birds and insect species	Switzerland
6.	Hui, 2011	Roof garden farming for food production	Hong Kong

In order to highlight the role of rooftop gardens in sustainable urban development, **Table 1** shows the effectiveness of rooftop gardens in solving several environmental issues in urban areas based on previous conducted research.

Mitigating Urban Heat Island

Based on the study conducted by Roslina Sapawi (2009), a rooftop garden on top of 1Utama Damansara shopping center was able to mitigate urban heat island (UHI) phenomenon and air pollution. From **Figure 3** below, the shopping center has a rooftop garden of 30,000 square feet located on the roof of the building. The rooftop garden which is also known as *Secret Garden* has preserved more than 500 species of exotic flora that make it the largest rooftop garden in Southeast Asia. Significant difference of

temperature can be seen during peak hours from 1pm to 3pm, where the temperature of car park area can reach up to 38°C compared to roof covered with vegetation which was only 30°C. According to Roslina Sapawi (2009), the shading effect produced by the plants on the roof has significantly reduced temperature of the building as well as its surrounding area and thus reduces urban heat island effects in the study area.

Managing Storm Water

Another study conducted by Sabariah *et al.* (2008) at Universiti Tun Hussein Onn Malaysia (UTHM) has demonstrated the effectiveness of green roof in reducing quantity of surface water runoff and storm water management. They compared the result of water retention and surface water run-off with the conventional

roof. The result recorded during a few rain events shows that green roofs can effectively decrease the surface water runoff. This is caused by grass and soil properties which are able to absorb water before discharge to drainage. The Green roof was able to manage storm water 50% better than conventional roofs. Indirectly, this technique will assist urban areas to avoid flash floods during heavy rain (Sabariah *et al.,* 2008).

Improving Thermal Comfort and Saving Energy Consumption

The rooftop garden is also proven to increase building thermal comfort and minimize energy consumption especially for the purpose of air conditioning (Wong *et al.,* 2003a; Wong *et al.,* 2003b). The experiment was carried out at a rooftop garden located on top of a five-storey

Figure 3: Secret Garden 1Utama Damansara.

Figure 4: Rooftop garden on top of five-storey commercial building in Singapore

Source : Wong *et al.,* 2003b

commercial building in Singapore as shown in **Figure 4.** According to Wong *et al.* (2003b), the impact of plant shading can reduce temperature of the building and its surroundings. At the same time, it helps to reduce energy consumption by around 25%.

In this case, soil depths and plants are important to prevent heat from being transferred to the building surface especially during the day. In comparison, for the bare roof, the heat transfer occurred to be very active and faster. The result from the experiment has shown that the direct effect of vegetation on the roof has contributed to a better outdoor thermal environment. This has directly led to greater energy saving as a result of the more comfortable environment achieved in the building provided by vegetation on the roof.

Preserving Habitat for Small Birds and Insect Species

The other ecological benefit resulting from rooftop gardens is that the property helps to preserve habitat for birds and small insects (Getter and Rowe, 2006) **(Figure 5).** Due to the loss of greeneries in urban areas, it has affected the existence of these animals. Therefore, the rooftop garden is able to help them to survive as it can provide basic components of habitat such as protection from weather and predators, food, water and space (Canero and Redondo, 2010). It has also preserved several plants from being extinct, for example, a rare species of orchids (Brenneisen, 2004).

Although these examples are taken from other countries and there is a difference in terms of climate aspects, it is still possible that the continued practice of rooftop gardens being built in Malaysia can be seen as an opportunity to improve biodiversity through the preservation of habitat for flora and fauna especially in urban areas. To state a few, the rooftop garden on top of 1Utama shopping center in Damansara will be able to become a temporary habitat for animals such as migratory birds and species of butterflies as well as for exotic and endangered species of flora.

Rooftop Farming for Food Production

Regardless of roles as a tool to combat environmental issues in urban areas, rooftop gardens also play a role in urban agriculture which encourages the citizen to grow food closer to home (Hui and Chan, 2011). This technique was applied in Hong Kong, Canada, United States, United Kingdom, Japan,

Figure 5: Birds nest on green roof (Getter and Rowe, 2006).

Singapore, Thailand and Taiwan **(Figure 6).** It is believed that urban agriculture is a new efficiency concept for the sustainable and livable city. Hui and Chan explained that even though there are some constraints and limitation issues, the benefit of urban agriculture is still tremendously important to assist food supply in the city.

Based on the discussion, it is clear that the role of the rooftop garden is not only as a passive recreational facility for the building occupants, but also as a beneficial form of landscape which can assist cities to improve the living environment of the urban dwellers. Its existence serves to create a balance between physical development and the preservation of urban green space in the city.

METHODOLOGY

The purpose of this article is to explore the role and significance of rooftop gardens towards sustainable urban development. Hence, qualitative research design was used to elaborate the contribution of this landscape towards sustainable urban development. A total of seven respondents from several organizations were involved in the in-depth interview to get a clearer picture of the connection between this landscape and its contribution to improve the living environment of urban dwellers. Most of the selected respondents are directly involved in the implementation of sustainable urban development, green buildings as well as research on the effectiveness of rooftop gardens in solving several environmental issues. Most of the selected respondents are from government agencies at state level.

CASE STUDY

The case study selected for this research involved a multi storey-residential building with a roof garden or podium garden. Physically, this landscape was built on an intermediate level of the building, which is between the car park level and residential unit level. This landscape functioned as a passive recreational facility for the building occupants. Among other amenities built on the landscape are swimming pool, children playground, reflexology garden, maze landscape and herb garden.

Figure 6: Examples of roof garden farming in several countries (Hui and Chan, 2011).

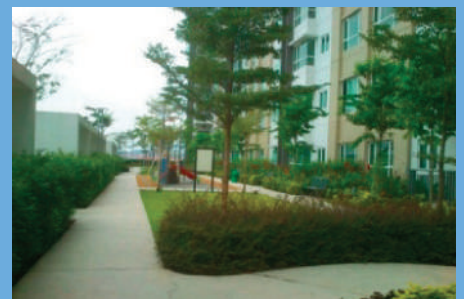Rooftop container garden in Taipei, Taiwan

Roof garden farming in Bangkok

Roof garden farming in Orakawa, Japan.

Roof garden farming in Changi Hospital, Singapore.

Figure 7: An Appealing Landscape for Visual Impact

This building was officially recognized by GBI as a green building. Herb garden is one of the elements that contribute to GBI assessment. The role of the landscape is not only as a recreational area but also to serve as an appealing landscape for visual impact. Each corner and end of the landscape were planted with several types of flower plants, shrubs, trees and groundcover that also have a great potential to give a positive impact to the environment. Therefore, this landscape has contributed to score marks in GBI assessment through mitigating urban heat island phenomenon as well as improving the value of biodiversity of the landscape through preserving habitat for small species of birds and insects. From the assessment, it has proven that the contribution of rooftop garden is found to be significant to improve the scoring marks of the building in GBI assessment. **Figure 7** shows the appealing visual impact of the landscape that has contributed to the mitigating urban heat island

phenomenon and also improving biodiversity value.

DISCUSSION AND CONCLUSION

A rooftop garden can be classified as one of the most innovative green features which constitute an opportunity to preserve green landscape in the compact urban area. The aim of its development is to promote a sustainable urban development in a way so as to conserve and minimize the impact of the building industry towards the environment.

Based on the analysis of this study, the role of this landscape is found to be more than a passive recreational area, giving visual pleasure to the occupants or acting as an additional landscape for the provision of the open space. The effectiveness of this landscape has proven to mitigate the urban heat island (UHI) phenomenon, managing storm water, maintaining thermal comfort, saving the cost of energy and preserving habitat for flora and fauna.

There are several criteria in creating a sustainable city. According to the Green Township framework issued by the Greenbuildingindex Sdn. Bhd. (GSB), there are six criteria that need to be fulfilled. The criteria include (i) climate, energy and water, (ii) ecology and environment, (iii) design and community planning, (iv) communication and transport, (v) building and resources; and (vi) business and innovation. Sustainable urban development requires not only being pollution-free, but it must be efficient in terms of managing water, energy and natural resources as well as using sustainable transport system. It also emphasizes on the quality of urban environment through the provision of green networks, whether in its natural form or man-made. Although the rate of development has increased rapidly, the retention of green areas can still be implemented through alternative greenery such as a rooftop garden.

Based on the interviews with the respondents, most of them agreed that roof garden is one of the new strategies to achieve sustainable urban development. The benefits of this landscape are not only in terms of its aesthetics but also cover the social,

economic and environmental aspects. Through the development of a rooftop garden, it will not only assist to solve urban issues, but also act as a passive recreation area that contributes to the social aspects of society. Besides, it also acts as a method to maintain and balance the preservation of green area in the city.

However, in Malaysia, a rooftop garden is not a major leap towards sustainable urban development. This is due to the fact that the high cost for its development and maintenance has become the major barriers of its implementation in Malaysia. Thus, this study suggests a good rooftop garden should be practised not only for the purpose of passive recreational area but also to serve as a tool to combat environmental issues occurring in urban areas.

Furthermore, its development can also be a benefit for dynamic urban planning either as greeneries preservation in compact urban areas or provision of open space for the community. Ultimately its development serves to improve the quality of life for the present and future through a healthy living environment.

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TOWARDS A DISASTER RESILIENT CITY: ASSESSMENT OF THE EFFICACY OF SHAH ALAM LOCAL PLAN'S RESILIENCE IMPROVEMENT STRATEGIES

ABSTRACT

The planning of a resilient city is a frontline effort for city developments which are able to withstand a variety of challenges within the following frameworks which are incorporated into urban metabolisms. One of the solutions is to integrate disaster risk reduction strategies and measures within the overall development plan framework considering disaster risk as an integral component of development plans. The objective of this paper is to develop an understanding on decision makers perceptions and needs to enhance the resilience of urban areas, and the gaps in responses by urban authorities in general and urban planners in particular, in order to comprehend the appropriate mechanism to enhance disaster resilient strategies' efficacy in local development plans for the adaptation to climate change. The analysis revealed two significant findings. Firstly, the disaster resilient attributes in the study were found to be in line with the limited references. Secondly, conventional planning intervention of land use control was found to be the only measure pertaining to disaster preparedness in the local level development planning. Integrating disaster resilient strategies in local plans and improving understanding for all urban stakeholders in Shah Alam seems logical policy implication of these findings. The study justifies the need of integrating disaster resilience strategies in local development planning as a response to the contemporary challenges of creating safer and more resilient cities.

