

Developing Strategies to Avoid Post-Expo Slump for Sustainable Urban Planning in Dubai

تطوير استراتيجيات لتجنب الركود بعد معرض إكسبو الدولي من ناحية التخطيط الحضري المستدام في
إمارة دبي

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ABSTRACT

In recent years, mega-events have been popular catalysts for urban sustainability; they have magnificent impacts on the host city from (environmental, physical, social and economic) aspects; in 2020 Dubai will be hosting Expo which is considered the third largest global event in terms of economic and cultural impact during its six month run, this study mainly discussed how can EXPO sustain the success of EXPO after the end of the event, many scholars generally addressed the preparation for the event without considering the legacy phase, the research identified difficulties in achieving sustainability are very similar to issues associated with assessing the impacts of mega events through the time cycle of EXPO, therefore, the research aimed to fill this gap by creating strategies that help in sustaining the success of Expo 2020; these strategies can be used by Expo stakeholders to utilize the infrastructure of Expo 2020 for Dubai's long term sustainable planning needs and objectives especially the urban planners.

The research evaluated four international case studies to show the planning behavior of each ex-host city, the lessons learnt from these previous experiences will help in demonstrating the relationship between sustainable urban planning and hosting Expo to achieve a sustainable World EXPO.

The research found that the success of EXPO can be sustained by contributing EXPO in the urban sustainable development of the host city; therefore, the research identified EXPO's role from sustainable urban aspect.

As Dubai is still in the preparation phase the research covered the pre-event level from sustainable urban planning aspect, and extracted lessons from Shanghai which hosted EXPO 2010 with a sustainability related theme, Shanghai was a significant example to follow on how to achieve a good urbanism; with regards to Shanghai EXPO 2010, the research suggested guidelines for Dubai EXPO 2020 to follow based on the sustainable world EXPO strategies and a legacy plan to avoid post-EXPO slump.

ملخص

في السنوات الأخيرة تعتبر المعارض الدولية من أهم المحفزات لتحقيق الاستدامة الحضرية؛ حيث لها تأثير إيجابي على المدينة المستضيفة من الناحية (البيئية والمعمارية والاجتماعية والاقتصادية)؛ في عام 2020 سوف تستضيف دبي معرض اكسبو الدولي تحت عنوان (تواصل العقول وصنع المستقبل) الذي يعتبر ثالث أكبر حدث عالمي من حيث التأثير الاقتصادي والثقافي خلال مدة استضافته.

إن السبب وراء اختيار هذا الموضوع تقييم إمكانية استدامة إرث إكسبو بعد انتهاء مدة استضافته، حيث تم إجراء عدد من الدراسات تناولت التحضير لهذا الحدث دون النظر إلى عواقبه وتبنيها لتطوير المدينة المستضيفة، سوف يقوم البحث بملء هذه الفجوة من خلال وضع استراتيجيات تساعد في الحفاظ على استمرارية نجاح معرض اكسبو 2020 بعد انتهائه و التي يمكن استخدامها من قبل منظمي إكسبو 2020 وخاصة مخططي المدن للاستفادة من البنية التحتية للمعرض لتلبية احتياجات دبي التخطيطية على المدى الطويل، حيث تسعى حكومة دبي لرفع مستوى الوعي وحث المواطنين والمقيمين للتوجه نحو الاستدامة عن طريق اكسبو، بالإضافة إلى ذلك تحرص الدولة على تقييم المنجزات الحالية ووضع استراتيجيات مستقبلية لتقليل الأثار على البيئة بالتزامن مع تحضيرات الحدث.

ستقوم الأطروحة بتقييم أربع تجارب دولية سابقة لإظهار السلوك التخطيطي لكل مدينة استضافت إكسبو سابقا ، و استنتاج دروس من هذه التجارب تساعد في إظهار العلاقة بين التخطيط الحضري المستدام واستضافة المعرض لتحقيق معرض عالمي مستدام .

لقد توصل البحث إلى أن عوائد معرض إكسبو يمكن أن تستمر من خلال مساهمة الفعاليات والبنية التحتية في التنمية الحضرية المستدامة للمدينة المضيفة؛ بما أن دبي لا تزال في مرحلة التحضير لاستقبال إكسبو، سيقوم البحث بتحليل هذه المرحلة من جانب التخطيط الحضري المستدام ، و استخراج دروس من شغهاي التي استضافت إكسبو في عام 2010م والتي تعتبر مثال يقتدى به لتحقيق التطور الحضري و العمراني للمدينة المضيفة.

في المحصلة قام البحث بوضع المبادئ التوجيهية لمعرض اكسبو دبي 2020 لضمان استمرار عوائده وتطويره للتخطيط الحضري للمدينة استنادا على الاستراتيجيات المستنتجة من التجارب السابقة و وضع خطة زمنية لتفادي ركود ما بعد المعرض.

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LIST OF ABBREVIATIONS

CERES	-The Centre for Education and Research in Environmental Strategies
WRI	-World Resources Institute
WWF	-World Wild Life
CSD	-Commission on Sustainable Development
UNCED	-United Nations Conference on Environment
CLC	-Centre for Livable Cities in Singapore
BIE	- Bureau International des Expositions
AIPH	-International Association of Horticultural Producers
GHG	-Green House Gases
PRC	-The Government of People's Republic of China
EPA	-US Environmental Protection Agency
NUS	-New Urban Space
SEPC	-The Shanghai Environmental Protection Committee
SEPB	-The Shanghai Environmental Protection Bureau
UNEP	-United Nations Environment Program
LEED	-Leadership in Energy Environmental Design
BIG	-Bjarke Ingels Group
WGES	-World Green Economy Summit
DEWA	-Dubai Electric and Water Authority
UNDP	-United Nations Development Program

CHAPTER 1. INTRODUCTION

1.1 introductory

In a city where everything is possible, today Dubai is a modern city with over two million inhabitants, it is a combination of the Arabic culture with Western Minds, in 2020 Dubai will be hosting Dubai EXPO 2020 under the theme “Connecting minds, Creating the Future”, and the subthemes ‘Opportunity, Mobility and Sustainability’, the World EXPO is considered to be the third –largest global event in terms of economic and cultural impact during its six month run, the preparation for EXPO 2020 will add a magnificent achievement to the UAE’s record, it is the chance to represent the challenges the world is facing most notably in environmental and economic transformation by stimulating research and inspiring our dynamic society to help in creating a sustainable legacy and to create the best practices that can sustain Dubai’s growth in different sectors. On the other hand, it is important that Dubai does not experience the slump after EXPO 2020 as other countries previously reached their goals in terms of economic growth and faced a sudden vacuum in the years following due to the declining number of visitors and investments, these experiences must be a learning opportunity to achieve a healthy trend. The research aims to approach strategies that help in expanding the success after Expo 2020, by creating local sustainable economy, educational and cultural agenda through learning from previous experiences and planning ahead to avoid any potential crisis, moreover, the research will clarify the importance of contributing EXPO to develop a sustainable urban planning for the host city, and to ensure the legacy plan after EXPO. The research will follow both quantitative and qualitative methods to achieve the aim of the study and will demonstrate the right practices that can help in sustaining Dubai growth after Expo 2020. Furthermore, the study will investigate the nature of EXPO and sustainable city to demonstrate strategies for sustainable urban planning to show how World EXPO can be utilized to sustain the growth of the city in addition to the future challenges. The paper will highlight the strategies used in previous World EXPOs to avoid post-EXPO slump from physical, economic, social and environmental aspects. The result of this research will be a series of lessons to learn from previous ex-host cities, suggesting strategies that are inspired by the theme of Dubai Expo 2020 ‘Connecting Minds, Creating the Future’ and the subthemes ‘Mobility, Sustainability and Possibility’, to support Dubai’s growth in the

physical, economic, social and reputational aspects while developing references to sustain the legacy of Expo 2020.

1.2 Background of the Research

The World Expo is one of the main mega events that have a great impact on the host city from (Environmental, Physical, Social and Economic) aspects, Kulsariyeva a, A.Masalimova b, A.Omirbekova c, M.Alikbayeva (2011) indicated that since 1851 the World EXPO went through major periods that shaped the main purpose of hosting this event; in recent years the World EXPO is being used to contribute in finding solutions for global problems like globalization, Stiglitz, J.E. (2006) declared the effect of globalization on the natural resources; it is worth mentioning that Dubai is one of the world's cities where the depletion of natural resources is rapid and the CO₂ emission is high which increases the global warming (Swan, M. 2013).

The Global warming is global concern as everyone will suffer the consequences, therefore, "the whole population of the world will benefit if they can ensure that their future development is more sustainable. The whole world will suffer if they fail" (Hunt, 2005, p.20). Dubai is Shifting its focus and depending away from oil by diversifying its economy growth in order to ensure Dubai's future development is sustainable; Expo will be used to address this issue by creating strategies to contribute Expo in sustainable city development, however, the challenge lies in sustaining the legacy of Expo 2020 to avoid the slump after the end of the event which is a great concern in mega-events to keep benefiting the host city.

1.3 The Significance of the Research

In 2020 Dubai is hosting Expo which is considered the third largest global event in terms of economic and cultural impact during its six month run (Badam, R.T. 2014), the preparation of Expo 2020 will add magnificent achievement to UAE record; many scholars and researchers generally address the preparation for the event phase without considering the legacy phase, therefore, the research will help in creating a sustainable legacy and create the best practices that can sustain Dubai's growth after the end of the event.

1.4 The Purpose of the Research

The main purpose of the thesis is to reveal the relationship between The World EXPO preparation and the principles of developing a sustainable city by contributing EXPO to the development of a sustainable city.

The thesis can be used to fill the gap of knowledge in the legacy phase (Post-event period), to focus on “what’s next” instead of “what’s now, moreover, the thesis will use Dubai EXPO 2020 as a case study, it’s important to mention that in the future global warming is a huge problem to Dubai, the thesis will investigate how Expo planning can support the developing of a sustainable city from different aspects focusing on the urban development of the city.

1.4.1 Goal

The main goal of the thesis is to create strategies that help in sustaining the success of Expo 2020; these strategies can be used by Expo stakeholders to utilize the infrastructure of Expo 2020 for Dubai’s long term sustainable planning needs and objectives especially the urban planners.

The research will evaluate international case studies to show the planning behavior of each ex- host city, the lessons learnt from these previous experiences will help in demonstrating the relationship between sustainable urban planning and hosting Expo.

1.4.2 Objectives

1. Understand the nature and the principles of a sustainable city.
2. Understand the nature of planning for Expo and the role of Expo themes.
3. Create a theoretical framework to demonstrate the link between Expo 2020 preparation and achieving a sustainable city.
4. Examine the planning behavior of Shanghai World Expo 2010.
5. Understanding the environmental and the urban development history and the recent statue of Dubai, in addition to the preparation for Expo 2020
6. Developing set of strategies that would dedicate Expo 2020 to support the future growth of Dubai especially after Expo 2020.
7. Set a legacy planning guidelines.

1.5 The Research Questions

To demonstrate the relationship between developing a sustainable city and planning for the World EXPO, first the thesis will analyze four examples of previous mega-event host cities (Seville, Lisbon, Hannover, Aichi) to learn a lesson from previous experiences to achieve a healthy trend and investigate their strategies of sustainable development in Mega-events, then the thesis introduces Dubai EXPO 2020 as a case study. Finally this thesis will develop strategies that will help in sustaining the legacy of EXPO.

The thesis will answer three specific questions to achieve the objective of the research:

- 1- What are the causes of post EXPO slumps in previous mega-events host cities?
- 2- How is the planning design for EXPO related to developing a sustainable city?
- 3- What is the legacy plan for EXPO site?

1.6 The limitation of the Thesis

Dubai EXPO 2020 is the first EXPO to host in Arab country, despite of differences in cultures, the thesis will mainly connect the western theories to the situation in Dubai, for that reason, the social aspects will vary from one country to another.

Regarding the case study, the research is taking place in Dubai, due to the fact that Dubai EXPO 2020 is still in the pre-event phase, the plans for pre-event phase was not complete, therefore, there was a difficulty in collecting reliable data to get the insider view, the author covered the local case by interviewing members from EXPO team in addition to published reports.

1.7 The Conceptual Framework and Methodology of the Thesis

The thesis is a mix of qualitative and quantitative method which helped the author in proving the relationship between the World EXPO preparations and the principles of developing a sustainable city; moreover, the research methodologies helped in collecting data to achieve the stated objective of the thesis:

Literature reviews: in order to value the nature of sustainable city and Expo, the literature review helped in understanding the two concepts, also it presented two previous practices for mega-event host cities to learn from previous examples.

News paper and websites: the thesis tried to cover the missing data from literature reviews by using news paper and websites especially for the local news and to get the insider view for Dubai Expo 2020.

Structured interviews: the author interviewed important members from Expo team; the locations of the interviews were in Expo office; Dubai Expo data were collected by face to face meeting or by email.

Government documents: the main source for local urban planning documents was from Dubai Municipality in addition local future plans.

Other sources: journalistic and internet articles, unpublished dissertation and related books.

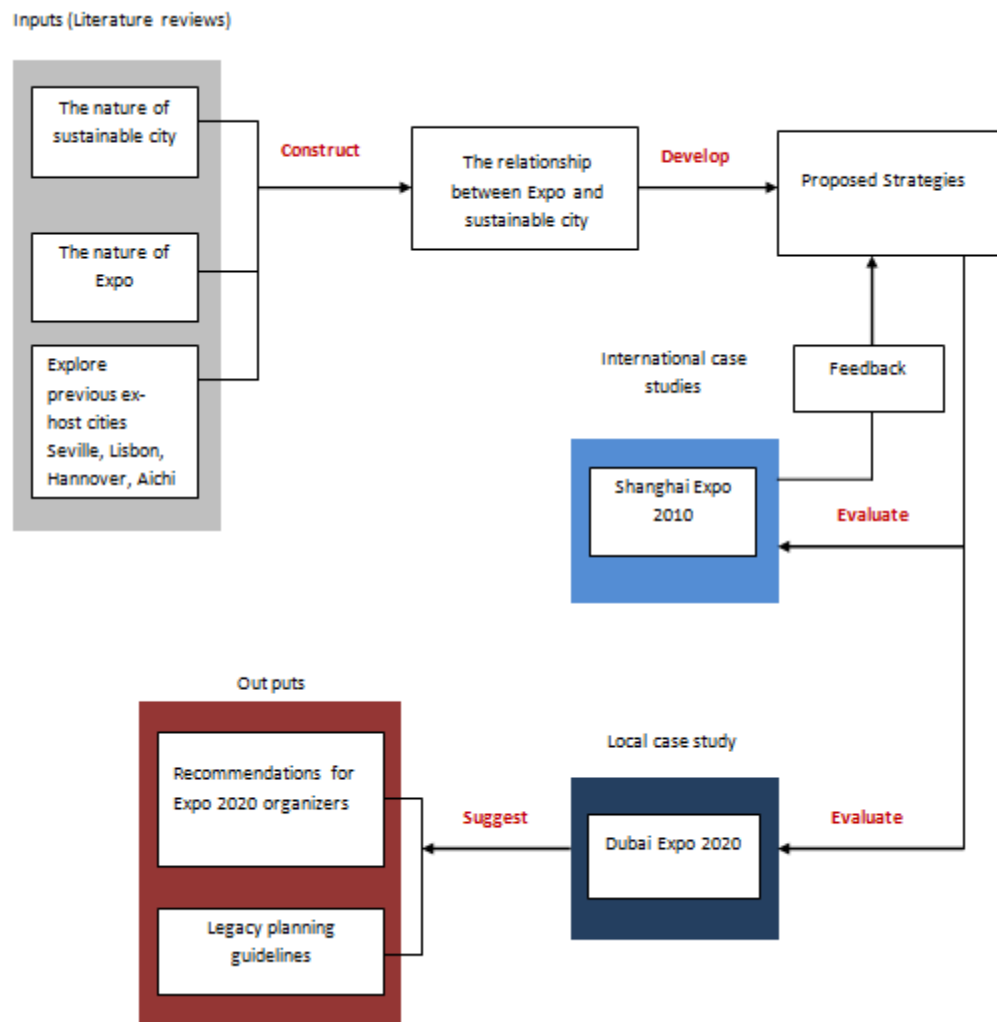


Fig1.1 The conceptual Study framework and methodology. Source: Author

1.8 The Organization of the Thesis

The thesis consists of six chapters, chapter one is an introduction of the research, it provides a background of the research, moreover, it declares the purpose of the study and what are the main goals and objectives of the research; This chapter addresses the research questions which will be answered at the end of the research, also it shares the limitation of the study and describes the methodology.