Keywords: Disaster Resilient City, Local Plan, Sustainable City

INTRODUCTION

The concentration of people in cities increases their opportunities as well as their vulnerabilities to natural hazards, civil strife, and climate change impacts. Climate-related vulnerability increases not only from flooding due to more precipitation and storm surges, landslides, drought, salt water intrusion, and typhoons, but also earthquakes and other similar hazards, particularly where poor quality and ill-maintained infrastructure, low-quality building stock, and lower resilience of the high-density society come into play. Planning of the resilient cities need to develop plans with climate change in mind for emergence of new settlement options that are not located in flood plains and steep slopes, at densities that control urban sprawl. The development of resilient cities is complex and interdependent systems are extremely vulnerable to threats from both natural hazards and terrorism. The dynamism of cities in nature make cities feasible and desirable – their settlement pattern, architectural structures, population concentrations, places of assembly and interconnected infrastructure systems also place them at high risk to floods, earthquakes, hurricanes, and terrorist attacks. Berke *et al.* (2006) asserts that dynamic process of urban expansion will contribute to the increasing disaster risks through degradation of environmental system, transformation of physical environment and depletion of natural assets. Several initiatives attempt to meet these challenges at the regional and local level but there is still a need for examining urban systems in terms of their resilience against disaster.

The International Strategies for Disaster Reduction (ISDR) in the 2010-2011 World Disaster Reduction Campaign clearly stated the issue as: Cities serve as nation's economic engines, center of technology and innovation and living evidence of local heritage but cities can also become generators of new risks: failed infrastructure and services, environmental urban degradation, increasing informal settlements and almost billion slum dwellers around the world. For example, eight out of the 10 most populous cities in the world, including Tokyo/Yokohama, Seoul/Incheon, Osaka/Kobe/Kyoto, Metro Manila and Jakarta in South East Asia, have moderate to high earthquake hazard (World Bank, 2009). Similarly, eight out of 10 of the most populous cities are located on the coast and are vulnerable to storm surges and tsunami waves. Velasquez *et al.* (1999) stated that despite growing recognition of building resilient cities and adaptation to climate change, urban communities and cities are not yet receiving adequate attention. According to Klein (2003), local and city governments

Box 1:

…*"These extreme floods and the recent mud flood that hit Cameron Highlands last October are strong indicators of the climate change facing our planet. There will be more natural disasters and they will worsen. It is critical that the federal and state governments perform a thorough re-evaluation of the systems and procedures in place to mitigate floods and other natural disasters. We must be better equipped to face bigger challenges brought about by global climate change. This includes reviewing rescue and relief efforts, temporary re-location of victims, dissemination of information and disaster warnings, as well as efforts to rehabilitate affected areas and resume normal economic activities…"*

YAB. Dato' Seri Najib Tun Abdul Razak posted in the official website of Najib Razak, Prime Minister of Malaysia on December 15, 2013.

need to be aware of current and future potential risk and take more land use planning initiatives in order to enhance the resilience of urban systems and communities. The 13th Conference of the Parties to the United Nations Framework Convention on Climate Change at Bali in December 2007 affirmed the increased willingness of city governments to take action in addressing climate impacts. Furthermore, the Prime Minister of Malaysia (2013) called upon federal, state and local government authorities to take several precautionary steps to modify urban land use and development by-laws based upon knowledge of hazards (see box 1). For example, land uses, buildings, and infrastructure change over time, creating opportunities to incorporate hazard prevention measures to help make urban communities less vulnerable in the future.

ROLE OF LAND USE PLANNING IN REDUCING DISASTER RISK

Urban managers and decision makers must take necessary actions to deal with future risks. One of the actions is through non-structural mitigation by land use planning strategies since land uses are sources of anthropogenic activities vulnerable to disasters risks (UN/ISDR, 2005). This is pointing out that climate change induced disasters need special attention in terms of policies and land use planning programs especially in the city because cities are recognized as a *growth engines* for national economic development. Although there are also mitigating aspects such as structural mitigating and non-structural mitigating with respect to living in a city and surviving disasters, these

positive aspects such as existence of facilities and abundance of supplies, are negated by the existence of more man-made hazards such as dangerous materials and chemicals. These shortcomings can be offset through land use planning activities. Smith (2001) points out that the key benefit in urban planning is to build disaster risks reduction through the development plan mechanism. The main approaches for development planning at the local level are local plan and master planning. The failure of land use developments to take into consideration the possibility of local hazards causes a city to be vulnerable to risks (Burby *et al.*, 1998).

Urban planning is a multi-faceted process leading to overall urban development. The development plans (i.e., national plan, structure plan, local plan and master plan) as the main tools have been used by local authorities for guiding sustainable development within their jurisdiction. One of its products, the 'local plan', is the primary instrument used to guide physical development at the local authority level (Bruton, 2007). However, there are inadequate actions to analyze the extent to which better plans are associated with disaster mitigation outcomes (Deyle *et al.*, 2008). Furthermore, it is a different matter when it comes to implementation of planning objectives and day-to-day decision making in the process of development and the approval of development projects especially dealing with highly sensitive areas or hazard prone areas (Ismail, 2007). According to Fernandez (2007), de-gazette of forest reserves, cutting of hill lands, and conversion of agricultural land, recreational open spaces and water catchment areas to physical

development lead to subsequent undesirable hazard impacts such as flooding, soil erosion, land instability, loss of agricultural products, loss of open spaces and insufficient water supply. Carter (1991) observes that disasters cannot be prevented but the effects can be mitigated. In this view, hazard impacts may not happen or can be reduced if land use planning integrates with disaster risk reduction actions towards the planning of resilient settlements.

Contemporary urban-planning practices are becoming more participatory, as they involve stakeholders in decision-making. Saavedra *et al.* (2009) emphasized the importance of understanding the inherent resilience of local areas and enhancing this resilience through strategic interventions involving stakeholders. Inherent resilience is the natural capacity of people, communities and habitats to cope with and adapt to disastrous events. Local people and community leaders usually possess an understanding of inherent resilience. Thus, Godschalk (2003), Wamsler (2005), Campanella (2006) and Ernstson, et al. (2010) have pointed out the importance of a participatory approach in urban planning and the utilization of indigenous knowledge of inherent resilience to identify strategies to reduce the vulnerability of urban areas. However, little empirical evidences exists on the extent to which urban-planning practices and products (i.e., plans) have incorporated inherent resilience or have improved resilience through strategic interventions derived from a participatory urban-planning process. Few studies have attempted to understand the extent of the embedded disaster-resilience of local areas or the stakeholders' need to reduce vulnerability through urban development plans and strategic proposals. Therefore, the central research question addressed by this article is to what extent local development plans have incorporated the attributes of resilience, in consultation with local stakeholders to adapt to climate change-induced disasters. Here local stakeholders include civil society in general, which represents the demand side of disaster-risk reduction. The urban authorities, in general, and the urban planners and managers, in particular, represent the supply side. Accordingly,

The Great Bangkok Flood in 2011 demonstrated 13 provinces with more than 1 million people are affected.

the overall objective of this article is to develop an understanding of civil need to enhance the resilience of urban areas. This article also aims to analyze the extent to which urban planners have responded to those needs in their planning and development instruments.

PLANNING PROCEDURES TOWARD ACHIEVING DISASTER RESILIENT CITIES

In the planning of resilient cities, the local plan should consider the characteristics of resilient cities. The first characteristic of a resilient city is that the communities participate, decide and plan based on their capacities and resources (IDS, 2007). The second is that local government in a resilient city should be competent and accountable in order to cater for sustainable urbanization with participation from all groups. The third characteristic is that disasters should be avoided by ensuring the whole population lives in homes and neighborhood served by good infrastructures and services, in structures that meet sensible building codes, without the need for informal settlements on flood plains or steep slope because no other land is available. The fourth is that a resilient city should understand its dangers, and develop a strong, local information base on hazards and risks, on who is exposed and who is vulnerable. The fifth is that several steps are taken to anticipate disaster and protect assets – people, their homes and possessions, cultural heritage, economic capital – and is able to minimize physical and social losses arising from extreme weather events, earthquakes and other hazards. The sixth is, the resilient city has committed the necessary resources and is capable of organizing itself before, during and after a natural hazard occurrence and is able to quickly restore basic services as well as resume social, institutional and economic activities after such an event.

Understanding the above characteristics of a disaster-resilient city is also central to preparing local development plans. Therefore, planning for resilient cities requires urban planners designing local plans to combine explicit strategies in planning procedures and implementation comprising plan making, plan adoption, plan implementation and governance.

Plan Making

Scholars argue that urban plans often give greater consideration to the policies and strategies pertaining to

The Example of Flood Mitigation Plan for Bangkok Metropolitan Area.

SAVING THE CITY
A map of the Bangkok Metropolitan Administration's flood prevention walls and drainage tunnels built to safeguard the city.
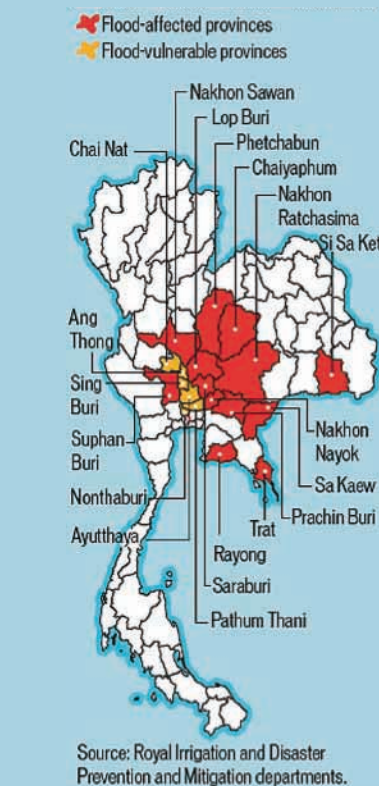
— Flood prevention wall along the Chao Phraya River and canals.

····· Unfinished flood wall on an eastern bank of the Chao Phraya River (1.2 kilometres)

←Ⓣ Giant water drainage tunnels with combined distance of 19km.

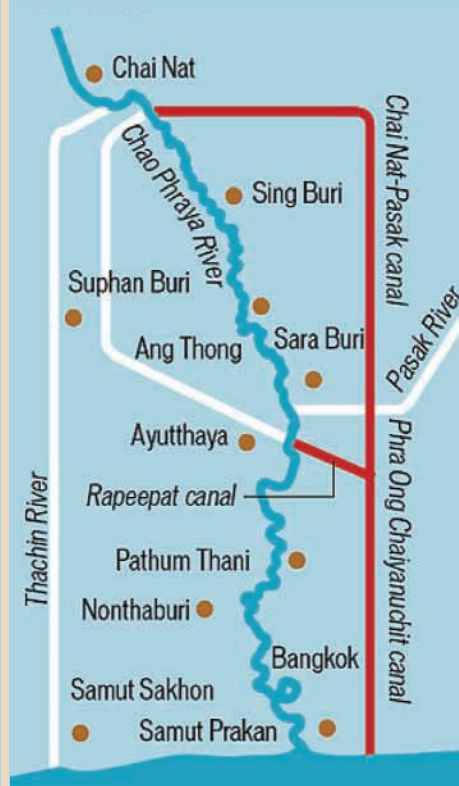Source: Bangkok Metropolitan Administration's Drainage and Sewerage Department

DANGER ZONES

Flooding has affected 13 provinces since Oct 10. The hardest-hit provinces are Nakhon Ratchasima, Lop Buri and Nakhon Sawan.
The Royal Irrigation Department yesterday warned six Central Plains provinces to brace for high water. They are Sing Buri, Chai Nat, Ang Thong, Pathum Thani, Ayutthaya and Nonthaburi.

Source: Royal Irrigation and Disaster Prevention and Mitigation departments.

WAY OUT OF FLOODS

A map showing a floodway developed from three existing canals to prevent flooding. The idea was proposed by a team of experts from Chulalongkorn University.

socio-economic development sectors such as housing, infrastructure, transportation, and health (Phong & Rajib, 2007). Other than general safety and hygienic conditions of development, there is no explicit set of strategies to ensure public safety and security against natural hazards, although improving the citizens' quality of life is the overall goal of most urban plans. The lack of reference to safety and security against natural hazards is a crucial gap in the context of climate change, representing a major sustainability issue in urban areas. In the context of Malaysia, this omission is due to the sector-based format used to propose the policies and strategies in the development plans. Because the state structure plan is organized according to the development sectors of the state, the same format is used to organize the district local plans, which are designed to implement the policies and strategies of the structure plan. As a result, cross-cutting issues, such as security and safety in local areas and the reduction of vulnerability to multiple hazards, have not been explicitly included among the strategies in the district local plans. A local plan serves as a tool to communicate land- and resource-use promotion, prevention, and conservation in a local area. In this regard, the local plan can identify the areas vulnerable to climate related disasters and can prevent or control development in such areas. Similarly, the attributes that provide inherent resilience can be conserved (e.g., mangrove forests) and areas with inherent resilience, such as firm ground above the high flood level, can be allocated and promoted for human settlements. In fact, sustaining and improving resilience should be a major strategy that needs special consideration by local plans.

Several scholars argue that there are barriers to overcome when formulating disaster resilience strategies in the urban development policy and plans. Pelling (2006), Berke *et al.*, 2006, and Gurmit (2008), argued that the formulation of disaster resilience strategies is an integral process in preparing district local plans in which people participate, decide and plan the area based on their needs and resources considering the general safety, security and quality of life issues. Ainul (2008) asserts that the residents have their own safety objectives regarding how they want

the plan to direct development of their living environment. For example, in the rebuilt city of Kobe in Japan, some settlements were able to adapt after the earthquake disaster in 1995 because of the communities' desire to live in structures that complied with building codes and served by necessary infrastructure and service systems. They included some informal settlements on flood plains and steep slopes (Pelling, 2006; Cutter *et al.*, 2008; Klein *et al.*, 2003). In Smit and Wandel's (2006) words, people are sensitive to their vulnerability, take measures to minimize their exposure to hazard and strengthen their adaptive capacity to live with inevitable hazards. In view of that, public participation is required at all stages of the plan

making process in order for better understanding and identification of critical issues and resolution of them through socially acceptable, environmentally sustainable, technically viable and economically feasible strategies.
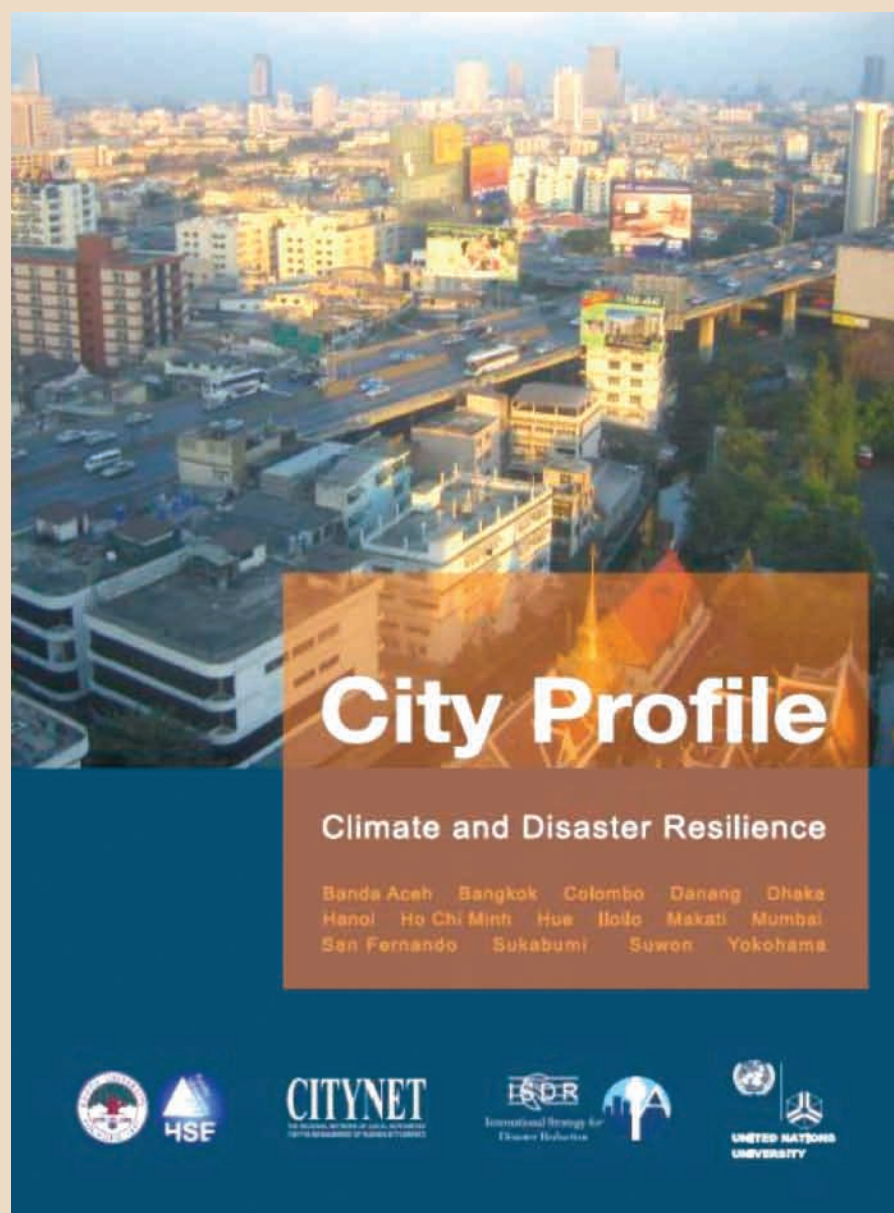
Plan Adoption

Once the plan is prepared, it needs to be adopted by the relevant authorities before implementing it. Implementing disaster resilience strategies in a district local plan can be a first critical step in plan adoption even before the beginning of the planning process. This is because if the policy direction and legal backing are in place they themselves can drive the adoption

The City Profile Report on Climate and Disaster Resilience by International Strategy on Disaster Reduction (ISDR), 2005

of disaster resilience measures in the planning process. The current need is not simply to be prepared for a particular disaster but to prepare for multiple disasters caused by climate change. The most appropriate levels of intervention for improving preparedness for climate change-induced disasters is at the national planning and local planning (i.e., think globally and act locally). The impacts of disasters are felt most strongly at the local level and therefore national policies are most suitably implemented at the local level (ISDR, 2005). In order to do that it is first necessary to understand how a district local plan can influence the resilience of a local area. A district local plan also provides the basis for local governance under the decentralized administrative system and is therefore the most appropriate level of intervention to introduce adaptation strategies for climate change-induced disasters.