Chapter two is the theoretical framework of the thesis which clarifies the relation between planning for expo and developing a sustainable city by understanding the principles of sustainable city and the nature of mega-events focusing on Expo, in addition to exploring previous ex-host cities experiences, this chapter uses the research questions to form a theoretical framework and propose strategies that answer the research questions.

Chapter three examines the planning behavior of Shanghai Expo 2010 as a previous example of EXPO host cities; the chapter uses the proposed strategies to evaluate the international case study and shifts from theoretical frame work to full implementation of sustainable development in mega-events.

Chapter four focuses on the case study (Dubai Expo2020), it addresses the environmental, urban history of Dubai and the recent situation in addition to analyzing the preparation for Dubai Expo 2020, Chapter five evaluates the pre-event phase according to the purposed strategies and suggests the right implications for legacy based on Shanghai's experience.

The last chapter is a conclusion for the whole research; it concludes the major findings of the research.

CHAPTER 2. THEORETICAL FRAMEWORK

Introduction

The theoretical framework demonstrates the link between developing a sustainable city and planning legacy for EXPO. Firstly, this chapter reviews the concept of a sustainable city and what are the principles to achieve it, then it defines the meaning of mega-events and the important role of hosting hall-mark events to develop the image of the city.

Secondly, this chapter will evaluate 4 international case studies to show the planning behavior of each ex- host city, the lessons learnt from these previous experiences will help to explain the relationship between sustainable urban planning and hosting EXPO to demonstrate strategies that help in achieving a sustainable World EXPO.

2.1 What is a Sustainable City?

2.1.1 The Definition of a Sustainable City

In 1976 Habitat, the UN conference on human settlement is the first global action that recognize the challenge of urbanization which is one of the main cause of global warming; Concerns about global warming and climate change especially in alpha world cities drove lots of researchers and scholars to define the meaning of a sustainable city; Bärnlund, K. (2005) declared the most globally known definition for the development of sustainable city is the one defined by Brundtland commission in 1987 “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

2.1.2 Indicators for Sustainable City Development

Nongovernmental organizations such as CERES, World resources Institute (WRI) and World wild life fund (WWF) play a big role in shaping the future of sustainable cities by promoting sustainability and undertaking research and publication on environment.

In 1992 the United Nations conference on Environment and development in Rio de janeiro (Agenda 21) called nongovernmental organization to develop indicators for sustainability, therefore, the commission on sustainable development (CSD) was created in 1992 as a response for the united nations conference on environment and development (UNCED) (CSD 2008).

UN Habitat II (2014) assured that achieving sustainability requires integrating four aspects social development, economic development, environmental management, and urban governance, (figure 2.1) presents the indicators of each aspect; it is possible to describe the indicators as objectives to aim for sustainability in a local and global level.



Fig.2.1 the indicators for achieving sustainable city. Source: (www.un.org)

UN Habitat II (2014) created a framework that addresses the importance of integrating Sustainable Human Settlements and Eco-city concept; following aspects of sustainable human settlements are presented:

- Sustainable Built Environment development.
- Conservation and rehabilitation of the historical and cultural heritage
- Improving Technology innovation
- Balance development of settlements in rural regions

Considering the city as a sustainable eco-system will help in improving the quality of living, Newman, P.D. and Jennings, I. (2008) present the principles for sustainable cities which were shared in Johannesburg Earth Summit in 2002 to pursue an urban sustainable development:

Vision	provide guidance for stakeholders and decision makers, it focuses on different stages based on environmental, social and economic sustainability: 1-where are we now? 2-where are we going? 3-Where do we want to be? 4-How do we get there?
Economy and society	to set social environmental values in cities' economy.
Biodiversity	The importance of biodiversity in sustainability and ensuring the role of humans to protect the nature.
Ecological footprints	Initiating new practices to reduce ecological footprints and limit unsustainable trends.
Model cities on ecosystems	Modeling urban processes by integrating the characteristics of ecosystems to achieve sustainable urban development .
Sense of place	Enhancing the feeling of connection to a place by valuing the history and the culture of the city and strengthen the connection between the people and the land.
Empowerment and participation	Encouraging people to support the development of a sustainable city by planning, putting solutions and involving them in decision making.
Partnerships	Expand the network of the city to exchange knowledge and support working on a sustainable future.
Sustainable production and consumption	Promoting sustainable practices to transform our consumption and production pattern.
Governance and hope	Hope needs vision and leadership and this can be achieved with a good governance that sets targets based on benchmarks and

follow the progress of the city to launch the path towards sustainability.

Table2.1 The ten Melbourne principles for sustainable cities. Source: (Newman, P.D. and Jennings, I. 2008, p.4)

2.1.3 How to Make a Sustainable City Livable

Leung, Lok-sze and Lucille (2009) highlighted the importance of strengthening the characteristics of sustainability and providing the city with urban transformation opportunity which will keep the city livable.

Girardet (2004, p.14) defined livable city as follows:

“Livable, compact city...is a place that is a pleasure to live in, work in and visit...cities are centers of economic activities, places of cultural creativity, citizenship and conviviality. They should have well-designed public spaces and buildings, large pedestrian areas, access to water, parks and gardens, high quality 'micro-environments' and a vibrant and diverse street culture...to enhance the experience of urban living”

In order to achieve a sustainable and livable city, centre for livable cities in Singapore (CLC 2014) has illustrated a framework to envision livability; (figure 2.2) shows three outcomes of livable city, the first outcome is “a competitive economy” to keep business interest and job opportunity in the city, the second outcome is “the sustainable environment” to ensure long-term availability of the natural resources especially the land and the water use, the third outcome is “the high quality of life” which include the social and psychological well being of the citizens.

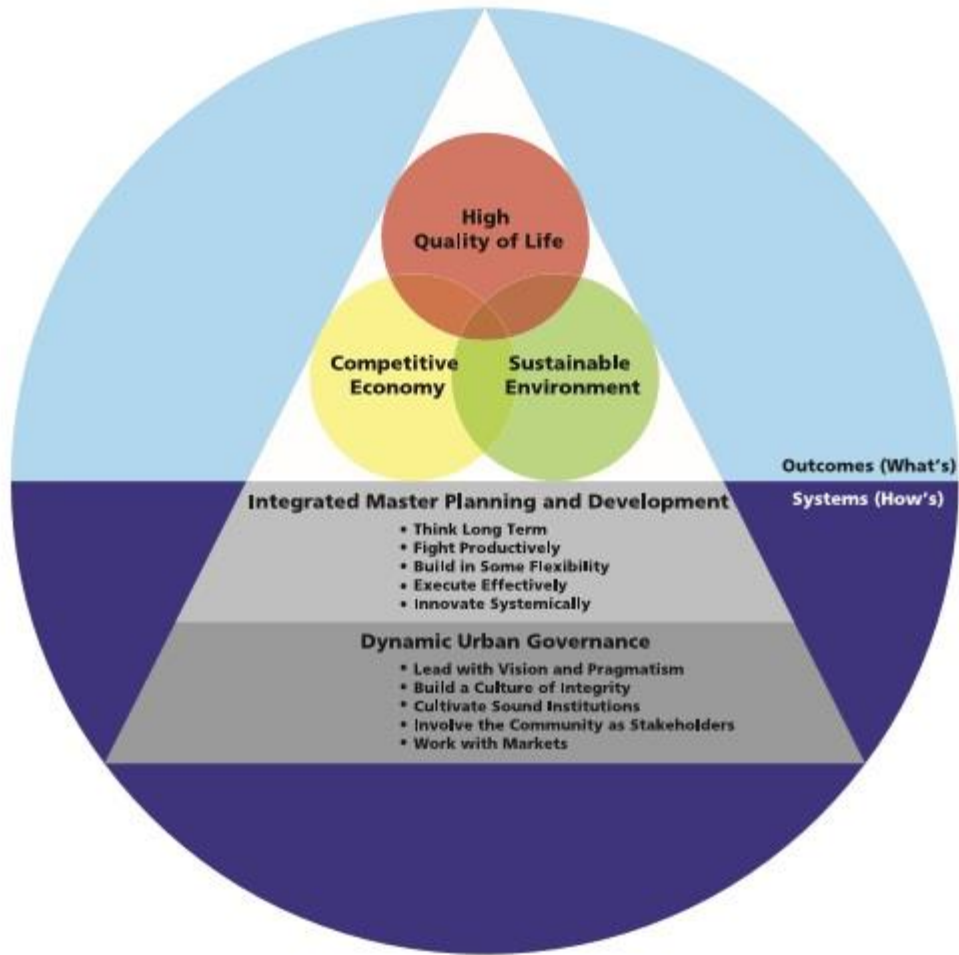


Fig2.2 The CLC liveability framework. Source: (CLC. 2014, p.7)

Integrated master planning and development is an important system in Singapore which work on evaluating the physical plans from sustainable aspect to ensure the best outcomes for the environment, economy and quality of life, on the long term.

2.2 The Nature of World Expositions (EXPO)

2.2.1 The Definition of Mega-Events

To understand the nature of world expositions, the research will start by defining the meaning of mega-events; Roche, M. (2000) defines it as follows:

"Mega-events' are large scale cultural (including commercial and sporting) events which have a dramatic character, mass popular appeal and international significance. They are typically organized by variable combinations of national governmental and international non-

governmental organizations and thus can be said to be important elements in ‘official’ versions of public culture"

The most global events are the Olympic Games, FIFA World Cup and World Fair such as EXPO.

(Figure 2.3) shows some of the main examples of world level mega-events in the contemporary period (1980-2012).

<i>Periods</i>	<i>City/nation</i>	<i>Mega-event</i>
<i>1980-1989 period</i>		
1980	Moscow	Olympics
1982	Spain (Final in Madrid)	World Cup (FIFA)
1984a	Los Angeles	Olympics
1984b	New Orleans	Expo
1986a	Mexico (Final in Mexico City)	World Cup
1986b	Vancouver	Expo
1988	Seoul	Olympics
<i>1990-2000 period</i>		
1990	Italy (Final in Rome)	World Cup
1992a	Barcelona	Olympics
1992b	Seville	Expo
1994	USA (Final in New York)	World Cup
1996	Atlanta	Olympics
1998a	France (Final in Paris)	World Cup
1998b	Lisbon	Expo
2000a	Sydney	Olympics
2000b	London	Expo (Millennium)
2000c	Hanover	Expo (International)
<i>Early 21st century</i>		
2002	Japan and Korea Salt Lake City	World Cup Winter Olympics
2004	Athens	Summer Olympics
2006	(venue to be decided) Turin	World Cup Winter olympics
2008	(venue to be decided)	Summer Olympics
2010	(venue to be decided)	World Cup
	(venue to be decided)	Winter Olympics
1012	(venue to be decided)	Summer Olympics

Fig2.3 The key examples of world level mega-events (1980-2012).

Source: (Roche, M. 2000, p.2)

Mega-events activities and impacts can be classified into four main periods:

1-The bid period:

The host city usually is elected seven years before the event; the bidding process starts a year or two before the announcement of the winning city, intending candidates cities are selected not only from metropolises of developed countries, but also competitive cities from developing countries, each mega-event has its own bidding process; to win the bid each

candidate demonstrates the experience that will be delivered by innovative ideas and be committed to find solutions, the main purpose of the bid is to win the right to host the event ; moreover, a bid “represents a collection of interest and skills (sports federations, local authorities, economic partners, the media, etc.) that have to be focused on the single objective of winning (Chappelet, 2005, p.19), (Figure 2.4) shows the full process of determining the event feasibility.

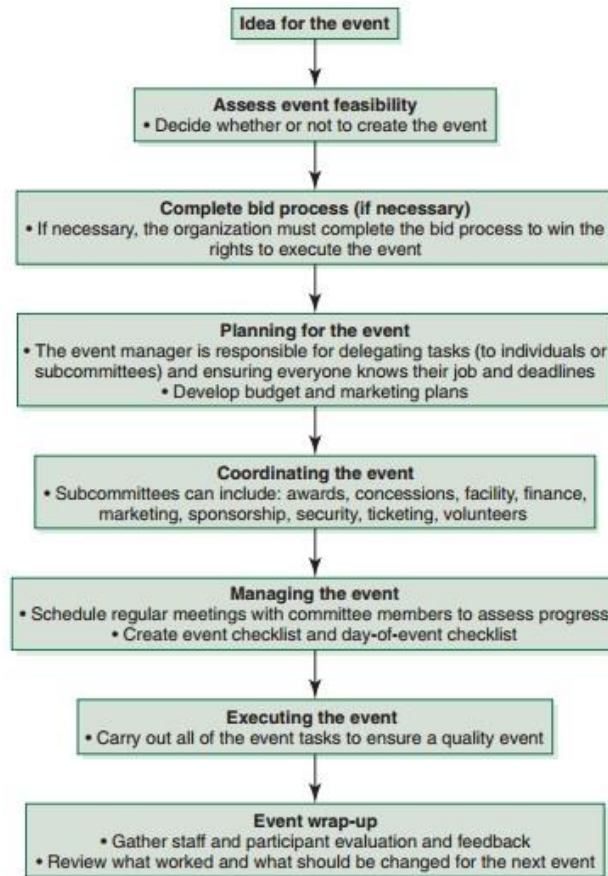


Fig2.4 The process of determining event feasibility.

Source: (L, A. and Koba, P. 2015, p.90)

2- Pre-event:

Pre-event phase is the period of decision making which integrates designing plans, demolition and restructuring the site and the surrounding area to upgrade the image of the city, master plan will be implemented and planned construction will be started, it lasts for six to seven years after announcing the winner of the bid; Clark, J., Kearns, A. and Cleland, C.

(2016) ensured that lately mega-events are committed to develop the city in three focus areas in which to direct the activities related to economic, social and environmental aspects of sustainable development in the event; moreover, the host city is pursuing mega events for infrastructure improvement and promoting the urban (Chen, H. 2006).