Plan Implementation and Governance

Many local development plans are not action-oriented and time-specific (Berke *et al.*, 2006). Their implementation rely mainly on the private developers who carry out development projects at their own pace, location and schedule, resulting in leap-frog developments and environmental problems. Implementation of the local plans requires better coordination between local authorities, development players and local communities. If the private developers implement projects at their own pace that might affect the coordinated implementation of a plan prepared on the basis of meeting needs of the stakeholders. Saavedra and Budd (2009) argue that some natural hazards are very location specific and they do not always occur within administrative boundaries. This affects the effectiveness of plans prepared for administrative areas and based on the needs of the stakeholders in that area. In countries like Malaysia urban areas often exceed the boundaries of the areas of jurisdiction of local authorities. Especially urban fringe areas are under great pressure for development (FDTCP, 2006). These areas may come under rural local authorities and are not well organized to undertake participatory planning procedures. In this context district level analysis and intervention could be more effective

in plan implementation because the preparation of the district plan is based on the findings and recommendations of the State Structure Plan (macro level). In other words, plan making and implementation can be more effective at the district level (i.e., neither at the national level nor at the local level) when considering the spatial impacts of multiple disasters that do not conform with the boundaries of a local area. The local plan can fulfill the functions such as bringing up local issues at the local planning level, providing a broader basis for development control and coordinating the developments. There are also some arguments in favor of the adoption of disaster resilience measures in the process of local plan preparation where the people would participate, decide and plan their area based on their capacities and resources such as public inspection and inquiry platform. Noor (2004) points out that every local plan has its own objectives of how the local people wants to develop, along with the evidence and analysis necessary to inform and justify an integrated physical and resource planning approach.

The above discussion demonstrates that the existing process of plan preparation at the district and local level lacks adequate integration of resilience as a goal to achieve and an attribute to enhance. In other words, consideration of the socio-physical resilience of people and the settlements are not adequately incorporated in development plans to target those qualities as necessary attributes to build resilient cities. In the absence of such a systematic approach, new settlements continue to expand toward disaster prone areas or even to increase the vulnerability of other areas due to rapid land use changes that affect even the qualities of inherent resilience. Recent studies have also noted the importance of urban governance in promoting planning for resilient cities. Tanner *et al.* (2009), Ignesias and Arambepola (2007), UN/HABITAT (2002), and Tanner (2009) highlighted that good urban governance plays an important role on the success of planning and management of cities towards resilience. Good urban governance is indicated by equity, efficiency, transparency, accountability, civic engagement and citizenship, security and sustainability (UN-HABITAT,

2002). Literature suggests that disaster resilience and safety should be a primary focus of urban planning.

RESEARCH METHODOLOGY: ASSESSMENT OF EFFICACY OF RESILIENCE IMPROVEMENT STRATEGIES

The upcoming discussion is an assessment of the Shah Alam Local Plan 2020 (SALP 2020) and any implementation of the short listed strategies (29) from the perspective of professional planners and managers from federal, local and private sectors. It should be reiterated here that the SALP 2020 is a development plan and not specifically a climate change adaptation plan. Therefore, it appears like an assessment for something which the subject of assessment was not intended for. It is argued that local development plans should ideally be comprehensive in nature and not limited to guiding the socio-economic and physical development of the plan area. In this sense it is also argued that disaster preparedness in general and resilience improvement in particular should be part and parcel of a local development plan. Therefore, it should be noted that the purpose of this assessment is to verify the extent to which the specific attributes of resilience as identified by the (Principal Component Analysis - PCA) are already integrated in the local development plan with reference to the short-listed set of resilience improvement strategies. Any short-comings are indicators of the room for improvement and formal mainstreaming of resilience as an attribute in future plans.

The PCA output indicated the grouping (statistical term is principal components) of more frequently pointed out strategies (statistical term is variables) by more or less the same group of key informants indicating their consensual agreement of the respective strategies. The groups indicate the most important strategies that are needed to implement in order to make Shah Alam a resilient city because a group indicates a shared set of strategies. Strategies with the 'Measure of Sampling Adequacy (MSA) less than 0.50 were removed from further analysis. That means, only the strategies with MSA above 0.50 were used in the next stage of analysis. The Kaiser-Meyer-Olkin (KMO) value for sampling adequacy was 0.729 and the Bartlett's test of sphericity was significant at p < 0.001, and therefore PCA was considered as statistically valid **(Table 1)** (Rubin, 2005).

Eight groups of strategies having *Eigen value* >1 were identified using varimax rotation with Kaiser Normalization to maximize intra-component variances as suggested by Tabachnick and Fidell(1996). The percentage of variance garnered by each group of strategies was also considered in ranking the groups. In other words, group 1 is considered as the most important group of strategies among all the eight groups obtained by the PCA. These groups of strategies were given separate names (statistically called new variables) based on the specific types of resilience, i.e. community resilience, infrastructure resilience, ecological resilience, environmental quality resilience, land use resilience, emergency readiness and responsiveness, stakeholder

Table 1: Statistical verification of the adequacy of samples for PCA

KMO and Bartlett's Test	
Kaiser-Mayer-Olkin Measure of Sampling Adequacy	.729
Bartlett's Test of Sphericity Approx. Chi Square	701.326
df	351
Sig.	.000

participation and socio-economic resilience. **Table 2** presents the summary result of PCA. According to that there are eight groups of strategies to improve the disaster resilience in Shah Alam City. The common attribute of each group was derived from the constituent strategies of the group. It indicates that the 'community resilience improvement' has the highest percentage of variance explained. It means a sizable majority of the key informants consider that improving community resilience should be the most important specific attribute of the local development plan of Shah Alam City. The following discussion explains the details of each group of strategies and their common attributes as identified by the research conducted.

RESULTS OF ANALYSIS - EFFICACY OF RESILIENCE IMPROVEMENT STRATEGIES IN SHAH ALAM LOCAL PLAN

The assessment used a 5-point Likert Scale (1.0=extensively implemented, to 0.0=not implement at all). The Weighted Mean Score (WMS) was used as a tool to arrive at an overall assessment of implementation of each short-listed strategy. WMS for each strategy was computed using the formula $\sum W_i/n$. After determination of individual weighted mean score

Table 2: Eight groups of strategies identified from the result of PCA

Group of Strategies	Common Attribute	Percentage of Variance Explained
Group 1	Community Resilience	8.459
Group 2	Infrastructure Resilience	7.616
Group 3	Ecological Resilience	7.060
Group 4	Environmental Quality Resilience	6.953
Group 5	Land-use Resilience	6.893
Group 6	Emergency Readiness and Responsiveness	5.752
Group 7	Stakeholder Participation	5.534
Group 8	Socio-Economic Resilience	5.459

(index) for each strategy, an "index mean" for the set of strategies (and thereby for the attribute) was prepared using the formula $\sum W_i f_i/\sum f_i$ (where W_i = individual's weighted score for each strategy, f_i= frequency of that particular score). Table 3 to 10 provides a summary of the implementation efficacy of the short listed strategies in the local development plan of Shah Alam City (SALP 2020). The summary provides an Index Mean Score for each specific attribute of resilience to indicate the integration of that attribute in the local development plan. Any Index Mean Score of more than 0.75 was considered as an indication of that attribute adequately integrated in the local development plan.

Efficacy of Resilience Improvement Strategies for Community Resilience

Table 3 indicates that strategies to achieve **community resilience** have been more or less adequately implemented under the SALP 2020. This condition is indicated by the Index Mean Score of 0.73 (≈0.75). It is also an indication of the Shah Alam City Council's highest priority of making the communities resilient against climate change induced flooding.

It is noted that only two strategies to improve community resilience have not been adequately implemented under the SALP 2020. They are: ST26 - Improve public understanding on

Table 3: Efficacy of resilience improvement strategies for community resilience suggested by the key informants in SALP 2020

Principal Component	Resilience Improvement Strategy	Responses of the Professional Planners and Managers (N=97)					Weighted Mean Score (WMS)
		Extensively implement (1)	Adequately implement (0.75)	Moderately implement (0.5)	Inadequately implement (0.25)	Not implement at all (0)	
1. **Community resilience**	ST21. Ensure residential and commercial activities to be in safer zones	63 (65.08%)	23 (23.7%)	4 (4.1%)	5 (5.2%)	2 (2.1%)	0.86
	ST12. Allocate land for public spaces and uses	50 (51.6%)	33 (34.0%)	7 (7.2%)	8 (8.3%)	9 (9.3%)	0.83
	ST19. Improve community awareness on hazard intensity and frequency	57 (58.8%)	22 (22.7%)	7 (7.2%)	6 (8.2%)	5 (5.1%)	0.81
	ST10. Establish environmental stewardship within communities	32 (33.0%)	51 (52.6%)	2 (2.1%)	7 (7.2%)	5 (5.2%)	0.75
	ST26. Improve public understanding on climate change & risks	35 (46.4%)	22 (36.1%)	18 (8.3%)	15 (5.2%)	7 (4.1%)	0.66
	ST29. Enhance and sustain social capital	12 (12.4%)	23 (23.7%)	15 (15.5%)	37 (38.1%)	10 (10.3%)	0.47
Index Mean Score for the attribute							0.73

climate change & risks (WMS = 0.66), and ST29- Enhance and sustain social capital (WMS = 0.47). These two findings indicate that the Shah Alam City Council has to take more actions to improve understanding on climate change and its risks among the members of the civil society. Social capital is relatively a new term for urban planners and managers although the existence of it is evident in traditional *gotong royong* (mutual help) activities. With urbanization and modernization, these traditional practices gradually disappear from civil society. Therefore, the city council has to take some concerted actions to improve and sustain social capital in the communities. That will help to further increase the community resilience against climate change related hazards as well as other unforeseen incidents affecting communities.

Efficacy of Resilience Improvement Strategies for Infrastructure Resilience

Although improvement of the resilience of infrastructure, especially the city's lifelines, is the second highest priority for the urban planners and managers, the achievement of that target by implementing SALP 2020 is only moderately successful as shown by an Index Mean Score of 0.59 (see in the last part of **Table 4**).

Apparently this deficiency is largely due to the inadequate collaboration between agencies that manage infrastructure networks. The relevant strategy i.e. ST13- Enhance inter-agency collaboration for disaster preparedness, has garnered only a WMS of 0.41, indicating less than moderate success in implementation of that strategy under SALP 2020. Therefore, the city council has to play a stronger role for coordinating different agencies functioning in the city in order to improve the resilience of transport infrastructure and other critical infrastructure. Collaboration between relevant agencies for limiting the single occupancy vehicles running on city streets will be beneficial not only during the times of emergencies but also to reduce carbon emission per capita.