3-During the event:

“Olympics and EXPOs are only the most visible and spectacular examples of a dense social eco-system and social calendar of public cultural events in modern societies. This thriving ‘event ecology’ or ‘performance complex’ includes a vast range of more specialist forms of great international events which have developed in the late twentieth century” (Roche, M. 2000, p.18); Mega-events vary according to their frequency and their duration; During the World EXPO, the host city invites international countries, companies and organizations to participate in educating the public and exchange knowledge and network according to the given theme of the event through different activities that last for six months (BIE 2015); for Olympic games “the period of staging the Games normally lasts for two weeks to 17 days” (Cashman, 2002).

4- post-event:

This phase is the most challenging phase in the mega-events time line, it is the legacy phase; it has been recognized since the 1990s (IOC, 2015), Stewart, A. and Rayner, S. (2015) defines post-event period as a post event consequences in terms of social, economic, environmental and physical aspects ; Leopkey and Parent call it “the return of investment”, moreover, legacies weather (social, cultural, environmental, political, economic or sport) are the greatest attraction of hosting mega-events (Horne, J. and Horne, W.M. 2006), on the other hand “white elephant” have harassed several host cities for not considering post-event consequences while planning for the event in the early stages which is our main focus in the research.

2.2.2 The Impacts of Mega-Events on the Host Cities

Andranovich et al (2001) declared that due to the global crises of 1980s, hosting mega events became a solution for many cities; Cashman (2002) listed the impact of mega-events on a host city during four periods:

The bid period:

To win the bid, the host city should submit a clear plan about what will the event deliver as an outcome for the city from a global point of view, the plan should serve the city's future demands and global concerns at the same time; the bid books should include how the event will benefit the city to upgrade the living quality, this can be achieved for example by solving environmental issues and improving the urban infrastructure of the city; it is important in the bid period for the host city to ensure that the event cost will pay back by bringing the best out of the event on the long term by adding more value and enhancing the image of the city

The government and business are the major support for the city, because they believe that the event will have a great impact on the city's economic growth and promoting the city globally.

Pre-event period:

After winning the bid, many promises are made which will require the city to work on delivering what have been documented during the election, moreover, it is expected that the public are having high expectations and positive change by hosting the event and the city should carry the responsibility; to ensure a positive impact of the event, the host city should consider the environment through plans and enhance implementing sustainable strategies within the infrastructure of the event.

During the seven years, there are a lot of changes in the built environment of the city such as the event venue and the urban infrastructure; these changes can affect the comfort of the resident, especially to those who live close to the event venue.

During the event:

It is the time when there is the highest impact on the city, for politicians and stakeholders the event is a nation's pride and a new land mark to the world; the event will add a stunning physical transformation and updated technology, it will help in growing the local economy and strengthening the city's position among other countries; it will offer job opportunities and networking platform in addition to lifting tourism activities in the host city.

Post-event period:

When the event is over, a new plan begins, a good management will assure that the plans of the event will fit the urban future plan of the city to avoid the post-event slump and keep the glamour of the host city.

The post-event period is also known as the legacy phase, the importance of securing the positive impact on the long term has been widely recognized, therefore, the host city should consider the sustainable planning from the pre-event period in addition to the socio-economic legacies, economic impact and the utilization of the built infrastructure of the venue.

2.2.3 The Definition of EXPO

As a forum of virtual tourism; EXPO presents the essence of the traditional culture of the participating countries while implementing updated technology and hi-tech materials to deliver a certain message that reflects people vision of industry, science, technology, culture and ethnicity in formal, leisure time contexts.

BIE (2015b) defines EXPO as following:

“EXPO is a global event that aims at educating the public, sharing innovation, promoting progress and fostering cooperation”

The hosted country get to invite other counties which are required to do physical and intellectual engagement to promote a specific set of values of the world within a circumscribed environment and solve global problems of humanity.

There are two types of Expo (International registered exhibition and international recognized exhibition)

The BIE currently regulates 4 types of Exhibitions:

- **World Expos**

The world expo is a form of image management striving to influence future world order, the participants (countries, companies, international organizations, the private sector, the civil society and general public) are allowed to build innovative and unique pavilions to create a dialogue with the community: World EXPO is a platform for business meetings, public debate and live shows to solve global issues while considering the scope of a certain theme; world EXPO takes place every 5 years and lasts for 6 months, it becomes as part of the hosted country urban development plan, where the organizing team should consider fitting the plan for EXPO, and transforming it to fit the development needs after the event.

- **International Specialized Expos**

International specialized EXPO is a national event established by the BIE in 1988, it is very similar to the world EXPO in the physical term but in smaller scale (up to 25 ha); the participants don't get to build their own pavilions but they get to customize the space given to them by the organizers.

The event aims to set values to solve world issues, the aims are more specialized compared to world EXPO; the event takes place between 2 EXPOs and lasts for 3 months.

- **Horticultural Exhibitions**

Horticultural EXPO is a national event established by the BIE in 1959; the event is organized by the collaboration between BIE and the association of the international horticultural producers (AIPH).

The event aims to highlight the latest development in agriculture, horticulture and landscaping to dedicate and improve the quality of living through green areas; the size of EXPO can reach up to 50 ha; the site of the event helps in developing the urban plan of the hosted city through green projects such as parks and gardens.

The event takes place at least every 2 years and last from 3 to 6 months.

- **Triennale di Milano**

Triennale di Milano is an event established by BIE in 1933, and organized by Triennale di Milano Institution which is a cultural institution in Milano, the event takes place in Milano every 3 years; the aim of it is to bring the latest trend in the design factory and discuss how it can improve our quality living through, art, architecture, fashion, films and designs; the Triennale provides the participants with an exhibition space where they can present their ideas in different forms under the theme of the event; the exhibition takes place in the institution in Milano every 3 years.

2.2.4 The History of EXPO (time line)

Based on EXPO historical experience, the World EXPO has developed by time from different aspects; in addition to the reasons and forces behind their creation and their effect globally and on the hosted city; each exhibition presents the cultural traditions of each country trying to show their best achievement in different fields according to the given theme, and to create a dialogue with the community despite of the language barrier (BIE 2015b).

The paper will highlight the historical significance of EXPO and its potential in understanding the society of each time.

BIE (2015b) declares the first international exhibition World EXPO was in London in 1951, it was called “The great exhibition of the works of industry of all nations”.

The concept of the exhibition was brought by Prince Albert, Queen Victoria’s husband; the exhibition was hosted in Hyde Park in London.

According to Kulsariyeva, Masalimova, A., Omirbekova, A. and Alikbayeva, M. (2014b) the exhibitions were divided into three major periods:

The period of industrialization (1851-1938): this period was a platform to show the latest update in the field of trading and the latest addition in the field of science and technology.

The period of Cultural Revolution (1939- 1987): this period was dedicated to present the latest technological advances to solve human’s problems during New York International Exhibition (1939-1940), the theme of this exhibition was “creating the world of the future”; during (1964-1965) the exhibition of Montreal took place under the theme “The person and

his world”, all exhibitions were aiming to exchange cultural knowledge and appreciate human value.

The third period began in 1988 till now a day: the exhibitions in this period are focusing on upgrading the image of the host city and other countries through their pavilions.

In all periods cultural development was a main concern for all the countries and the core driver of growth for each exhibition; moreover, since the beginning of 90s EXPO played an important role in enhancing awareness of sustainable and human development and addressing global challenges such as global warming, EXPO offers a unique platform for the participant countries to cooperate and discuss recent challenges to obtain solutions and establish new collaborations.

2.2.5 Examples of Expos from the Third Period

The cases are chosen to show the urban planning behavior of each ex-host city, some of them succeeded sustaining the urban development of the city after EXPO, while other examples failed, the lessons learnt from these previous experiences will help in demonstrating the relationship between sustainable urban planning and hosting Expo.

Seville EXPO 1992

Under the theme “The Age of Discovery” Expo 1992 was held in Seville in Spain, EXPO Museum / expo '92, Seville, Spain (1992) noted that Seville Expo 92 attracted 41.8 million visitors through six months and created 5500 jobs, 111 countries were welcomed to participate in an area of 215 hectares in Isla Cartuja where EXPO was held as it is shown in (figure 2.4).

the host city was successful to present the historical value of the city, in addition to the geographical value as it is located along river Guadalquivir (Andulucia Com S.L., 2008b); Seville is considered the largest city in Southern Spain, the contexts of the city helped in creating an Andalusian spirit within the site.

From an urban planning aspect, the host city benefited significantly from hosting EXPO, many large investments on the main arrival points to Seville took place such as constructing additional terminal in Seville Airport, a new train station, a new high way between Seville and Madrid was constructed in addition to new 6 bridges crossing the Guadalquivir to facilitate the access to EXPO site (BIE 2015c).

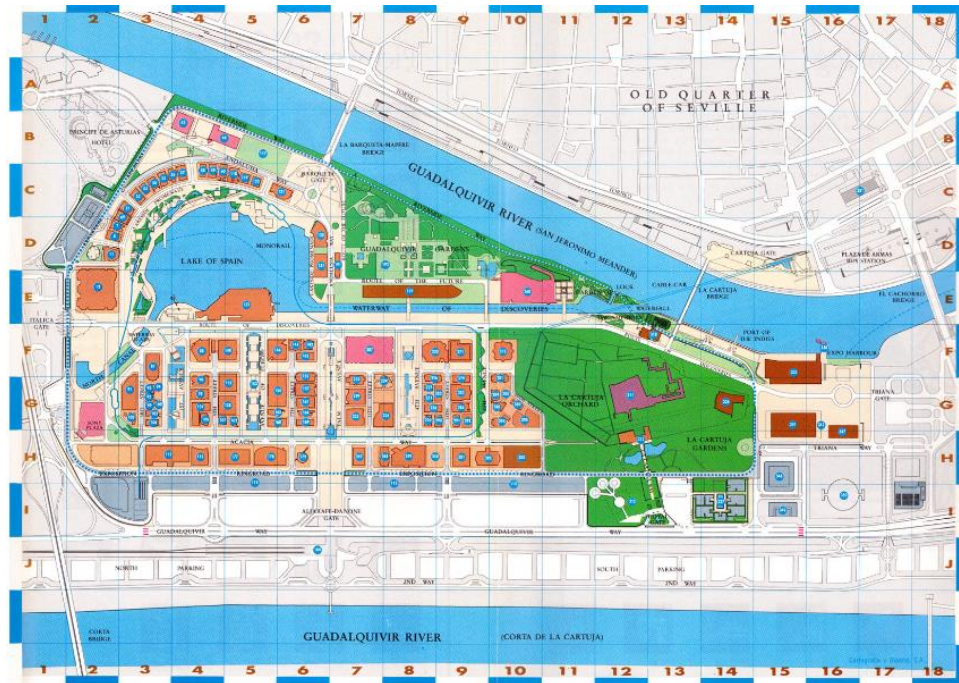


Figure 2.5 Seville Expo 1992 Site (Source: www.expomuseum.com)

When EXPO was ended, the original EXPO coordinator (company) was dissolved, and it was replaced with a developer who transformed the Cartuja island into a science and educational park which was a failure action due to the hasty transition between the organizational models of the EXPO and post-EXPO development without putting any previous plans according to the society demands, some pavilions were remained due to the financial situation of the government, they were turned into offices, additionally, the site experienced serious post-expo problems, starting with the low occupancy of the site although many educational institutions and government agencies occupied remained pavilions and part of the park, there was no residential area planned along with Expo which had a negative impact on the livability of the site after the end of the event (EXPO92.net, 1999).

Later on, the park was served with additional public facilities such as museums, theatres, cafes and cinemas to keep attracting people to visit the site (Andalucia Com S.L., 2008a).

Lessons learnt from Seville:

- The urban development of the host city is one of the event-heritage, it is important to put a plan for the after use of the site and the remained pavilions in addition to the other facilities based on the future

demand of the city and the surrounding area of the site to ensure the continuity and the livability of the site after EXPO.

- The smooth transition between organizational models of the EXPO and post-EXPO development should be taken into account in the EXPO pre-event planning.
- Designing a sustainable site has an impact on the after use of the site, it is essential to create mix use and public facilities which will keep serving the people after EXPO to keep the site alive.

Lisbon EXPO 1998

Under the theme “The Oceans, a Heritage for the Future) EXPO 1998 was held in Lisbon in Portugal, the ExpoMuseum / expo ’98, Lisbon, Portugal (1998) noted that Lisbon was successful to attract 11 million visitors during EXPO, and created 18000 jobs within 4 months of the event, 145 countries participated on EXPO site which covered an area of 50 hectares along the river Tanguis as it is shown in (figure 2.5).



Figure 2.6 Lisbon EXPO 1998 Site (Source: www.expomuseum.com)

Lloyd-Jones, S. (2011) noted the importance of Lisbon as a tourist destination in Portugal, it carries a history of 20 centuries, it is known as the “White City” for the whiteness of the facades and the streets marbles; Lisbon has a magnificent location, it lies on seven hills along the shore of the river Tanguis.

Moulaert, F., Rodriguez, A. and Swyngedouw, E. (eds.) (2003) shared the urban planning development of the event, they declared that EXPO was a typical large-scale urban development project, the site was located in the old industrial part of Lisbon which was

isolating Lisbon from the Tanguis since the industrial era (BIE, 2008b; Nash, 1998), the event contributed in implementing the urban development plan on the site which was a neglected part of the city, the site contexts included a lot of old factories, old residential housing and industrial buildings, they were replaced with a lot of entertainment facilities such as museums, theatres, and oceanarium which was the landmark of the site, in addition to new residential areas to accommodate the people working on site during EXPO and they were converted to residential for rent after EXPO.

Many great investments took place to prepare the city to host EXPO, a new road system was constructed in addition to a new Metro line; Lisbon government established a special company to organize the event called (Praque EXPO 98 SA) they were supporting the event financially by selling lands for property development, in addition to the European Regional Development funds.

Since the pre-event preparation, Lisbon EXPO 1998 was built to remain, the event brought two main outcomes, a new local centre was developed and the tourism value of Lisbon was upgraded for hosting EXPO, the oceanarium is now used for nature studies.

Lessons learnt from Lisbon:

- EXPO 98 organizers adopted concurrent strategic planning, the pre-event and post event phase were planned in parallel to serve the Master Plan of the city.
- The urban plan of EXPO site was designed in harmony with the surrounding urban fabric, moreover, the new transport infrastructures helped in linking the site with the city.
- The site adopted sustainable design principles as the site was designed for legacy and became part of the city's fabric.

Hannover EXPO 2000

Under the theme “Man, Nature, Technology” Expo 2000 was held in Hannover in Germany, ExpoMuseum / expo 2000, Hanover, Germany (2000) noted that 18.1million tourists visited

EXPO 2000 during five months of the event, and created 19000 jobs, 187 countries participated on site which covered an area of 160 hectares.

EXPO 2000 was a new milestone through EXPO history; it was focusing on developing and presenting solutions for the future while previous EXPOs were mainly focusing on science and technology; Hannover created the concept of thematic zones, there were four main zones on site: Future of labor, Environment, health and nutrition.