Efficacy of Resilience Improvement Strategies for Ecological Resilience

The third highest priority for urban planners and managers is the improvement of ecological resilience of the city. Implementation of strategies targeting ecological resilience has garnered an Index Mean Score of 0.60 indicating slightly more than moderate

Table 4: Efficacy of resilience improvement strategies for infrastructure resilience suggested by the key informants in SALP 2020

Principal Component	Resilience Improvement Strategy	Responses of the Professional Planners and Managers (N=97)					Weighted Mean Score (WMS)
		Extensively implement (1)	Adequately implement (0.75)	Moderately implement (0.5)	Inadequately implement (0.25)	Not implement at all (0)	
2. **Infrastructure resilience**	ST36. Propagate the city's development vision regularly	46 (47.4%)	23 (19.6%)	6 (6.2%)	19 (19.6%)	7 (7.2%)	0.73
	ST30. Improve transportation network	34 (35.1%)	23 (23.8%)	10 (10.3%)	22 (22.7%)	8 (8.3%)	0.64
	ST16. Protect lifelines and critical infrastructure	34 (35.1%)	19 (19.6%)	9 (9.3%)	26 (26.8%)	9 (9.3%)	0.62
	ST14. Improve the quality of public transport services	22 (22.7%)	31 (32%)	18 (18.6%)	17 (17.5%)	9 (9.3%)	0.60
	ST35. Restrict the single occupancy vehicles during times of emergency	15 (15.5%)	34 (35.1%)	8 (8.3%)	29 (29.9%)	11 (11.3%)	0.54
	ST13. Enhance inter agency collaboration for disaster preparedness	9 (9.3%)	20 (20.6%)	18 (18.6%)	28 (28.9%)	22 (22.7%)	0.41
Index Mean Score for the attribute							0.59

level of implementation. The analytical results presented in **Table 5** indicate that further dissemination of zoning and building regulations among the public (i.e., ST18) may lead to higher level of ecological resilience in the city.

Efficacy of Resilience Improvement Strategies for Environmental Quality Resilience

The SALP 2020 has more or less adequately implemented strategies to improve the resilience of environmental quality in the city. This level of implementation is indicated by an Index Mean Score of 0.70 for Environmental Quality Resilience. The analytical data presented in **Table 6** indicates that the city council has given only moderate support for community-

based environmental management actions (WMS for ST34=0.52). It is a fact that local government authorities in many cities collaborate with community organizations to improve the environmental quality in residential areas and thereby the whole city. Apparently the Shah Alam City Council has not done enough to support the community-based environmental management actions. On the other hand Table 6 does not indicate that support from the city council to improve the environmental quality of the communities is not a particular need of the people. However, it is needless to say that more support and collaborative actions with community organizations can further improve the environmental quality resilience of the city.

Table 5: Efficacy of resilience improvement strategies for ecological resilience suggested by the key informants in SALP 2020

Principal Component	Resilience Improvement Strategy	Responses of the Professional Planners and Managers (N=97)					Weighted Mean Score (WMS)
		Extensively implement (1)	Adequately implement (0.75)	Moderately implement (0.5)	Inadequately implement (0.25)	Not implement at all (0)	
3. **Ecological resilience**	ST20. Protect water retention areas such as wetlands and ponds	28 (28.9%)	35 (36.1%)	15 (15.5%)	10 (10.3%)	9 (9.3%)	0.66
	ST9. Protect ecologically sensitive areas	25 (25.8%)	36 (37.1%)	12 (12.4%)	15 (15.5%)	9 (9.3%)	0.64
	ST15. Reduce soil erosion rate	22 (22.7%)	31 (31.9%)	16 (16.5%)	18 (18.6%)	10 (10.3%)	0.60
	ST18. Disseminate zoning and building regulations among the public	16 (16.5%)	24 (24.7%)	27 (27.8%)	17 (17.5%)	13 (13.4%)	0.53
Index Mean Score for the attribute							0.61

Table 6: Efficacy of resilience improvement strategies for environmental quality resilience suggested by the key informants in SALP 2020

Principal Component	Resilience Improvement Strategy	Responses of the Professional Planners and Managers (N=97)					Weighted Mean Score (WMS)
		Extensively implement (1)	Adequately implement (0.75)	Moderately implement (0.5)	Inadequately implement (0.25)	Not implement at all (0)	
4. **Environmental Quality resilience**	ST4. Regulate development of land in urbanizing areas	48 (49.5%)	31 (32.0%)	11 (11.34%)	5 (5.16%)	2 (2.10%)	0.80
	ST11. Improve solid waste collection and disposal	43 (44.3%)	28 (28.9%)	13 (13.4%)	6 (6.2%)	7 (7.2%)	0.74
	ST24. Improve sanitation system	35 (36.1%)	23 (23.7%)	26 (26.8%)	10 (10.3%)	3 (3.1%)	0.70
	ST34. Support community-based environmental management actions	11 (10.7%)	26 (26.8%)	33 (34.0%)	14 (14.4%)	13 (13.4%)	0.52
Index Mean Score for the attribute							0.70

Efficacy of Resilience Improvement Strategies for Land Use Resilience

The land-use resilience of Shah Alam City is just moderate. This is due to the moderate implementation of strategies to improve the land-use resilience of the city, as indicated by an Index Mean Score of 0.51 **(Table 7)**. Apparently the urban planners and managers have been inadequately successful in involving stakeholders for mapping climate change risk areas of the city. This is indicated by a WMS of 0.41 for the relevant strategy (ST2). On the other hand this strategy is ranked number 2 and cited by nearly 85% of the key informants indicating its significance from their view point. Therefore, Shah Alam City Council has to take some concerted actions to receive the collaboration of local stakeholders for mapping climate change risks in the city and use that information for climate change adaptation planning. Moreover, it seems to be difficult for the urban

planners and managers to increase the land-use resilience without localizing land-use zoning & building regulations.

There is a common set of land-use and building regulations applicable throughout Malaysia under the Town and Country Planning Act 1976 (Act 172) and Street, Drainage and Building Act 1974 (Act 133). The land-use and building regulations in SALP 2020 are based on these Acts. The local authorities like Shah Alam City Council are allowed only to enforce by-laws under the Local Government Act 1976 (Act 171). This provision is inadequate for counter-acting climate change related risks (Khir, 2004). Therefore, majority of the urban policy makers, planners and managers (76.5% of the key informants) are of the view that 'localized land-use zoning & building regulation by-laws' are a critical need of the time. However, such by-laws are difficult to enforce without amending the Act 171 to empower local authorities to enact 'localized land-use

zoning & building regulations'. Until such times, improving the land-use resilience is a challenge for the Shah Alam City Council.

Efficacy of Resilience Improvement Strategies for Emergency Readiness and Responsiveness

Table 6 also indicates that 'emergency readiness and responsiveness' as a specific attribute of resilience has fared only moderately (Index Mean Score=0.52) in the implementation of SALP 2020. The main reason for this level of implementation is due to inadequate integration of the city-wide emergency and rescue services (WMS=0.34 for ST17) **(Table 8)**. As discussed earlier, integration of city-wide emergency and rescue services which often compete with and duplicate each other, is a tough task. Therefore, Shah Alam City Council will find it difficult to improve the overall status of 'emergency readiness and responsiveness' without taking serious

Table 7: Efficacy of resilience improvement strategies for land use resilience suggested by the key informants in SALP 2020

Principal Component	Resilience Improvement Strategy	Responses of the Professional Planners and Managers (N=97)					Weighted Mean Score (WMS)
		Extensively implement (1)	Adequately implement (0.75)	Moderately implement (0.5)	Inadequately implement (0.25)	Not implement at all (0)	
5. **Land Use resilience**	ST27. Improve the access to safety zones	42 (43.3%)	26 (26.8%)	22 (22.7%)	5 (5.2%)	2 (2.1%)	0.76
	ST1. Ensure rule of law in development control	33 (34.0%)	16 (16.5%)	29 (29.9%)	13 (13.4%)	6 (6.2%)	0.65
	ST2. Involve stakeholders in risk mapping	9 (9.3%)	20 (20.6%)	18 (18.6%)	28 (28.9%)	22 (22.7%)	0.41
	ST6. Localize land-use zoning & building regulation by-laws	-	3 (3.1%)	20 (20.6%)	39 (40.2%)	35 (36.1%)	0.23
Index Mean Score for the attribute							0.51

Table 8: Efficacy of resilience improvement strategies for emergency readiness and responsiveness suggested by the key informants in SALP 2020

Principal Component	Resilience Improvement Strategy	Responses of the Professional Planners and Managers (N=97)					Weighted Mean Score (WMS)
		Extensively implement (1)	Adequately implement (0.75)	Moderately implement (0.5)	Inadequately implement (0.25)	Not implement at all (0)	
6. **Emergency readiness and responsiveness**	ST3. Improve the capacity and readiness of local government officers	38 (39.2%)	24 (24.7%)	19 (19.6%)	11 (11.3%)	5 (5.2%)	0.70
	ST17. Integrate city-wide emergency and rescue services	3 (3.1%)	5 (5.2%)	37 (38.1)	29 (29.9)	23 (23.7%)	0.34
Index Mean Score for the attribute							0.52

Table 9: Efficacy of resilience improvement strategies for stakeholder participation suggested by the key informants in SALP 2020

Principal Component	Resilience Improvement Strategy	Responses of the Professional Planners and Managers (N=97)					Weighted Mean Score (WMS)
		Extensively implement (1)	Adequately implement (0.75)	Moderately implement (0.5)	Inadequately implement (0.25)	Not implement at all (0)	
7. **Stakeholder participation**	ST5. Stakeholder participation in climate change adaptation planning	7 (7.2%)	22 (22.7%)	28 (28.9%)	25 (25.8%)	15 (15.5%)	0.45
Index Mean Score for the attribute							0.45

Table 10: Efficacy of resilience improvement strategies for socio-economic resilience suggested by the key informants in SALP 2020

Principal Component	Resilience Improvement Strategy	Responses of the Professional Planners and Managers (N=97)					Weighted Mean Score (WMS)
		Extensively implement (1)	Adequately implement (0.75)	Moderately implement (0.5)	Inadequately implement (0.25)	Not implement at all (0)	
8. **Socio-Economic resilience**	ST7. Sustain value of property and assets	19 (19.6%)	37 (38.1%)	24 (24.7%)	10 (10.3%)	7 (7.2%)	0.63
	ST31. Inculcate saving and insurance habits among people	-	16 (16.5%)	30 (30.9%)	28 (28.9%)	23 (23.7%)	0.35
Index Mean Score for the attribute							0.50

actions to integrate the city-wide emergency and rescue services.