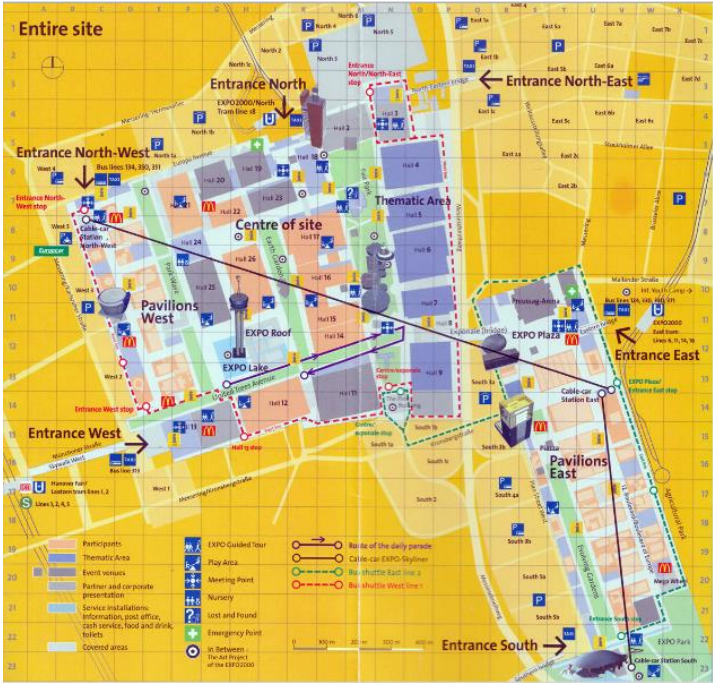


Figure 2.7 Hannover EXPO 2000 site (Source: www.expomuseum.com)

Hannover is an exhibition city; it holds world class industrial fairs, therefore, EXPO organizers made a smart step by choosing the site with already existing exhibition facilities to serve EXPO’s activities in an area called Kronsberg, the existing facilities covered 90 hectares from the site while the rest was a new infrastructure and green landscaping, this move helped in reducing the environmental impact and the cost of developing new infrastructure for the site (Zawadzky, 1996, p.179).

According to Baudezernat, H. (2014), Hannover was facing a growing housing shortage, therefore, a new residential district was developed which linked the existing community of Bemerode with EXPO site; as part of Agenda 21 the new residential district was developed

upon sustainable principles (began as EXPO village), the district adopted the “Urban NEXUS” planning approach which is a new sustainable urban solution that works on increasing service quality and using renewable energy to generate its power (Zawadzky, 1996, pp.185-188), moreover, EXPO 2000 wrote “The Hannover principle” to encourage the sustainable future of the city.

After few years, Hannover failed financially to return on EXPO’s investment, it lost six times as much money as it was budgeted for - an estimated total of 2.4 billion DM (1.250.000.000 Euro).

Hannover EXPO failed to upgrade the tourism image of the city, as an industrial city it lacks the tourist attraction, moreover, the location of EXPO was not linked well with the residential district which left the site empty (Jin and Liang, 2006).

Lessons learnt from Hannover:

- Using existing facilities that serves EXPO’s activities can minimize the environmental impact of the cost of the infrastructure.
- Planning and design should be guided by sustainability principles.
- Integrating residential district with EXPO will help in keeping the site livable after the end of the event.
- Build with some flexibility.

EXPO 2005 Aichi

Under the theme “Nature’s Wisdom” EXPO 2005 was held in Aichi in Japan, ExpoMuseum / expo 2005, Aichi, Japan(2005) noted that 22 million tourists visited EXPO 2005 during six months of the event, 120 countries participated on site which covered an area of 200 hectares; the theme focused on enhancing sustainable principles in human’s life and rethinking the use of technology and our life style to protect the environment.

An existing youth park in Nakagute area hosted the international and corporate pavilions where visitors enjoyed being in the heart of the nature; as respect to the nature, the core structure of EXPO consisted of global loop and global commons (Zones) to assure minimum change within the site.



Figure 2.8 EXPO 2005 Aichi site (Source: www.expomuseum.com)

EXPO organizers demonstrated strict environmental requirements during preparation phase:

- The site will be used for EXPO facilities but it should be returned to its original condition without any impact after EXPO.
- All pavilion should be (reduce, recyclable, and reusable).
- Clean internal and external transportation to achieve zero emission (Gao and Zha, 2005).



Figure 2.9 the Japanese pavilion using bamboo as a building material
(Source: Hikosaka, Y. 2006, p.12)

EXPO 2000 succeeded in foresting the relation between wisdom and technology in architecture, the Japanese pavilion captured the environmental theme, a new eco-technology was used to prepare the pavilion constructed from cheap, natural and recyclable materials such as bamboo; the Japanese pavilion was built without screws and welding.

Nagakute is blessed with warm and temperate climate which helped in implementing passive design strategies within the main pavilion, e.g. natural ventilation, shades for cooling, to reduce energy consumption.

Japan, I. (2005) highlighted one of the innovative concepts in Aichi EXPO (the Bio Lung) which was constructed to improve the urban environment of the site by reducing the amount of carbon dioxide in the air, supply fresh air and lower the surrounding temperature by emitting mist.



Figure 2.10 Bio Lung in Aichi EXPO Site (Source: www.expo2005.or.jp)

Based on the citizens demand, the site was returned to its original function as a youth park, the authorities made an action according to the people's demands for more greenery.

Lessons learnt from Aichi EXPO 2005:

- Using (recyclable and reusable) materials to achieve energy efficiency and sustainable EXPO.
- Creativity is a tool towards promoting awareness of sustainability.
- Planning post-EXPO based on citizens demand assure the livability of the site.

2.3 The Theoretical Framework

2.3.1 The Relationship between Sustainable Urban Planning and Hosting EXPO

World EXPO is a powerful tool for a positive change; as the world is concerned about the climate change, EXPO is more than ever committed to the environment by inspiring the

society to embrace sustainability and directing the event’s activities related to economic, social, environmental aspects of sustainable development in EXPO; the research will combine the sustainable city aspects with sustainable human settlements to create the sustainable urban planning aspects:

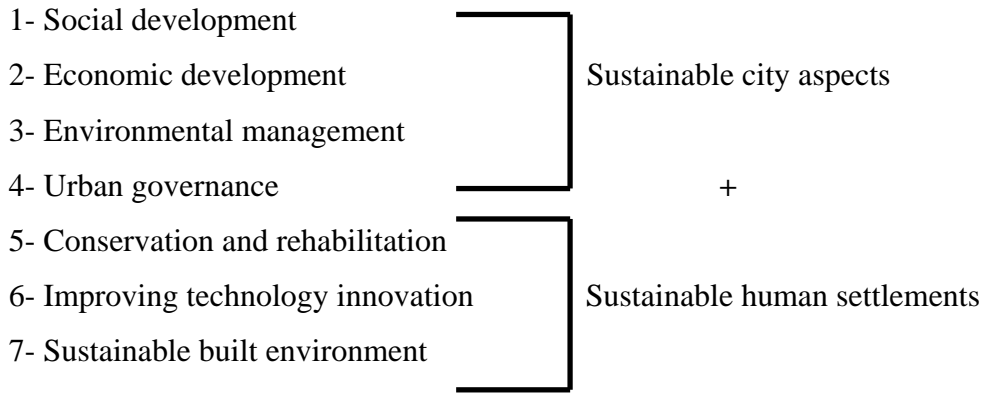


Fig2.11 Diagram of sustainable urban planning aspects. Source: (Author)

(Figure 2.11) shows that:

(Sustainable city aspects) + (Sustainable human settlements) =sustainable urban planning aspects.

Considering EXPO as a global event, the whole world will benefit if EXPO is used to ensure that the future development of the city is more sustainable by dedicating the events plan to sustain the growth of the city, the research will demonstrate the relation between EXPO’s practices and urban sustainable city’s development to achieve a sustainable event that keeps the host city livable and prevents any potential crisis after EXPO, the relation well be explained as follows:

(Sustainable urban planning aspects) + (World EXPO practices) = sustainable World EXPO

2.3.2 Proposed Strategies to Achieve a Sustainable World EXPO

After reviewing the concepts of sustainable city and mega-events, the research will use the outcomes to construct the theoretical framework which will help in answering the research questions:

- 1- What are the causes of post Expo slumps in previous mega-events host cities?
- 2- How is the planning design for Expo related to developing a sustainable city?
- 3- What is the legacy plan for Expo site?

The main outcomes from the literature reviews are the theoretical framework to demonstrate proposed strategies to achieve a sustainable world EXPO.

To contribute EXPO in the urban sustainable development of the host city, the research will explain EXPO's role from sustainable urban aspects:

Social Development:

The research will help to understand the national identity and the society behavior towards hosting EXPO; it will investigate the reasons behind such behaviors.

Pre event:

Expo will structure the social life of the city by engaging the community as a local level to think different and embrace sustainability issues, moreover, in some previous cases; the citizen's traditional living was changed to live in suburban instead of the central area which decreased the population in the central area and changed their social life.

Post event:

Lack of public participation has a negative impact on the host city, it is important to consider the post-EXPO market demand and integrate social groups in decision making; moreover, a lot of development in the urban infrastructures will benefit the citizens.

Economic development:

Roche, M. (2000) points out the importance of mega events to boost the economic growth of the host city which upgrades it up to "global cultural economy1"; it is considered as a key role in international, national and regional tourism; national projects such as hosting mega-events have a high impact on local property prices which offer a great opportunity for property investors.

Pre event:

At the preparation phase, most of the main public investments take place such as transport infrastructure, in addition to more constructions and land use to attract more investment to

the city; the local business stimulates the economic growth (Edmiston, K.D. 2007); according to the market demand, the host city might think of economic restructuring to upgrade the business infrastructure during EXPO.

During event:

The staging phase is the time when green thinking makes economic growth sustainable, the event creates good business environment that will payback to local economy in the long run which encourage leaders from many business disciplines all around the world to participate and benefit by exchanging business opportunities.

Post-event:

The host city works on redoing economic opportunity and loss of event employments after the end of the event, moreover the event planners try to integrate the community and regional continuing planning to avoid the drop of economic growth.

Urban governance:

Mega-events are national projects supported by local governments with international significance and associated with national ambition, it involves various stakeholders for developing the event and the urban space, therefore, the research will demonstrate the involvement of leaders (government, business and community) in sustaining the growth of the host city from sustainable aspects.

Pre event:

EXPO can be a great tool for the local authorities to use to regenerate urban areas and catalyze the change, it can be achieved by fostering the relation between the government and the private sectors which is one of the most important strategies;

The city municipal government usually organizes an urban design forum for the event to follow to create the city's image; it is important to mention that the municipal government features towards developing the infrastructure of the event and the surrounded area vary from one country to another.

During event:

The government plays a core role during the event; it works on connecting different forces such as forces from the local residents and private sectors to promote the growth of the city (Burbank, M.J., Andranovich, G. and Heying, C.H. 2002)

Post event:

Mega-events require the government support from winning the bid till the end of the event (Reid, S. and Arcodia, C. 2002).

Environmental management:

One of the main concerns within the preparation for World EXPO is environmental studies; while the event aims to develop the urban spaces of the host cities, on the other hand, it contributes negatively to the environment, in recent World EXPOs; the theme of the event is dedicated to support the development of sustainable city by keeping humanity footprint within planetary boundaries (Ng, M.K. and Hills, P. 2003)

Pre event:

During the preparation to the event, the host city will do its part to preserve the environment by making a balance between functional change and environmental sustainability in planning; the city's situation and contexts determine the environmental challenges to contribute EXPO towards a cleaner city; sustainability is measured during the preparation and staging of the event some of them are universal (ISO 2016).

Post event:

The national project will involve analysis and environmental input-output model to assess the quantitative impact of the whole cycle of EXPO.

Sustainable built environment:

The location of the event has an environmental impact on the host city; it can vary between hosting EXPO in the core areas of the city or in the suburban area which depends on the urban developing plans of the city.

Pre event:

EXPO can be used to improve the community and regional continuity planning; the infrastructure of EXPO can be aligned with the city’s urban planning objectives to create a new urban fabric according to the public interest or renew urban spaces in the old city.

The planners for EXPO should consider the utilization of the built environment for EXPO starting from the pre-event stage to impact the environment and the economic positively, and dedicate this change to be the norm for legacy planning after expo.

During event:

It’s the time when architecture all over the world demonstrate the development trend of green architecture as ecological architecture is the new trend of urban development, in addition to the sustainable development of the future city.

EXPO will embrace the environmental sustainability as a main component in planning to ensure that the rapid urbanization will not cause environmental degradation in the long term, moreover, the host city will involve projects from different nature (new adaptation, temporary, and permanent on and off site to mitigate the environmental impact of the event.

Post event:

After the end of the event, the city’s skyline will change and EXPO will leave a significant landmark on the urban grid of the city just as what Paris did in the 19th century (Lok, L. and Leung, S. 2009); therefore the event will upgrade the profile of the city especially the tourism industry (Lee, C.-K., Song, H.-J. and Mjelde, J.W. 2008); (table2.2) shows a non-exhaustive list of World EXPO built legacies.

Built legacies	Types	Sub-types	Examples
Standalone landmarks Flagship buildings		Memorials, monuments	The Space Needle – 1962 Seattle; the tower of the Sun – 1970 Osaka; the Skyneedle – Brisbane 1988; the Nepal Peace Pagoda – Brisbane 1988
		Museums, library, science centers	The Pacific Science Center – 1962 Seattle; the knowledge Pavilion (a science museum) – 1988 Brisbane; the China Pavilion, the Expo museum – 2010 Shanghai
		Conference center, exhibition centers	The San Antonio Convention Center – 1968 San Antonio; the Spokane convention center – 1974 Spokane; the Knoxville convention center – 1982 Knoxville; the Brisbane convention and exhibition center – 1988 Brisbane; the Lisbon international exhibition center – 1998 Lisbon; the Expo center, the theme Pavilion – 2010 Shanghai
		Performing arts centers, theaters	Performing arts centers – 1962 Seattle; the Inmax movie theater – 1974 Spokane; the Mercedes-Benz Arena – 2010 Shanghai
		Tourist/recreational facilities	The Montreal Casino – 1967 Montreal; the Riverwalk Marketplace (an upscale shopping mall) – 1984 Louisiana; The Casino Lisboa – 1998 Lisbon; A regional shopping mall – 1998 Lisbon; 20 hotels – 1992 Seville

Table 2.2 A non-exhaustive list of World Expo built legacies (Source: Deng, Y. 2016,p.2)

Conservation and rehabilitation:

The research will explain how EXPO can contribute to conserve the historic heritage and meet the contemporary needs at the same time incase EXPO will take place in the host city's down town to promote the unique value of the host city.

Improving technology innovation:

World EXPO is considered as a platform to present the latest technology that serves the human's needs (Zheng, 2006a).

Pre event:

The research will discuss the green technologies that serve sustainable urban planning, green building, technologies and strategies for green transportation to reduce the ecological footprint.

Post event:

The research will highlight the environmental benefits of using green technologies and strategies to mitigate urban problems in the long run.