Efficacy of Resilience Improvement Strategies for Stakeholder Participation

Stakeholder participation in climate change adaptation planning was also found to be inadequately implemented under SALP 2020. This deficiency is indicated by a WMS of 0.45 for ST5 (**Table 9**). The urban policy makers, planners and managers rank stakeholder participation very highly as indicated by more than 80% of the key respondents pointing out it as a key strategy to improve the resilience of Shah Alam City from climate change related hazards. However, there seems to be some difficulties faced by urban planners and managers in collaborating with the local stakeholders. Perhaps they need some training to learn the techniques of improving stakeholder participation.

Efficacy of Resilience Improvement Strategies for Socio-Economic Resilience

Surprisingly, the socio-economic resilience features last in the list of specific attributes of resilience. It also fares moderately in terms of implementation under SALP 2020, as indicated by an Index Mean Score of just 0.50. The main reason for this moderate level is due to the difficulty of inculcating saving and insurance habits among people. The relevant strategy (ST31) has a WMS of only 0.35 indicating inadequate implementation under SALP 2020 (**Table 10**).

Although Shah Alam City has a modern society, people's saving habits are still very traditional. It is not uncommon to find that many people still save in precious metals like gold. Similarly, taking an insurance policy against disasters is an uncommon practice although many people suffer from floods annually. Many people try to cope with emergencies by themselves or with the support of their relatives and friends. It is difficult to inculcate new habits of saving and insurance among people who follow traditional practices. As a result, the socio-economic resilience of people in Shah Alam will remain low from the perspective of urban planners and managers. However, the findings of the social survey revealed the opposite because majority of the respondents were having regular incomes from salaried jobs. Nothing in

terms of evidence was revealed from the resilience improvement needs of people to indicate that their socio-economic resilience is poor. On the other hand, community resilience featured on top of the specific attributes of resilience. Therefore, it can be inferred that socio-economic resilience is more critical at the collective level than at the individual level.

RESEARCH FINDINGS

The results of PCA on the strategies pointed out by key informants revealed that SALP 2020 has inadvertently integrated all 8 specific attributes of resilience. Regarding the specific attributes of resilience, it was revealed that 'community resilience' and 'environmental quality resilience' are integrated in SALP 2020, and more or less adequately achieved through the implementation of relevant strategies. 'Infra-structure resilience', 'Ecological resilience', 'Land-use resilience', 'Emergency readiness and responsiveness', and 'Socio-Economic resilience'; as specific attributes of resilience are also integrated in SALP 2020, but only moderately achieved through the implementation of relevant strategies. Only the strategies on 'Stakeholder participation' fared inadequate

implementation. That means the status of 'stake holder participation' as a specific attribute of resilience in SALP 2020 is questionable. However, it can be preliminarily concluded that both general and specific attributes of resilience are already integrated in the local development plan of Shah Alam City, despite having some room for improvement in the implementation of relevant strategies to achieve the goal of making Shah Alam a resilient city. It is reiterated here that the integration of general and specific attributes of resilience in the local development plan is a finding of this research based on the interpretation of the contents of SALP 2020 and the strategies proposed by the key informants to make Shah Alam a resilient city. Based on these findings, the research argues a case for formal mainstreaming of disaster resilience attributes in the local development plan.

CONCLUSION

The research question examined 'how the adaptation of disaster resilience attributes in the local development plan can lead to achieve the goal of a resilient city'. In order to find the answer to this question the urban policy makers, planners and managers who shape the destiny of Shah Alam city were asked a reverse question;

what are the planning interventions needed to make Shah Alam a resilient city? The answers to this question by different key informants were analyzed in order to identify common themes among them and then construe those themes as the specific attributes of resilience. The analyses lead to distinguish 8 specific attributes of resilience. That means adaptation of those specific attributes in the local development plan will be necessary to achieve the planning goal of a resilient city. Since the opinions of the key informants were more or less general and not so specific to Shah Alam City and its development plan, the specific attributes of resilience identified above can be considered as applicable to any city in Malaysia that face the threat of climate change induced disasters.

The research also investigated the extent to which those eight specific attributes of resilience are already integrated in the local development plan of Shah Alam City in an attempt to comprehend the implementation efficacy. It revealed that 'Community resilience' and 'Environmental quality resilience' are more or less adequately integrated in the plan and the relevant strategies are being implemented. 'Infra-structure resilience', 'Ecological resilience', 'Land-use resilience', 'Emergency readiness and responsiveness', and

'Socio-Economic resilience'; are moderately integrated and the relevant strategies are being implemented. Only 'Stakeholder participation' as a specific attribute of resilience was found to be inadequately integrated in the local development plan. These findings infer that a potential condition already exists in Shah Alam City to adapt resilience as an attribute in its local development plan. It is reiterated here that adaptation is a higher status of integration which require the subject to adapt to be specifically included in the plan making, plan adoption and plan implementation processes. As the Hyogo Framework for Action 2005-2015 recommends, adaptation to climate change related hazards require resolute actions by the planning agencies and local authorities (ISDR, 2005) as follows:

i)   An educated and empowered community is essential for effective disaster management
ii) Physical durability of structures is the basic requirement to be a disaster-proof city.
iii) Institutional preparedness and logistics are highly important.
iv) Identification of appropriate policy approaches for restoration is greatly favored to reduce conflicts after launching of a restoration program.
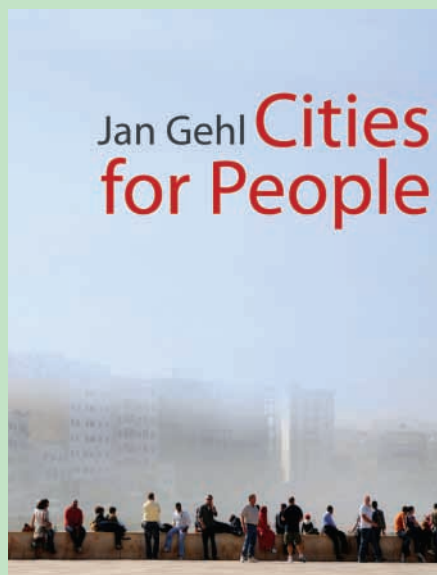
Moreover, if the disaster resilience attributes were resolutely adapted in SALP 2020, and relevant strategies were specifically targeted to improve sensitivity to hazards, exposure minimization and adaptive capacity improvement, the plan would have been more effective in fulfilling peoples' needs. In other words, the findings support the initial proposition of the study that the adaptation of disaster resilient attributes in the local development plan can make it more effective in achieving the planning goal of a resilient city. Answers to the research question give directions on how to adapt disaster resilience attributes in the local development plan, from the perspective of urban policy makers, planners and managers. The research discovered eight specific attributes of resilience to be adapted in the local development plan by synthesizing and interpreting the propositions of those key informants.

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BOOKS:
Editor's Choice

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Jan Gehl **Cities for People**

Jan Gelh has been involved in urban development as an architect for fifty years and has produced many books on urban planning. He is the founder of Gehl Architect was also a former professor at the Royal Danish Academy of Fine Arts.

Cities for People is one of his latest books that describe the 'soft elements' in urban planning – 'people and spaces'. Based on his observation, research and experience in many projects around the world, Jan Gehl has successfully explained his ideas in simple language for the non-technical person to understand.

There are six chapters in this book. **Chapter 1 – The Human Dimension** suggests that the human dimension is always overlooked and neglected in urban planning. Limited space, obstacles, noise, pollution and risk of accidents are generally faced by city dwellers. Development of new towns is now more focused on the physical aspects. Skyscrapers and ring roads meet spaces in the city. "First we shape cities then they will shape us" - this statement clearly shows that the city that we plan today will influence our behaviour in the future. More roads and parking lots will encourage more people to own and drive their vehicles. This will cause the number of vehicles on the road and traffic to increase.

Chapter 2 – Sense and Scale deplores the fact that development of a city often ignores the human scale. Tall buildings and facilities were placed away from public attention. Hence city residents were unable to experience and participate in activities in the city. From a study conducted by Jen Gehl, people who live five storeys and above will not be able to feel the activities carried out on the ground floor. This is because human vision and hearing are limited. We always forget that people who use the skyscrapers, big buildings and huge spaces are always small. Therefore, human scale is one of the key elements that should be considered in developing a city.

Chapter 3 – The Lively, Safe, Sustainable and Healthy City explains how to bring about a lively city, safe city, sustainable city and healthy city. This chapter also points out that humans are always attracted by the presence of other people. Therefore, a good building form will attract more people to get involved in the activities of the city.

Chapter 4 - The City at Eye Level tells the reader that the city should be planned well for people to walk, stand, sit, watch, listen and speak with the greatest ease and convenience and this can be done with human scale measurement. This chapter also makes the point that a great city should give pleasure and opportunity to the people for self-expression. A good city will also educate people on the environment by encouraging the use of public transport, cycling and walking.

Chapter 5 - Life, Spaces, Building - in that Order is where, Jen Gehl explains that urban design and urban planning involve three scales - urban scale, site planning scale and human scale. Good urban planning requires good coordination of the three scales and it should follow this sequence - life, spaces and building. This chapter also gives examples of successful cities such as Vancouver, Canada which has implemented the three scales in their development.
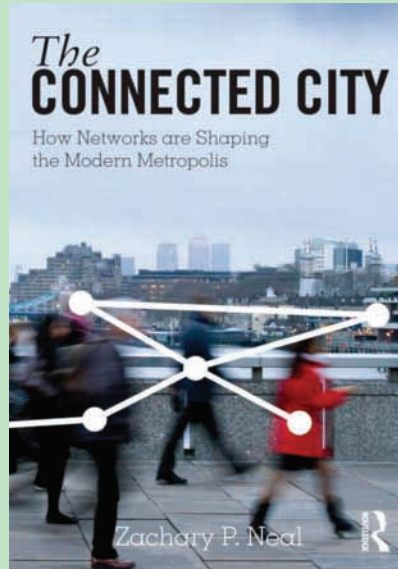
Chapter 6 - Developing Cities points out that most of the cities in the world are growing explosively and more people are now living in the cities. The rapid rise in urban population creates many problems and challenges. To develop a good city to live in, architects and urban planners should respect people and their needs and always bear in mind that the city is a meeting place. It is also important to ensure that the human dimension of city planning is carefully integrated into work on city development.

This book advocates the idea that cities should be planned for the people and with the people. Do mega projects with huge buildings or skyscrapers really fulfil the people's needs and requirement? This is the question that must be answered by all of us. Lack of 'human touch' in the urban design will create more issues and problems to the people in the future. Back to basics, people are close to nature; they like to live in a nice, green and healthy environment, safe surroundings, close to their families and friends, able to walk or cycle to public spaces, enjoying the activities near their homes and fully utilize the facilities provided. This book is an essential read for architects, urban planners and local authority managers to get ideas on how to make a city great for people to live in.

BOOKS:
Editor's Choice

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This book is about cities. It is because at least since the industrial revolution, people have been moving to cities in search of both opportunity and stimulation. The shift of the world's population into cities – urbanization - is clear from a few simple statistics. The rapid urbanization of the population has been even more dramatic and complete within the United States, where 6 percent lived in cities in1800, nearly 40 percent in 1900, and now over 80 percent. Clearly, then, cities are worth studying because they are where the majority of people are today.

As sociologist Zachary Neal of Michigan State University argues about cities and its connection in this book, *The Connected City*, cities are made up of human social networks. Neal took time to discuss his book and research with *Atlantic Cities,* explaining how cities work as living organisms and why what happens in Las Vegas cannot stay in Las Vegas.

The chapters in the first part of the book explore how the cities grow. **Chapter Two** asks what role community plays in modern city life. Some have argued that when people move to big cities, community and feelings of solidarity are lost and get replaced by isolation and feelings of loneliness. But, adopting a network-based approach, others have argued that community is alive and well in numerous and varied relationships that city dwellers maintain. **Chapter Three** then considers how such busy and crowded places like modern cities and social groups such as subcultures and ethnic enclaves are formed. The formation of such tight-knit groups might seem impossible in the big city, but from a network point of view, having a close circle of friends and acquaintances who all know one another and belong to the same clubs and organizations helps create pockets of order in a sea of chaotic diversity. **Chapter Four** examines why some people are influential in running cities and controlling urban affairs, while others are relatively powerless. While political and social influence might seem to depend on individual characteristics such as one's leadership ability or wealth, a person's position in an urban social network can be even more significant.

Chapter Five concentrates on cities' physical layout - their form - to consider how different physical arrangements influence how we experience the city. More than just aesthetics and efficiency, a city's infrastructure networks - its streets, sidewalks, mass transit - guide us to use the city in specific ways. Then, **Chapter Six** focuses on how the services, organizations, and agencies get coordinated

to keep a complex city functioning, rather than dissolving into confusion. The delivery of the wide range of urban services such as trash collection, health care, education, and recreation are rarely the result of a single centralized plan. More often they are made possible by a complex network of inter-organizational relationships that allow providers to join forces through collaboration, or to dominate through competition.

Chapter Seven asks how a city becomes a metropolis by looking at how groups of cities in a particular region are linked together by networks of commuting workers, partnerships among business firms, and cooperation between local governments. These regional city networks can transform a single downtown area where all the activity is concentrated into a metropolitan area where activity is concentrated in multiple places. Then, **Chapter Eight** considers how cities are related to one another across longer distances and larger areas such as an entire country. Often intercity networks, when they occur on national level, serve to establish a national urban system in which cities play specialized economic and social roles that require a level of urban interdependence. Finally, **Chapter Nine** turns to the global arena, asking what makes a handful of major "world cities" such as New York, London, and Tokyo so important.

The concluding chapter explores some of the universal features that cut across networks at the different levels. Throughout each of these chapters, the focus is more on broad patterns rather than on facts and figures. This is because the purpose of this book is not to provide a detailed discussion of specific research findings. As the field of urban networks is still rapidly developing, to do so would make it outdated as soon as it is published. Instead, this book aims to explore how a network perspective can be useful for making sense of cities and urban phenomena.

One observation is that planners, recognizing the efficiency of such branching network structures, adopted this design into their city plans. However, even unplanned ancient cities that emerged organically over centuries have street networks with these efficient structures.

The book ends with the suggestion that the formation of urban street networks is driven first by the logic of efficiency, and secondarily by planning considerations. This is certainly not to say that planners play no role, but rather that they must work within some relatively narrow parameters dictated by nature. This book can be considered as a comprehensive resource on creating future cities and an absolutely essential read for private and government town planners, local authority managers and administrators.

BOOKS:
Editor's Choice

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GREENING EXISTING BUILDINGS
Author: Jerry Yudelson
Publisher: The McGraw-Hill Companies, Inc.
Place of Publication: New York, United States of America
Year of Publication: 2010
Pages: 292
ISBN: 978-0-07-163832-6

Green technology, an environmentally friendly technology, is developed and used in a way that protects the environment and conserves natural resources. A part of the renewable energy branch of the environmental technology movement, the importance of green technology cannot be ignored. We have come to a point, where we need to pause and reflect on the growing green technology importance and why it is going to be important for humanity.

With plentiful reasons behind green technology importance, perhaps volumes can be written and spoken on the subject. Whether it is the growing importance of green technology in the industry or at homes, it is obvious that things need to be done fast. It does not take a rocket-scientist to state that mankind has to do something about clean environment and save energy resources.

Going green can only help us come out of the present grim situation. Before things turn for the worst, we should realize the importance of green technology to solve this problem.

The Earth's ecosystems are now at a critical stage: they are not only being severely damaged but human activity currently leads to irreversible losses of critical (i.e. life-supporting) ecosystem functions. Buildings and construction works have the largest single share in global resource use and pollution emission. In Organisation for Economic Co-operation and Development (OECD) countries the built environment is responsible for around 25-40% of total energy use, 30% of raw material use, 30-40% of global greenhouse gas emissions and for 30 to 40% of solid waste generation.

In addition, in OECD countries, people spend almost 90% of their life inside buildings. In the United States, the annual cost of building-related sickness is estimated to be at $58 billion. Consequently, healthy and comfortable indoor environments contribute significantly to human health and well-being and offer a large potential for reducing 'external' costs to societies through lowering diseases.

This *Green Source* guide written by Jerry Yudelson who is a principal of Yudelson Associates, a green building and sustainable planning consultancy based in Tucson, Arizona explains how to transform existing buildings into more energy-

efficient, resource-conserving green buildings. The book provides a clear process that guides you, step-by-step, through each phase of moving building operations and maintenance toward the goal of a green-certified building.

Greening Existing Buildings features proven technologies and operating methods, and shows building owners and facility managers how to green buildings in a cost-effective way. This practical and insightful resource highlights the ten best practices for greening existing buildings, and includes more than 25 case studies of successful implementations and 35 insightful interviews with industry experts and building owners and managers.

Greening Existing Buildings covers the aspects of:-

- Economic drivers and market dynamics;
- Getting the U.S EPA' ENERGY STAR rating;
- U.S Green Building Council's LEED for Existing Buildings rating;
- Making the business case for greening existing building;
- Cost of greening and setting realistic project budgets;
- Energy-efficient building upgrades;
- Sustainable site management and water conservation retrofits;
- Crafting purchasing and waste management policies;
- Upgrading indoor environmental quality; and
- Managing a LEED for Existing Buildings: Operations and Maintenance (EBOM) certification project, from beginning to end.

Beyond savings in energy, water, and waste management expenses, the real gains in greening existing buildings lie in the seemingly "soft" benefits: improvements in health, comfort, and productivity of building occupants; enhanced marketing and public relations; risk mitigation, improved recruitment and relation, and greater employee morale. As building owners look to make a business case for greening an existing building, whether a single-tenant or multi-tenant building, these other benefits constitute a strong part of the justification.

This book focuses mostly on using established green building rating systems, especially the U.S Green Building Council's LEED for Existing Building (LEED-EB), but includes consideration of newer evaluation schemes for existing buildings from the U.K's Building Research Establishment's BREEAM rating system and the Green Building Council of Australia's Green Star program.

This book can be considered as a comprehensive resource on greening existing buildings. This book shows the way for anyone involved with building ownership and operations to upgrade the energy and environmental performance of almost any building. As a country like Malaysia, and as a world, we need to get moving quickly to dramatically reduce carbon emissions from the existing building stock. It can be done by profiling the large number of successful projects, by demonstrating the business case, and by showcasing the wide range of specific strategies for greening existing buildings.

Much of this book has been focused on greening existing buildings, one building at a time. But an emerging planning science, based on applying the wedge concept at a "micro" level, is tackling larger developments, such as college campuses, urban districts, and mixed-use development. Pioneered by Mithun architects and planners in Seattle's South Lake Union District, the approach was recently introduced into the planning for the future expansion of Seattle University, a Jesuit institution with undergraduate and graduate programs.

This book is an absolutely essential read for private and government town planners, a building owner, building manager, or facility manager to greening existing buildings.