As a result, the research will summarize the strategies to achieve a sustainable world EXPO as following:

EXPO Cycle	Sustainable Urban Planning Aspects						
	Social Development	Economic Development	Environmental Management	Urban Governance	Conservation & Rehabilitation	Improving Technology innovation	Built Environment
Pre-event	-Structuring the social life.	-Main public investment -economic restructuring.	-City's situation & context determine the environmental challenge.	-new system to regenerate urban areas. -fostering relating between government & private sector	-conserve historic heritage while meeting temporary needs.	-green technologies to serve sustainable urban planning.	-improve regional continuity planning -utilization of built environment
During event	-Engage the community to embrace sustainability issue	-exchange business opportunities -present green economy.	-universal measurement	-connecting different forces.			-presenting green architecture
Post Expo	-Study market demand. -Integrate social groups in decision making.	-redoing economic Opportunities.	-environmental input and output to assess the quantitative impact	-government support through the whole cycle.		- environmental benefits of using green technologies	-new landmark -upgrade the city's image -new a daptation, temporary, permanent projects

Table 2.3 Proposed strategies to achieve a sustainable world Expo. (Source: Author)

2.4 The Summary

In Chapter two, firstly, the research defined the meaning of a sustainable city and what are the indicators for sustainable city development.

Secondly, the research highlighted the importance of providing the city with urban transformation opportunity which will keep the city livable.

Thirdly, the study defined the nature of World Expositions and the impacts of mega-events on the host cities during four periods.

Fourthly, four examples of previous EXPOs were evaluated to extract lessons which helped in demonstrating the theoretical framework and enforcing the relationship between sustainable urban planning and hosting EXPO; the third chapter will present Shanghai EXPO 2010 as a magnificent example on how to achieve a good urbanism.

CHAPTER 3. INTERNATIONAL CASE STUDIES

Introduction

To demonstrate the relationship between mega-events and urban development in sustainable cities, the research will present western literatures and connect them to the local case (Dubai Expo 2020); the research will examine the impact of mega-event on the host city based on the demonstrated strategies for a sustainable event.

Prepared plans are the primary focus, the study will examine the theoretical framework on international case studies and evaluate these previous experiences; the analyzed results from the international case study will shift the conceptual framework to full implementation of sustainable development in Dubai expo 2020 to keep the city livable after the end of the event.

3.1 Shanghai EXPO 2010

The reason behind choosing Shanghai because it is one of the widely acknowledged world cities, moreover it hosted EXPO with a sustainability related theme; the research will present Shanghai EXPO 2010 as a previous experience to learn from, starting with an introduction about Shanghai's background moving to the preparation of EXPO 2010; the research will analyze how Shanghai Expo 2010 contributed to the development of a city from a sustainable urban planning aspects.

3.1.1 Background

Shanghai is one of the most popular cities in China with over 23 million inhabitants; it is the most important industrial and commercial city in the country with different economic concentration; Shanghai has been geographically blessed with having Huangpu river, it reflects the past and the present of Shanghai and divides the city into two parts- Puxi (River West) and Pudong (River East); (Figure 3.1) shows the location of the river which runs through Shanghai's downtown.



Figure 3.1 Huangpu River (north-south direction) divides Puxi and Pudong

(Source: www.acitymap.com)

Shanghai currently occupies a land area of 6340 sq.km (Shanghaigov. 2015e); Lok, L. and Leung, S. (2009) summarized the urban history of Shanghai in four district periods: “the Prosperous mercantile era” (early 20th century); the stagnant 1949-1978; and the prosperous post-1990s”; Xuanmeng, Y., Xirong, Yu, X. and He, X. (2007) agrees that in spite of the impact of globalization, Shanghai has not lost its national identity; it has always been “The link” between China and the world, this relation has brought a great change to the architecture of the city, it added the contracts between Chinese and western architecture (Lee and L. O. 2000).

Shanghai is rich with the natural resources, but on the other hand, in 2010 China became the largest green house gases (GHG) emitter and energy consumer (IEA 2010a), during the period of (2005- 2010) China was aiming to achieve 20% cut in energy consumption (NDRC 2011), therefore, the opportunity of hosting Expo 2010 provided Shanghai a good chance for solving environmental issues and catalyzing urban renewal.

3.1.2 Shanghai Context

The research will focus on Shanghai's main water front along Huangpu Riverbank which was used for World EXPO 2010; the event aimed to regenerate the urban plan and the industrial site of the host city, therefore, the research will highlight the defining features on the event site and its surrounding areas along Huangpu Riverbank.

The 113 kilometer Haungpu River is the livable core of the city, it was dedicated for local port activities from the late 19th century, in addition to neglected dock lands which created tough challenge for urban planners, the old industrial and resident buildings and ware houses were located along the side of Haungpu River; as Shanghai finally chose the Haungpu Riverbank as EXPO location, the project Haungpu Riverbank development was established in 2002 as part of Shanghai World Expo 2010 (Chen, Y., Tu, Q. and Su, N. 2014).

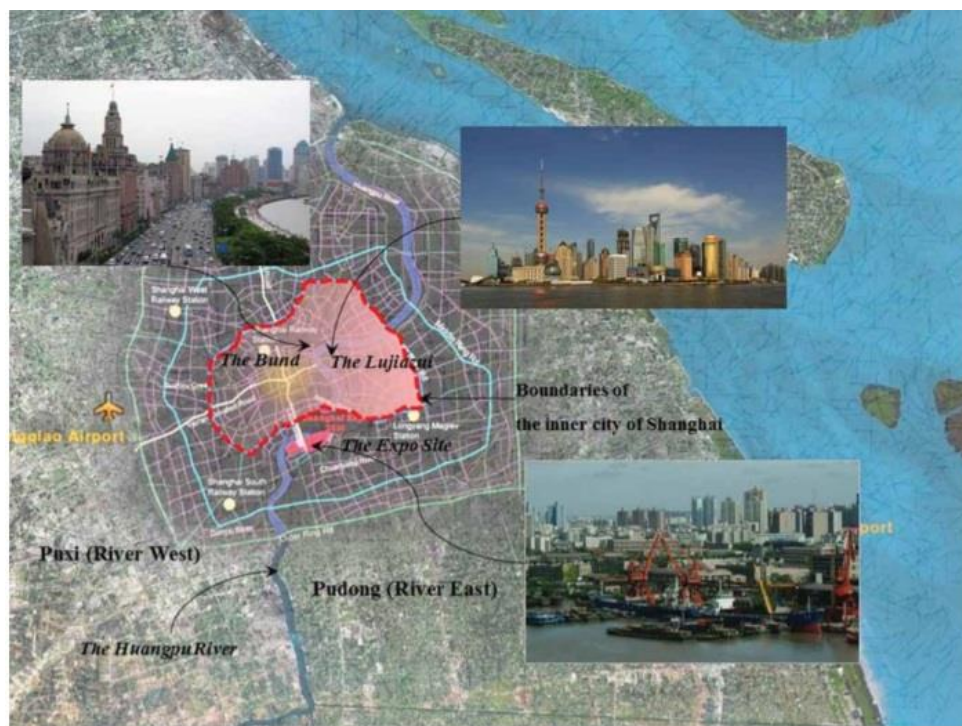


Figure 3.2 The Haungpu River as in 2005

(Source: Deng, Y., Poon, S.W. and Chan, H.W. 2014, p.10)

3.1.3 The Preparation for EXPO 2010

In 2002 china won the bid to host Expo 2010, under the theme “better city, better life” which took place in May 1 to October 31 (Deng 2006); to organize the event, Shanghai world organizing committee was set up in 2004; as a first move the Government of People’s Republic initiated actions plans to pave the path for Shanghai towards a sustainable urban development, the actions plans are as follows:

China Agenda 21: Shanghai Plan of Action

The agenda was established in 1999, it is considered as guidelines towards solving environmental, economic and social challenges, the principles of Shanghai Plan of Action are:

- Better utilize resources and protect the environment during development.
- Balance growth of the social, economic and environmental aspects.
- Use Shanghai to lead the regional development of Yangtze River Delta (YRD).

(Shanghai Leading Group Office of China's Agenda 21 Implementation, 1999)

Agenda 21 aims to achieve 6 main objectives:

- Enhancing the power of hi-tech to transform into knowledge economy.
- Transforming Shanghai to a sustainable city by promoting the 3Rs: (reduce, reuse, recycle) technologies.
- Developing the social aspect of the city and solve the social problems to improve the quality of living.
- Urban upgrading and regeneration to approach a sustainable development that matches the mega cities urban level.
- Reduce the consumption of natural resources.
- Strengthen governmental support for sustainable development (op. cit., pp.9-11).

Shanghai Comprehensive Master plan 1999- 2020

It is an action plan to direct future development of Shanghai according to the market demand, the plan was established in 1999, and the main goal of Shanghai plan is to become a global economic hub; Leary, M.E. and McCarthy, J. (2013)

High lights of the plan:

- Develop the urban form to transform population density.
- Improve industrial relocation and readjust spatial economic distribution.
- Improve the external and internal transport linkage by air, land and sea.
- Improve the environmental performance of the city.
- Support the heritage conservation and inject future use.
- Enhance technology that supports sustainable development and better functioning of the city.

3.1.4 The Theme and Sub-Themes

Under the theme of Expo 2010 “Better city, better life” Shanghai was aiming for entering the world stage, Shanghai used EXPO as a tool to make major changes in the urban plan of the city, in addition to the ecological and sustainability problems, therefore, Shanghai created a platform to welcome the whole world to bring their sustainable technologies and share their experience during EXPO; Shanghai World EXPO pursued a better living environment through many sub-themes (Shanghai Municipal Government 2010):

- Blending of diverse cultures in the city
- Economic prosperity in the city
- Innovations of science and technology in the city
- Remodeling of communities in the city
- Interactions between urban and rural areas.

3.1.5 EXPO 2010 Site Context

Starting with the site choice, EXPO 2010 was chosen to be located along the two river banks of Haungpu River on a total area 5.288 sq.km between Pudong and Puxi as it is shown in (figure 3.3) (Deng, Y. 2006, p.12)

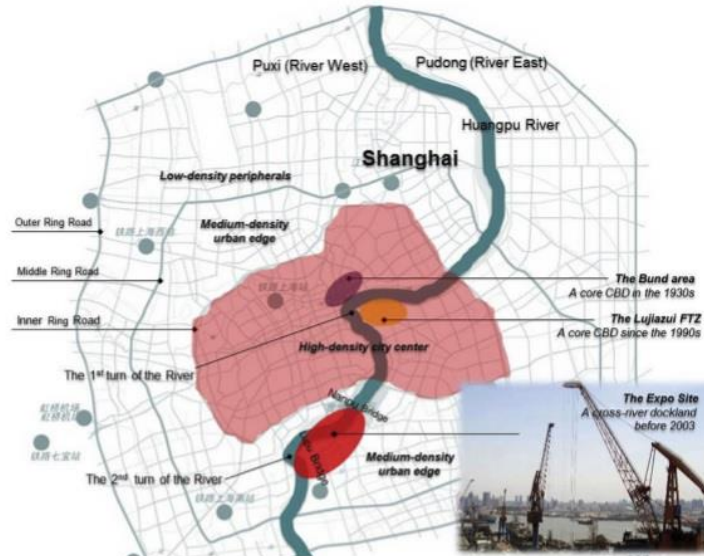


Figure 3.3 Location map of the Expo 2010 site in Shanghai (Source: Lok, L. and Leung, S. (2009))

Many of world's major banks, steel industries, coal-fired power plant which produce heavy pollution and residential houses are accommodated along the sides of the river; moreover, many skyscrapers were added in 1990s, EXPO 2010 gave the host city the opportunity to reclaim the lost identity in this area; the site plan was designed based on the requirement of (Agenda 21) and (Shanghai Comprehensive Master plan 1999- 2020), according to (SUPAB, 2007, p.195) the planning principles for EXPO site are:

- EXPO 2010 will exhibit the concept of “Harmony City”.
- Be human-oriented: design from the perspective of visitor.
- Harness cultural capital through adaptive re-use of heritage.
- Materialize sustainable development, emphasize on after-us.

According to the master plan of Shanghai (1999-2020) (SHG, 2001), the EXPO site will prepare the River belt to be an international financial centre by 2020; the site consisted of three main elements (expo2010china 2010a):

The Park: it covered 5.28 sq.km including the enclosed area and the opened area

The Zones: the site was divided into 5 main functional zones as it shown in (Figure 3.4)

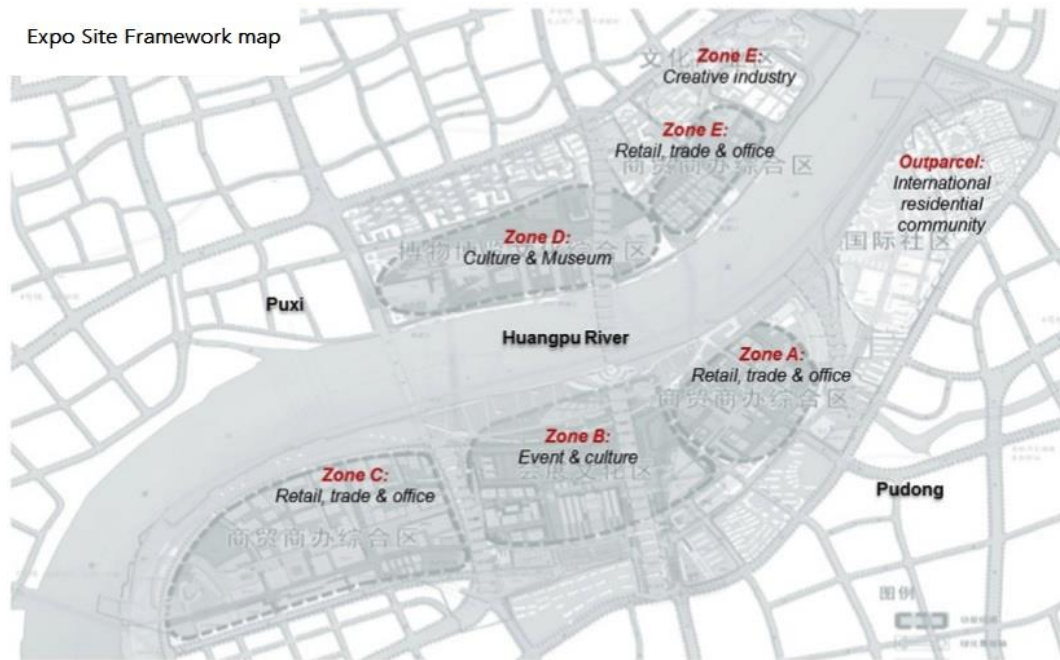


Figure 3.4: Expo site framework map (Source: Deng, Y. 2016, p. 7)

Zone A (Retail, trade and office): it is located between Expo Boulevard to the west, it hosted China Pavilion and national pavilions for Asian countries.

Zone B (Event & Culture): it hosted Theme pavilions, national pavilions of ASEAN countries, Oceanian countries, pavilions for international organizations, EXPO Centre, and Performance centre.

Zone C (Retail, trade and office): it hosted European, American and African national pavilion clusters, in addition to a large public amusement park of 10 hectares.

Zone D (Culture & Museum): it consisted of Jiangnan Shipyard and a group of valuable historical buildings; it was dedicated for outdoor exhibitions and culture exchange.

Zone E (Creative industry): it hosted stand-alone corporate pavilions, Urban Civilization Pavilion, Urban Exploration Pavilion and the Urban Best Practices Area.

The groups: There were 12 pavilion groups distributed between Pudong section and Puxi section.