PLANNING EVENTS

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Research and Development Division
Federal Department of
Town and Country Planning
Peninsular Malaysia

JANUARY 2013

1. **9th International Conference on Environmental, Cultural, Economic & Social Sustainability**

Date	:	**23rd – 25th January 2013**
Venue	:	**Hiroshima, Japan**
Organizers	:	**Asian Strategy and Leadership Institute**
Websites	:	**http://onsustainability.com/conference-archives/2013-conference**
Theme	:	Sustainability Knowledge Community

FEBRUARY 2013

2. **Greater KL and Smart Cities Summit**

Date	:	**25th February 2013**
Venue	:	**Prince Hotel & Residence Kuala Lumpur**
Organizers	:	**Asian Strategy and Leadership Institute**
Websites	:	**http://www.asli.com.my/?p=past-events/greater-kl-and-smart-cities-summit-gearing-up-for-sustainable-growth-through-smart-initiatives**
Theme	:	Gearing Up For Sustainable Growth through Smart Initiatives

MAY 2013

3. **6th International Conference on Sustainable Development and Planning**

Date	:	**27th – 29th May 2013**
Venue	:	**Kos, Greece**
Organizers	:	**Wessex Institute of Technology, UK**
Websites	:	**http://www.wessex.ac.uk/13-conferences/sustainable-development-and-planning-2013.html**

4. **CSR & Sustainability**

Date	:	**30th May 2013**
Venue	:	**Hotel Istana Kuala Lumpur**
Organizers	:	**Asian Strategy and Leadership Institute**
Websites	:	**http://www.asli.com.my/?p=past-events/csr-sustainability-summit-the-next-phase-of-corporate-social-responsibility-%E2%80%93-are-we-there-yet**
Theme	:	The Next Phase of Corporate Social Responsibility – Are We There Yet

JUNE 2013

5. **IFHP 100 Centenary London Congress**

Date	:	**8th – 11th June 2013**
Venue	:	**London, United Kingdom**
Organizers	:	**The International Federation for Housing and Planning**
Websites	:	**http://london2013.ifhp.org/**
Theme	:	A Tomorrow for Cities – for People, by People

6. The Planning Convention UK 2013

Date	:	**11th July 2013**
Venue	:	**London, United Kingdom**
Organizers	:	**Royal Town Planning Institute UK**
Websites	:	**http://www.theplanningconvention.co.uk/**
Theme	:	Growth - Planning Beyond Recession

AUGUST 2013

7. 16th Housing & Property Summit 2013

Date	:	**27th & 28th August 2013**
Venue	:	**Sunway Pyramid Convention Centre, Selangor**
Organizers	:	**Asian Strategy and Leadership Institute**
Websites	:	**http://www.asli.com.my/?p=past-events/16th-housing-property-summit-2013-scaling-new-heights-strengthening-growth**
Theme	:	Scaling New Height Strengthening Growth

SEPTEMBER 2013

8. 5th International Conference on World Class Sustainable Cities 2013 (WCSC2013)

Date	:	**24th September 2013**
Venue	:	**Mandarin Oriental Hotel, Kuala Lumpur, Malaysia**
Organizers	:	**The Real Estate and Housing Developer's Association (REHDA), Malaysian Institute of Planners (MIP) and Pertubuhan Arkitek Malaysia (PAM)**
Websites	:	**http://www.rehda.com/events/wcsc2013/index.html**
Theme	:	Liveable Cities Are Creative and Competitive Cities

9. Nantes - Ecocity World Summit on Sustainable Cities 25-27 Sept 2013

Date	:	**25th – 27th September 2013**
Venue	:	**La Cité, Nantes Events Centre, Nantes, France**
Organizers	:	**Nantes Métropole, UNHABITAT and UNEP**
Websites	:	**http://www.ecocity-2013.com/en**
Theme	:	Sustainable City

10. Low Carbon Earth Summit 2013

Date	:	**26th – 28th September 2013**
Venue	:	**Xian Quijiang International Conference Centre, China**
Organizers	:	**The Real Estate and Housing Developer's Association (REHDA), Malaysian Institute of Planners (MIP) and Pertubuhan Arkitek Malaysia (PAM)**
Websites	:	**http://www.rehda.com/events/wcsc2013/index.html**
Theme	:	Liveable Cities Are Creative and Competitive Cities

OCTOBER 2013

11. The 49th ISOCARP Congress

Date	:	**1st – 4th October 2013**
Venue	:	**Brisbane, Australia**
Organizers	:	**International Society of City and Regional Planners (ISOCARP)**
Websites	:	**http://www.isocarp.org**
Theme	:	Frontier of Planning: Evolving and Declining Models of City Planning Practice

12. 3rd International Forum on the 'FutureCity' Initiatives

Date	:	**20th October 2013**
Venue	:	**Kitakyushu International Conference Center, Japan**
Organizers	:	**Cabinet Secretariat and Cabinet Office, Japan**
Websites	:	**http://futurecity.rro.go.jp/en/event/**

13. Asia Smart City Week International Conference 2013

Date	:	**21st – 25th October 2013**
Venue	:	**Pacifico Yokohama, Yokohama, Japan**
Organizers	:	**Nikkei Business Publication Inc.**
Websites	:	**http://scw.nikkeibp.co.jp/2013/english/**
Theme	:	City Innovation

NOVEMBER 2013

14. The 2nd International Skyrise Greenery Conference (ISGC)

Date	:	**7th – 9th November 2013**
Venue	:	**Singapore Expo Convention & Exhibition Centre**
Organizers	:	**National Parks Board (NParks), the Singapore Institute of Landscape Architects (SILA) and the Landscape Industries Association of Singapore (LIAS)**
Websites	:	**http://greenurbanscapeasia.com/international-skyrise-greenery-conference**
Theme	:	Density & Greenery: Evolving Into Collaborative Cities

15. International Conference on World Town Planning Day 2013

Date	:	**12th November 2013**
Venue	:	**Mandarin Oriental Hotel, Kuala Lumpur, Malaysia**
Organizers	:	**Malaysian Town And Country Planning Officers Association (PERSADA) and Federal Department of Town and Country Planning, Peninsular Malaysia.**
Websites	:	**http://www.townplan.gov.my**
Theme	:	Towards Sustainable Future Cities

16. 46th EAROPH Regional Conference

Date	:	**19th – 20th November 2013**
Venue	:	**Thistle Hotel, Johor Bahru, Malaysia**
Organizers	:	**Eastern Regional Organization for Planning and Human Settlement (EAROPH)**
Websites	:	**http://earoph.info/46th**
Theme	:	Transforming Cities: 'Spatial and Socio-Economic Dimensions'

17. Smart City Expo World Congress 2013

Date	:	**19th – 21th November 2013**
Venue	:	**Barcelona**
Organizers	:	**Fira Barcelona**
Websites	:	**http://www.smartcityexpo.com/en/event**
Theme	:	Smart Cities Change the World

18. International Conference on Challenges of Extended Mega Urban Regions

Date	:	**19th – 21st November 2013**
Venue	:	**Pullman Lakeside Hotel, Putrajaya, Malaysia**
Organizers	:	**The Institute of Environment and Development (LESTARI), UKM**
Websites	:	**http://www.ukm.my/emur2013/**
Theme	:	The Changing Face of South East Asia and the World

DECEMBER 2013

19. 8th International Conference on Urban Regeneration and Sustainability

Date	:	**3rd – 5th December 2013**
Venue	:	**Putrajaya, Malaysia**
Organizers	:	**Wessex Institute of Technology, UK and University Teknologi Mara, Malaysia**
Websites	:	**http://www.wessex.ac.uk/13-conferences/sustainable-city-2013.html**
Theme	:	Sustainable City 2013

20. International Conference on Architecture and Engineering in Urban Development (AEUD 2013)
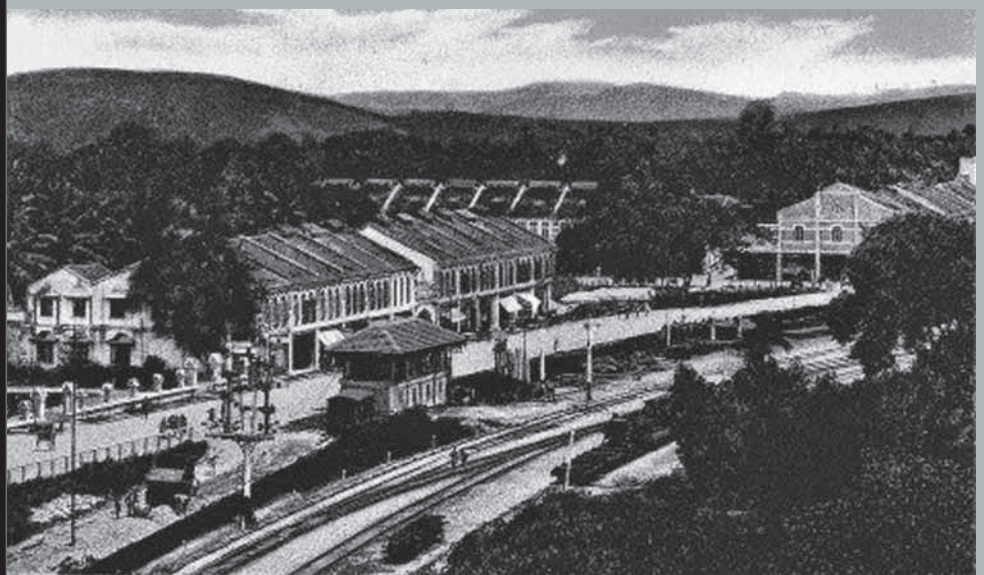
Date	:	**20th – 21st December 2013**
Venue	:	**Colombo, Sri Lanka**
Organizers	:	**International Centre for Research & Development (ICRD)**
Websites	:	**http://futureevents.org/icrd-archi**
Theme	:	Innovations & Creations for Sustainable Urban Environment

BRICKFIELDS

Wickham Lane Brickfields 1901.

Brickfields… From a centre for brick making and the site of the main depot for Malayan Railway… also known as Kuala Lumpur's biggest Little India, its history and urban fabric today has been changed by the development of a central transportation hub surrounded by high-rise office, hotel, commercial and residential iconic buildings.

Recognized as one of the good examples of transit-oriented development, fulfilling the characteristics of 'sustainable future cities', Brickfields and its iconic KL Sentral has became the landmark of Kuala Lumpur,… changing its original history.