The clusters: There were 26 pavilion clusters, each one covered 2-3 hectares and contained public services such as shops, toilets small canteens and nursing services

(Figure 3.5) shows the location of key pavilions in EXPO sites



Figure 3.5 The location of key pavilions (source: Chen, Y 2014, p.9)

China Pavilion:

It is located in the centre of the event site, in the main entrance of Pudong side of EXPO Park, it covers a total area of 160,100 sq.m which is triple the height of any other pavilions.



Figure 3. 6 China pavilion in Expo 2010 (Source: Bureau of Shanghai World Expo 2009, p.74)

Theme Pavilion:

The theme pavilion is one of the permanent buildings in EXPO Park; it is located in the West of the main entrance of Pudong side; the main function of this building is to deliver the theme concept (better city, better life) by strengthening the relation between the earth, the city and the people.



Figure 3. 7 Theme Pavilion in Expo 2010 (Source: Bureau of Shanghai World Expo 2009, p.76)

Expo Centre:

It is located in the Riverside greenbelt, the main function of EXPO centre is to create a platform for celebration ceremony and to hold conferences of the events, it covers a total area of 142,000 sq.m.



Figure 3.8 Expo Centre in Expo 2010 (Source: Bureau of Shanghai World Expo 2009, p.77)

Performance Centre:

It is located in the Riverside greenbelt in the East of the EXPO Axis, it covers a total area of 80,000 sq.m, the main function of the performance centre is to present big shows that requires the theatre facilities.



Figure 3.9 Performance centre in Expo 2010 (Source: Bureau of Shanghai World Expo 2009, p.80)

The Key Clusters of Expo 2010 presents large amount of renewable energy, new technologies and materials to approach a sustainable built environment especially that they were designed as permanent buildings for after Expo 2010.

3.1.6 The Evaluation of Planning for EXPO 2010 Based on Sustainable World EXPO Strategies

The research will examine the impact of Expo 2010 on Shanghai based on the demonstrated strategies for a sustainable event.

Economic development

Shanghai has always been longing to become the largest economic trading centre in Asia Pacific; Agenda 21 paved the path for the city to achieve the requirements to form the Comprehensive Master Plan which was created in 1986 (SUPAB, 2007, p.42); to reach this goal, the government of people's republic of China (PRC) has set strategic objectives to transform Shanghai urban plan to serve the economic growth of the city, (op. cit., pp. 46-47) highlights the strategic objectives:

- The master plan of the city was divided into 3 tiers as it showing in (figure 3.10) to create multi centre urban form for the city which will work as main economic zones and transfer population density away from the down town where EXPO Shanghai 2010 will take place, moreover, it will help to create new spaces for inhabitants, tourists and new business opportunities.

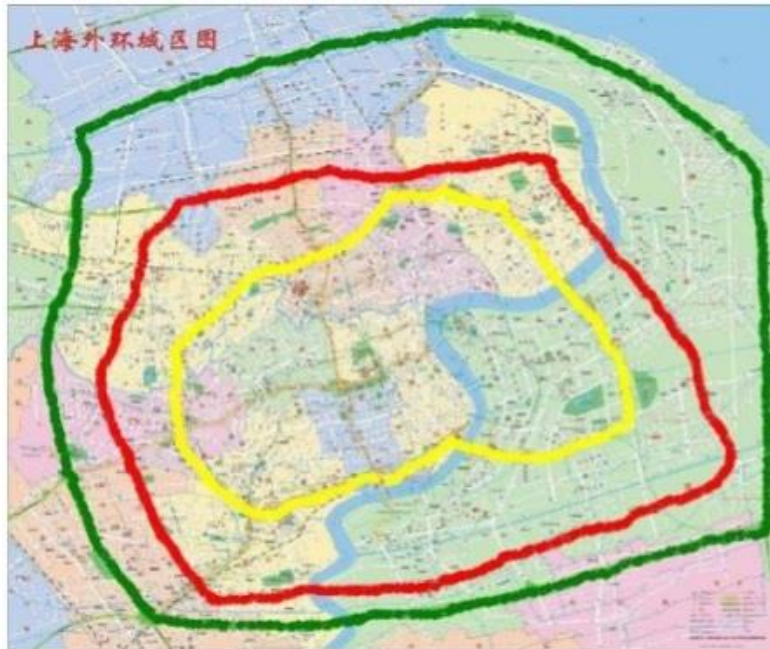


Figure 3.10 The three tiers of Shanghai (Source: Lok, L. and Leung, S. 2009, p.77)

- In the first tier, cultural industry, information service, finance, tertiary industries will be developed, Tong et, al (2006) described this tier as the core of knowledge economy.
- The second tier will be dedicated for zero emission industries.
- The third tier will be dedicated for primary and secondary industries, in addition to eco- tourism (Shanghai Urban Planning & Design (SUPD), 2006).

Yang, W. (2010) recorded that Shanghai was successful to record \$158 million profit while welcoming 73 million visitors, the new strategic urban plan helped to boost the tourism urban spatial of the city in addition to the hospitality and the residential properties.

Sustainable Built Environment:

As part of preparation for Expo 2010, China has set environmental guidelines for all cities to follow to achieve the concept of sustainable urban development; China Agenda 21: Shanghai Plan of Action is considered the reference for Shanghai for a better future; EXPO organizers selected EXPO 2010 site for city branding urban renewal, therefore, the legacy planning was the main driver for the event to develop an event site and the urban area to sustain the success

of Expo; based on the demonstrated strategies for developing a sustainable World Expo, the following is the implementation plan for sustainable built environment through EXPO Cycle.

Pre-event:

-Improving regional continuity planning: with reference to the population growth rate in Shanghai as it shown in (figure3.11) EXPO organizers contributed in restructuring the urban space in Shanghai EXPO, the high end and high profit service industries replaced the traditional manufacturing in the urban areas around the event site, in addition to the luxury housing instead of the original low-income residential area (Chan, R.C.K. and Li, L. 2016). The reason behind creating a new region is to transform Shanghai into an international financial center by 2020 (Chinese State Council 2009).

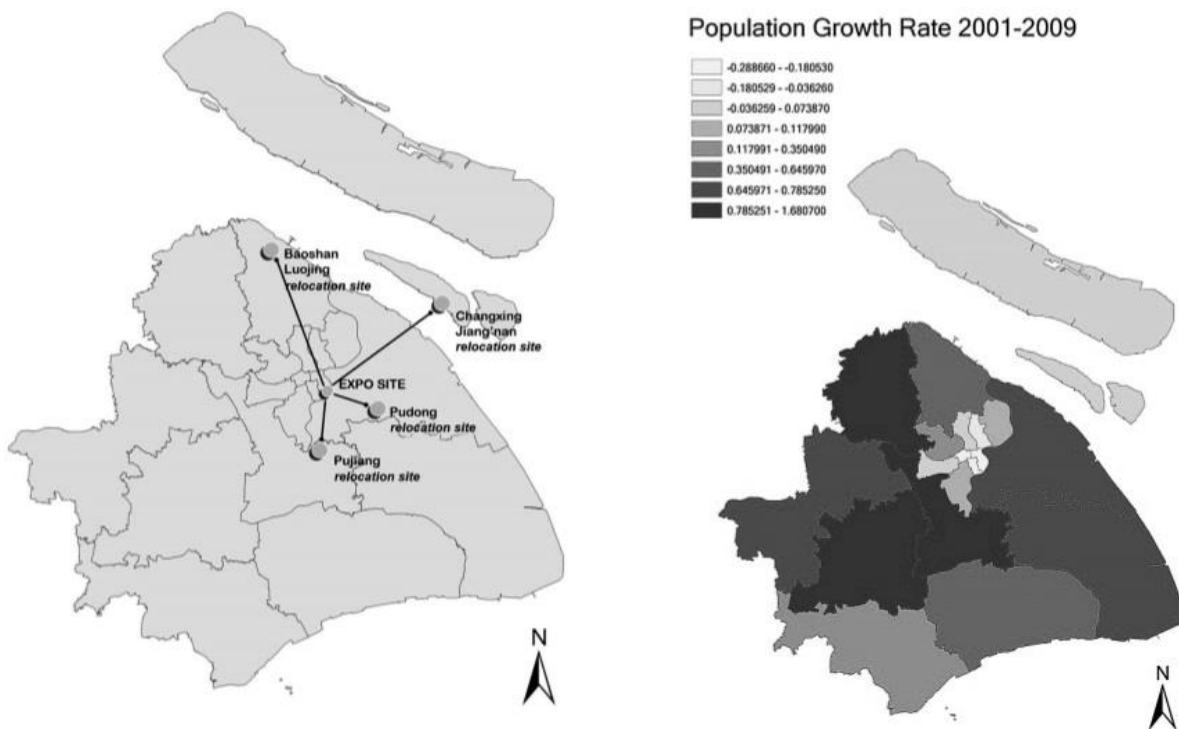


Figure 3.11 The relocation sites for enterprises and residence and the population growth in Shanghai (Source: Chan 2016, p.11, 16)

-Utilization of built environment: Zone A was merged with Zone B to be functioned as international business district, the EXPO village was utilized for international residential community, Zone C was used for retail, trade and office uses, in Zone D many of industrial

buildings were transformed into permanent culture venues, modern art museum, children's theatre and an EXPO museum, Zone E was reused for small businesses and low end catering in addition to leisure uses (Deng, Y., Poon, S.W. and Chan, E.H.W. 2016).

(figure3.12) shows the zones functions before and after Expo 2010; Deng, Y. (2016) highlighted the after use of the main four key clusters which were designed as permanent buildings, the theme pavilion became a commercial exhibition; China pavilion was transformed into Art museum; EXPO Performing Art Centre was renamed as Mercedes-Benz Arena to overtake large events such as sports events and live performances; Expo Center transformed to a center for high level political events.

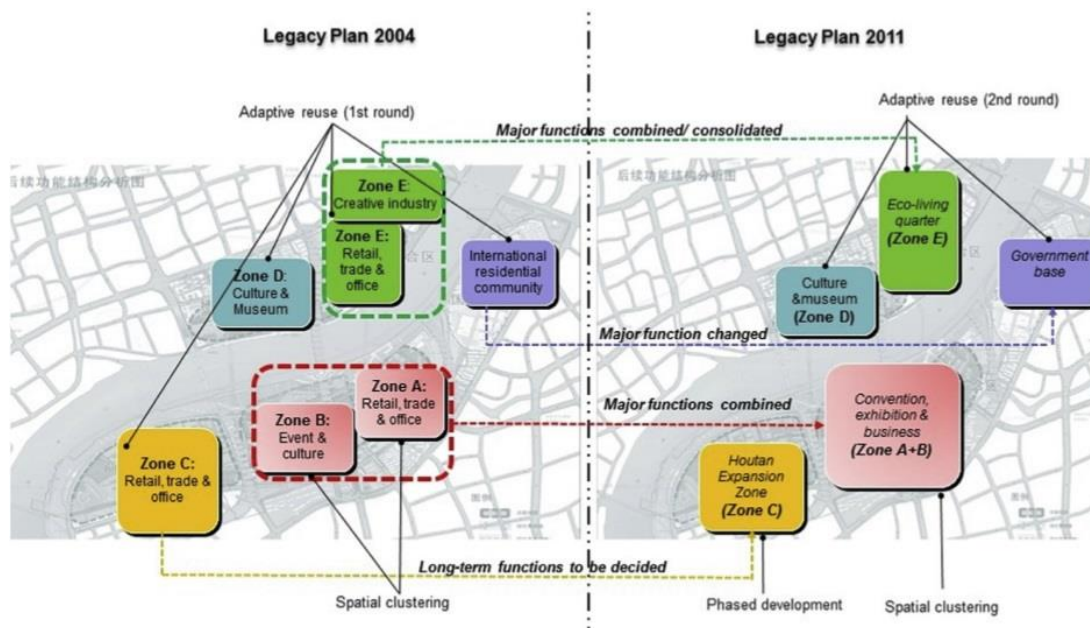


Figure 3.12 The Zones functions during Expo and after Expo 2010.

(Source: Deng, Y. 2016, p.11)

During event:

-Presenting green architecture: in response to global climate change and greenhouse emission, EXPO organizers took these issues as first priority while planning for EXPO, it promoted the sustainable built environment through its key buildings to reduce CO2 emission, EXPO 2010 explored the latest trends of green energy which was taken in consideration through designing stage, the for big clusters used environmentally- friendly building materials such as wood, solar energy utilization materials, wave absorption building

material and other new building materials for energy conservation; for temporary building, it was taken in consideration to use recycled materials such as recycled wood plastic, permeable pavement; The permanent pavilions were designed based on the requirement of green buildings “Three- Star Green Building Design Evaluation Mark” Which is under application for gold medal of USA’s USGBC LEEDNC2.2 (Bureau of Shanghai World Expo 2009).



Figure 3.13 Permeable pavement and Plastic- wood floor of elevated pedestrians’ walk

(Source: Bureau of Shanghai World Expo 2009, p.67)

Post-event:

-new landmarks: the magnificent exterior of the four big clusters (China pavilion, Theme pavilion, Expo Performing Art Centre and Expo Centre) had added a great value to the host city, it reflects the upgrading of design innovation and approaches the balance between for making and functional adaptability, (figure 3.14) shows the new land marks in the host city.

-upgrade the city image: to integrate EXPO in urban renewal projects, EXPO organizers set the 5R strategy to achieve a sustainable development and minimize wasteful construction through post EXPO period, the first “R” stands for “Repositioning” which deals with integrating the land use of EXPO and Post EXPO according to the market demand; the second ”R” stands for “Reduction” which aims to remove any source of pollution; the third “R” stands for “Rehabilitation” that works on developing the eco-system of Haungpu River; the

fourth “R” stands for ”Recycling” which aims to reshaping old buildings, landscape and using recycled components and materials, the last “R” stands for “Reusing” for reusing old industrial buildings for different functions. (Deng, Y., Poon, S.W. and Chan, H.W. 2014a)

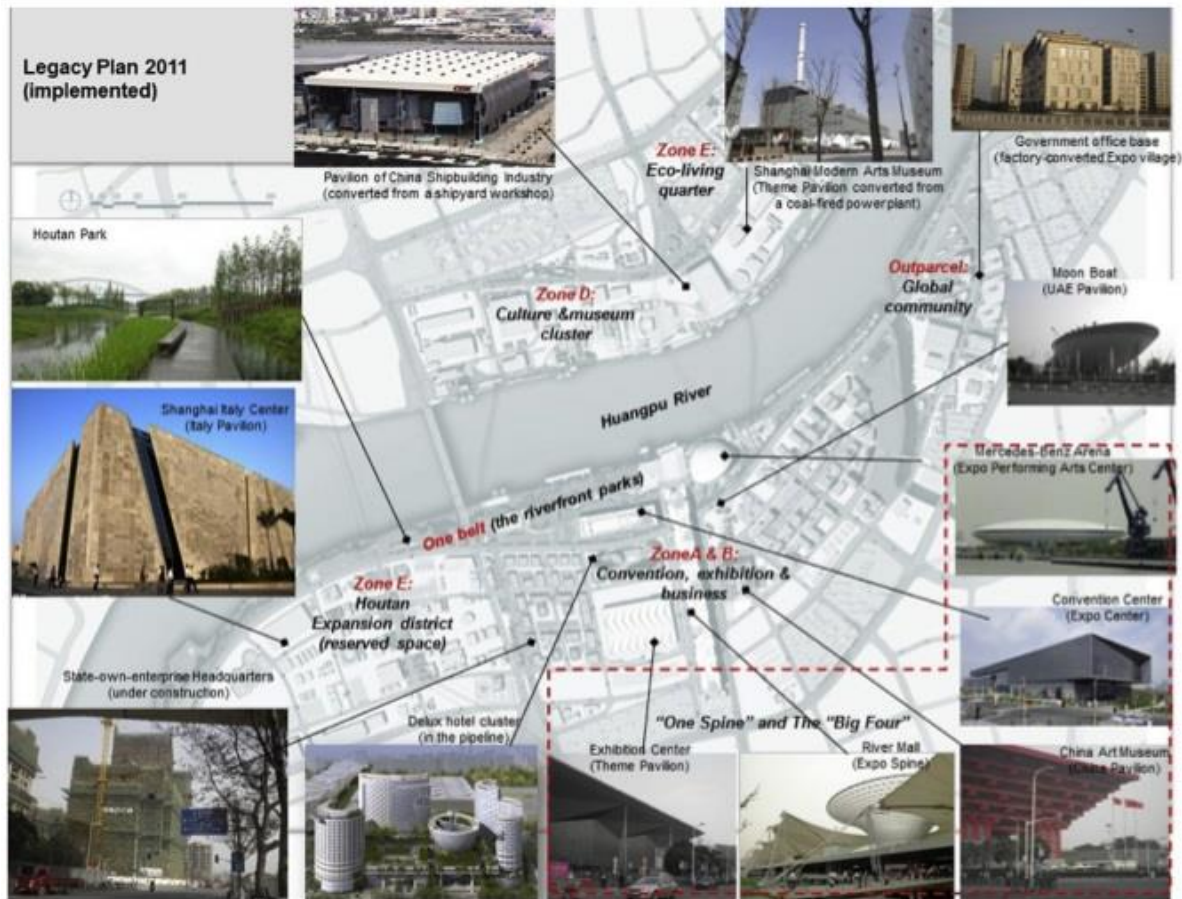


Figure 3.14 The new landmarks in Shanghai after Expo 2010 (Source: Deng, Y. 2016, p.10)

-adaptation, temporary and permanent projects: The permanent buildings were defined based on Shanghai’s urban strategies to avoid demolishing temporary buildings, as a result, After 2010 42% of 5.28 sq.km site area was demolished for restructuring where 40% of the site area were meant to be permanent as part of the legacy plan with new utilization (Deng, Y. 2016); as part of adaptation projects around 20,000 sq.m heritage buildings and around 400,000 sq.m industrial structures were represented for EXPO use; (figure 3.15) shows the renovation of onsite industrial structures for both EXPO and post EXPO uses, they were

used for temporary EXPO uses and now they are used for entertainment and exhibition facilities (Deng, Y. 2016).



Figure 3.15 Renovation of on-site industrial structures for both Expo and post-Expo uses.

(Source: Deng, Y. 2014, p. 17)

Environmental management

Pre- event:

-City situation and context determine the environmental challenge: Shanghai is considered as an industrial city; it produces a large amount of pollutants which have negative impact on the eco-system; (figure 3.16) shows how China is rated as the biggest producer of carbon dioxide.

Bureau of Shanghai World EXPO (2009) shared the polluting sources in EXPO site, there were 21 major industrial polluting source identified in 2000 (Nanshi Power Plant, Shanghai Pudong Iron & Steel Group, Jiangnan Shipyard, Port Machinery CO.,...etc).

As a result, EXPO 2010 turned into a resource efficient and environmentally- friendly gala, the organizers supported the green practices by improving environmental protection,

publicizing and demonstrating green EXPO concept, and raising public awareness on sustainable development and enhancing public participation.

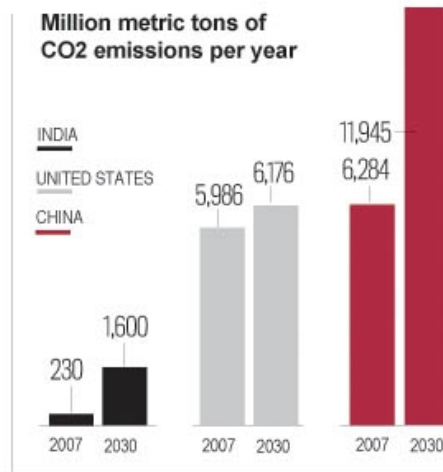


Figure 3.16 The Co2 emission of China compared with US and India

(Source: <http://www.china-mike.com>)

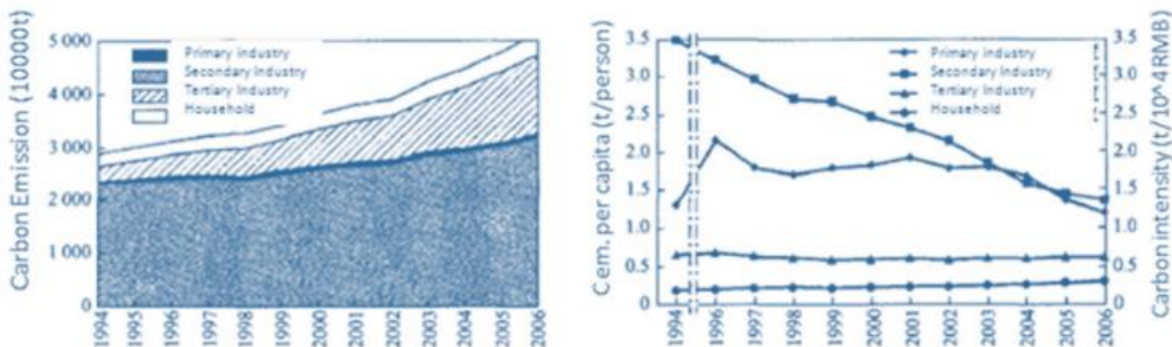


Figure 3.17 Carbon emissions and carbon intensity of different sectors in Shanghai

(Source: Min & al 2009)

During event:

-Universal measurement: Taking the opportunity of hosting EXPO 2010, Bureau of Shanghai World EXPO (2009) aimed to stage an environmentally- friendly world expo under the guidance of “Shanghai Three Year Environmental Action Plan”, the main goal of the event is to combine the short term objectives with the long ones which will help in reducing environmental problems, after investigating the root causes of pollution in Shanghai, the “Shanghai Three Year Environmental Action Plan” went through main three rounds, the first

round took place in (2000- 2002) it was focusing on 110 projects to solve five main environmental problems (watercourse pollution, direct discharge of sewage and pollution of domestic garbage, and paved up in green space construction and rehabilitation of heavily polluted areas); the second round took place in (2003- 2005) it was focusing on Ecological Conservation and Construction for Rural Areas for 289 projects in 6 rural areas, the third round (2006- 2008) supported the environmental infrastructure for Expo park, in addition to solving environmental problems from the past such as the rehabilitation of polluted watercourses, control over coal ash, fugitive dust and motor vehicle exhaust, and the rehabilitation of Wujing Industrial Zone and retention of sewage collection in industrial zones.

Globally, US Environmental Protection Agency (EPA) initiated AIRNow- International (AirNow- I) in 2010 which works on monitoring air quality of Shanghai to share air quality information, Dawes, S.S., Brian, G. and Zheng, B.L. (2011).

AIRNow- I launched its first international air quality site for Shanghai, as a partnership between the U.S. Environmental Protection Agency and the Shanghai Environmental Protection Bureau to help in monitoring the air quality in Shanghai and help in improving the environmental condition of Shanghai after Expo 2010, therefore, EXPO 2010 aimed to improve the environmental condition of Shanghai by initiating a set of documents to plan for EXPO 2010 according to environmental perspectives to mitigate major industrial pollution and improve the urban services; (Table3.1) shows the environmental guidelines for EXPO 2010 site renewal.

Year	Milestones of the Expo 2010 Site development	Environmental guidelines	Sources
2001	International consultation for master site planning	Report on environmental impacts of Expo 2010 Shanghai China	Application documents for bidding world Expo 2010
2002–2003	Adjustment to the Site's boundaries and programmes		
2004	International seminar on the Site's planning and design issues	Chapter of ecological and environmental impacts	Application documents for registration of world Expo 2010 Shanghai China (2004)
	International competition for master site planning		
	Approval of the Expo Site master plan		
2005	Publication of the first edition of the Expo Site detailed regulatory plan	Chapter of ecological and environmental impacts (revised)	Application documents for registration of world Expo 2010 Shanghai China (2005)
2006	Publication of the Expo Site urban design scheme	Environmental impacts assessment of the planning area of Expo 2010 Shanghai China	Remedial action decision on industrial soil contamination
	Publication of the second edition of the Expo Site detailed regulatory plan		
	Design for permanent flagships		
2007	Publication of the third edition of the Expo Site detailed regulatory plan	Environmental protection (which specifies the green design guidelines of all Expo construction)	World exposition Shanghai China 2010 participation guide (for official participants)
	Ground-breaking for major on-site construction		
2008–2009	Full-swing of all on-site construction	Green guide of Expo 2010 Shanghai China	Design specifications for all on-site design and construction
		Environmental report of Expo 2010 Shanghai China (2000–2008)	

Table 3.1 Timeline of environmental guidelines for the Expo 2010 site renewal

(Source: Deng 2014, p.11)

Post-event:

-Input and output to assess the quantitative impact: After Shifting and shutting many of major industrial polluting sources, Ruet, J., Vallantin, F., Daval, A. and Pasternak, J. (2010) pointed out the impact of this action on the energy consumption, it didn't change radically but it was reduced 3% in 2008; The Clean Air Initiative for Asian Cities Center (2010a) indicated the impact of 2010 Shanghai World Expo on the air quality, although it was considered as a successful mega event in many ways, but the air quality remained uncertain, unfortunately the city experienced API levels reaching 100 for eight days , as an overall result the air quality levels in 2010 are slightly lower compared to previous years, still Shanghai is monitoring the long term impact of Expo.

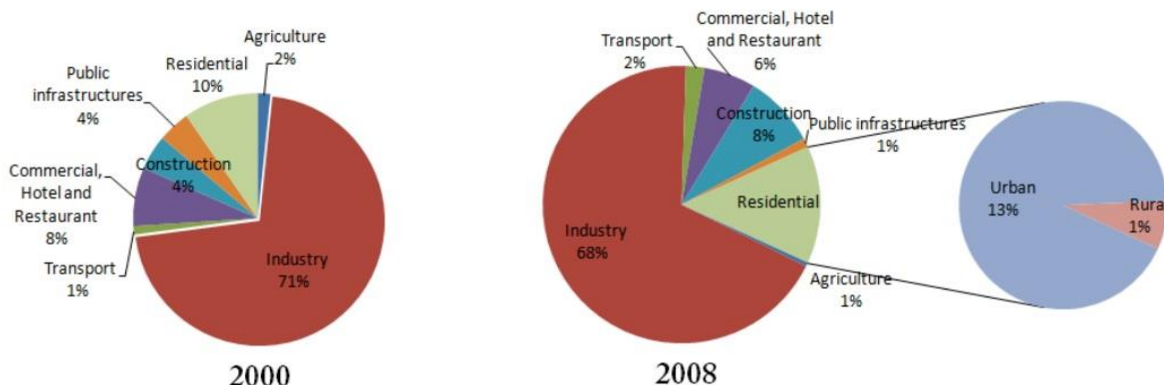


Figure 3.18 Shanghai electricity consumption by sector evolution (Source: www.worldenergy.org)

Pollutant	Mean Level	China's Upper Limit of Class II	WHO EU 2000 Air Quality Guidelines	WHO 2005 Air Quality Guidelines
SO ₂	Annual Mean 24-hour Mean Hour Mean	60 150 500	50 125 500 ¹	None 20 500 ¹
PM ₁₀	Annual Mean 24-hour Mean Mecan	100 150	~ ~	20 50
NO ₂	Annual Mean 24-hour Mean Hour Mean	80 120 240	40 120 ² 200	40 None 200
CO	24-hour Mean Hour Mean	4,000 10,000	10,000 ² 30,000	10,000 ² 30,000

Figure 3.19 China's Class II national air quality standard (Source: UNEP (2009b, p.20))

Social Development

Pre- event:

-Restructuring the social life: Due to the population expansion and rapid economic growth, Shanghai energy consumption is greatly expanding and its release of environmental pollutant; focusing on the population, EXPO 2010 planners initiated a new pattern of industry and residential areas away from the urban centers to solve the urban disorder and offer new

homes for new families and middle class families in new suburban areas with new settings, this type of new urban space (NUS) production helps in distributing the population away from the centre of the host city (Roger 2016).

During event:

-Engage the community to embrace sustainability issue: In order to promote sustainability, the Chinese community was engaged in supporting environmental education activities in the community, Shanghai World EXPO (2009) ensured the role of Shanghai Public Education Centre which organized education programs with the theme “Welcome World EXPO Environmental Protection with You”, this program was able to reach 200 community schools and 1 million local residents by the opening of EXPO 2010, moreover, the program was enhanced with additional education campaigns, consequently, the people of the host city are more aware of the importance of sustainability and environmental protection.

Post-event:

-Integrate social groups in decision making: To spread the word about sustainable living, many social groups were integrated to help in sustaining a healthy living, in 2003 Shanghai launched the “Green Community” campaign under the guidance of “Three Year Action Plan for Environmental Protection”, by the end of 2008, there were 68 green communities in Shanghai; in addition to green community campaign, the “Green school” campaign was initiated in 1999 to enhance the practice of energy conservation, emission reduction and waste treatment and grow a responsible generation towards their earth, by the end of 2008 Shanghai established 22 national green schools, 136 city green school and more than 500 country level green schools; the private sectors with cooperation with (Bureau of Shanghai World Expo) played a big role in promoting the sustainable living by initiating campaigns like "Green World EXPO, Happy Seating" Campaign, Ban on Free Plastic Bags Campaign, Mass Activity of Tree Planting to "Add Green to Shanghai and Welcome World EXPO", in addition to international conferences on environment and development (Shanghai World EXPO 2009).

The Shanghai Environmental Protection Committee (SEPC) is the responsible of enhancing coordination between different private sectors, social groups and The Shanghai Environmental Protection Bureau (SEPB), (Figure 3.20) shows the coordination mechanism for environmental protection in Shanghai.

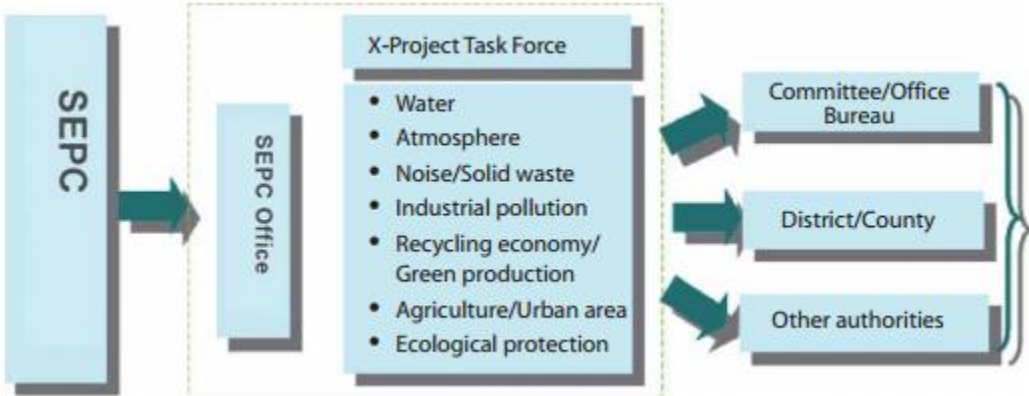


Figure 3.20 The coordination mechanism for environmental protection in Shanghai.

(Source: www.unep.org)

Urban Governance

Pre- event:

-New system to regenerate urban areas: Globalization and decentralization have changed and remolded the local government system, for EXPO 2010, the local government sat new strategies to transform Shanghai into entrepreneurial city, (Bracken 2012, song and Ding 2007) agreed that the transformation of the city was led by the government to develop more positive image for shanghai especially the area around (Shanghai huangpu river) where EXPO 2010 took place, to achieve that, the government focused on the legacy of the event and supported the development of EXPO site as a new urban fabric (Xiao 2011):

Core areas	Main development concepts
Yangpu Bridge Area	Puxi part: work and residential area Pudong part: yacht pier, transform Yangpu Gas plant to neighbourhood cultural centre
North Bund Area-Shanghai Shipyard	Puxi part: Shanghai Shipping Exchange Centre, business and residential area Pudong part: transform Shanghai Shipyard to Maritime museum, business, office and service apartments, yacht pier, waterfront square and public space along Huangpu Riverbank
Shiliupu-Dongchang Area	Puxi part: Transform Shiliupu ferry centre to water tourism centre, connect old Shanghai neighbourhood with the Bund area, transform warehouse in Dongchang Road to business centre or special market.

Table 3.2 Main development concepts for the core areas of the expo site supported by the government (Source: Chen, Y., Tu, Q. and Su, N. 2014, p.9)

-Fostering the relation between government and private sector: The government of China expanded the channels for the citizens to participate and provide suggestions for green activities in order to enhance the awareness of improving the environmental condition of Shanghai, moreover, to promote the growth of the city, the government worked on interacting with other forces such as private corporations; the government made use of EXPO 2010 for industrial relocation and residential resettlement, and due to the high demand on visiting EXPO, the government improved the public transportation and set up special stations in addition to zero emission in the park and low emission in the surrounding area.



Figure 3.21 Public Transport Lines and Stations in the Expo Park

(Source: Bureau of Shanghai World Expo 2009, p. 61)

As the population of china is growing, the government integrated transport service level, a new system frame work was integrated which focused on 2 ports, 2 highways, 3 networks, and an international airport.

During event:

-Connecting different forces: The partnership between the government and the private sectors is very important tool for strengthening the delivery of city services and generating local benefits, in fact the private sectors can secure the financial support for major investments for EXPO; Shanghai government encouraged more private sectors participation in addition to the cooperation with international participants, 246 international participants were welcomed to develop new cooperation relations and help establish long-term

relationships of extremely high-value for the city; (table 3.3) shows the economic benefits gained from strengthening the relation with private sectors and international participants.

NEW INVESTMENTS	<ul style="list-style-type: none"> ▪ New injection of national and international investments ▪ New public-private partnerships in investment
NEW BUSINESS	<ul style="list-style-type: none"> ▪ Repositioning of existing industries ▪ Development and launch of new business sectors ▪ New opportunities from face to face international business meetings connected to participants, sponsors and suppliers
NEW REVENUE	<ul style="list-style-type: none"> ▪ Additional tax revenue for the city: national tax revenues that come back to the city ▪ Higher-value real estate and new business and/or residential districts
NEW TALENT	<ul style="list-style-type: none"> ▪ Additional employment options ▪ New training opportunities in different domains that help develop human capital and foster a new professional cultures at all levels of society through the experience of working within an international event ▪ Development of new entrepreneurial skills in city management

Table 3.3 Economic benefits for Shanghai Expo 2010 (source: Peck, M. (2011. P,6)

Post- event:

-Support the whole cycle of EXPO: Because legacy plan was one of the main strategies of preparing for EXPO, the government continued to assist the urban development of the city according to the market and social demand after EXPO 2010, the utilization of the permanent buildings served the new shanghai economic fabric such as Cultural exhibitions and museums to help the growth of tourism revenues. He, J. (2012) shared one of the most important actions of the local government (The Shanghai Master Plan 2001-2002), the government sat many targets to support the preparation of EXPO through the whole cycle: the population growth, land development, industrial structures , infrastructure and green space, (table3.4) shows the variable indicators for the evaluation of planning implementation.

Variables	Indicators	
	Quantitative objectives	Spatial distribution
Population	Population scale	Spatial distribution of population
	Employment structure	
Land development	Total area of developed land	Spatial distribution of developed land
	Total area of residential land use (*)	Spatial distribution of residential land use
Industrial Structure	Industrial development (area and proportion)	Spatial distribution of secondary industry (and industrial parks)
Infrastructure	Length of roads (*)	Road system
	Length of metro lines (*)	Spatial distribution of metro lines
Green space	The area of undeveloped land	Spatial distribution of strategic green space (*)

Table 3.4 The variables and indicators for the evaluation of planning implementation
(Source: He, J. 2012, p.7)

Conservation& Rehabilitation:

-Conserve historic heritage while meeting temporary needs: The site of EXPO consisted of many old factories, many of them were relocated, and the remaining ones were reused, Bureau of Shanghai World Expo (2009a) ensured that 1/6 of old buildings were reused for Expo's requirements such as pavilions, offices, hotels and scenic spots, the following is examples of Protection and Utilization Plan for Historic Buildings in EXPO Site:

-The office building of Jiangnan Shipyard: planned to be transformed into VIP reception.

-The hangar of Jiangnan Shipyard: transformed into exhibition hall or cultural facilities.

-Old site of Navy Command: planned to be transformed into cultural facilities.

-Red building & office building of Qiuxin Shipyard: planned to be transformed into industrial museum.

-Sanshan Guild (Municipal Protected Historic Site).

-Shanghai Solvent Factory villas group (Protected Historic Site in Pudong District): planned to be transformed into a hotel.

After EXPO, the site transformed into a concentration area of modern services for conferences, activities and accommodations that serves the economic and tourism growth of the city.

Improving technology innovation:

Pre- event:

-Green technologies to serve sustainable urban planning: A list of green technologies were applied to achieve the sustainable development of the city, in 2004 the United Nations Environment Program (UNEP) agreed to support the greening of EXPO 2010, Zhang, X. (2013) listed the technologies employed as respond for the Three Year Environmental Action Plan under the guidance of (LEED) and the National Association of Home Building Green Home Building Guidelines:

1. Technologies for sustainable urban planning: Urban climate modeling technology/ spatial information technology/ atmospheric environment assessment/ landscape simulation technology/ air ventilation assessment.
2. Technologies for green building: Incorporate energy-efficient into the site layout and building design to reduce none renewable energy use/ Prefabricated concrete technology/ ground source heat pump technology/ use local, reclaimed, recycled and renewable materials/ cooperative energy efficiency design for sustainability/ green roof technology/ energy saving windows program/ reduce the urban heat island impact resulting from new buildings and paved surfaces/ solar PV panels.
3. Technologies and strategies for green transportation: Transit oriented development/ alternative transportation tool to improve opportunities to utilize public transit/ alternative transport fuel (bio fuel/ electric)/ invest in transport system and infrastructure that reduce dependence on fossil fuel use/ neutralize carbon emissions from unavoidable travel
4. Technologies for urban waste management: encourage reuse, recycling, and composting technologies thus generating energy/ waste classification and recycling technologies/ expert system to waste management planning/ waste incineration directive emissions technology.
5. Technologies for urban water management: Water reuse and reclamation treatment tools/ black and grey water cycle systems/ green infrastructure materials for urban water systems/

Bio gas micro digester for waste water treatment technology/ physical and institutional integration by design in between water supply, waste water and storm water.

Post-event:

-Environmental benefits of using green technologies: The main aim of using green technologies is to mitigate pressing urban problems and to reduce energy consumption; moreover, it had an impact on the city image as an environmentally friendly city; Shanghai became a new tourist destination to explore the latest trends in green technologies, (figure 3.22) shows the percentage of renewable energy used in EXPO site:

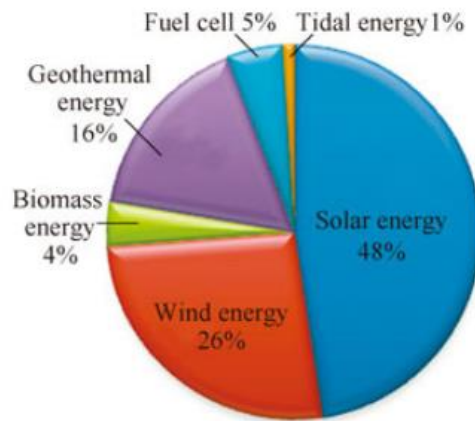


Figure3.22 New energy utilization by classification in EXPO site (source: UNIDO 2014, p.27)

3.1.7 Lessons Learnt from Shanghai EXPO 2010

The case of Shanghai Expo 2010 was brave enough to use existing urban spaces that was well integrated with the urban fabric of the city which helped in keeping the Expo site livable after the end of the event; the most important is that the EXPO garden restructures and balances Shanghai urban tourist spatial structure which takes on balanced and multi-poles pattern. (table3.5) shows how the event was successful to implement urban planning strategies to achieve a sustainable World Expo.

EXPO Cycle	Sustainable Urban Planning Aspects (Shanghai Expo 2010)						
	Social Development	Economic Development	Environmental Management	Urban Governance	Conservation & Rehabilitation	Improving Technology innovation	Built Environment
Pre-event	- NUS project	-The three tiers of Shanghai	-shutting and removing pollution sources	- The Shanghai Master Plan 2001-2002	-1/6 of old buildings were reused	-green technologies to serve sustainable urban planning.	-Creating new suburban areas -new utilization of zones and built environment
During event	- “Welcome World Expo Environmental Protection with You” program.	-exchange business opportunities -present green economy.	- Shanghai Three Year Environmental Action Plan - AIRNow-I project.	-economic benefits for connecting different forces			-presenting green architecture in Expo site
Post Expo	-Initiating different campaigns	-redoing economic Opportunities.	- Shanghai electricity consumption by sector evolution -Air quality assessment	-supporting financially the legacy plan.		New energy utilization by classification in Expo site - Changes in industrial energy consumption	-the 5 R strategy - Reutilize of on-site industrial structures and permanent clusters

Table 3.5 Shanghai’s strategies to achieve a sustainable World EXPO (Source: Author)

3.2 The Summary

In Chapter 3, the research examined the theoretical framework on Shanghai EXPO 2010; first of all, the research presented a background about Shanghai to explain the reason behind choosing Shanghai as an international case study, then the study covered the preparation for Shanghai EXPO and the theme/subthemes in addition to EXPO site context. The outcome of this chapter was the evaluation of planning for EXPO 2010 based on sustainable World EXPO strategies.

The fourth chapter will cover the local study (Dubai EXPO 2020) during the preparation phase.

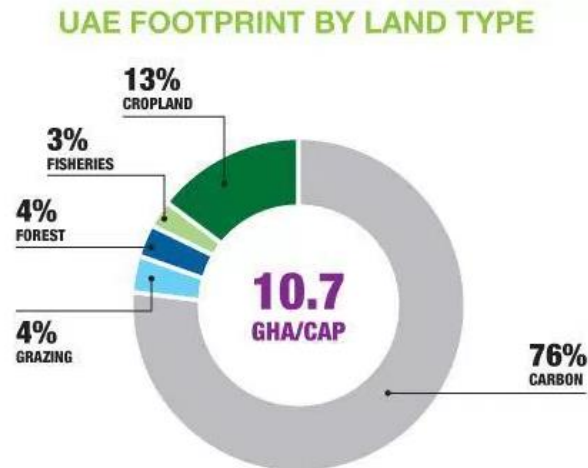
CHAPTER 4. LOCAL CASE STUDY (DUBAI EXPO 2020)

Introduction

As Dubai will be hosting EXPO 2020, the research will cover the preparation phase of the event till the meantime, to shift the conceptual framework to full implementation, it is important to go through the history of Dubai urban development and the environmental revolution to know the nature of the city's growth and set the right strategies for the city to follow through EXPO journey, moreover, the research will include Dubai's location and climate to cover a decent background about the city.

4.1 Why Dubai?

Dubai is a modern city with over two million inhabitants, it has a combination of the Arabic culture with Western Minds, locally, Dubai is considered as the largest city in the United Arab Emirates (known before independence as the Trucial Coast) (Al-SayeghFatma 1998); It is blessed with its diversified nature of economy, moreover, the significant presence of ports and the natural resources have boosted the economy of Dubai, moreover, Statica, R., Salacanian, S., Snoj, J., Begum, K. and Soman, R. (2016) noted that Dubai has the highest percentage of different nationalities, in fact 10% of the population is Emiratis while the rest are immigrants from different countries, these factors have contributed to the economic growth of Dubai in addition to the discovery of oil in 1950, the fact that globalization has altered UAE's oil revenue dependency is also a big boost to its economy, Dubai glamour stands for the visionary of its rulers who supported the creation of Dubai within 20 years; globally, Dubai has been voted as the 13th most important global city and the eight fastest growing city (24, E. and Deulgaonkar, P. 2016), now Dubai is one of the most popular tourist destination for its shopping districts and other tourists attractions, Matly, M. and Dillon, L. (2007) simplified the importance of Dubai within three factors (The speed, the culture and the government), As shown above Dubai is successful to create an international image, equally important the economic growth in Dubai has resulted in increasing the consumption of natural resources and CO₂ emissions, according to the 2015 UAE State of Energy Report in 2010 the UAE CO₂ emissions increased 63% from 2000, (figure4.1) shows the UAE footprint by land type warming, as Dubai will be hosting Expo 2020 ,it will be a great opportunity to promote a sustainable living and generate solutions not only for Dubai but also for global issues.



gha/cap - global hectares per person, it represents a measure of area of land and sea needed to supply a person's use of natural resources

Figure 4.1 the UAE footprint by land type

(Source: Emirates Wildlife Society – WWF)

4.2 The History of Dubai Urban Development

The transformation of Dubai economy began with the discovery of oil in 1950, it boosted the population growth and economic infrastructure (archives, G.N. 2010), and it helped to shift Dubai economy from fishing and trading, but on the other hand Dubai's oil reserves have reduced over the past decade, it is now expected to be exhausted within 20 years, therefore , the economic boom has encouraged the development of a number of new service sectors and hubs of non-oil industrial activities starting with the establishment of Jebel Ali Port in the late 70s which is the biggest port in the middle east (Matly, M. and Dillon, L. 2007); it was a turning point for Dubai economy especially that Dubai has a limited supply of oil and gas, in 1979 Dubai World Trade Center was built, it plays a big role in Dubai's business tourism for leading global events, conferences and exhibitions (CENTRE, D.W.T. 2016); next phase of development was done by founding Dubai international financial center (DIFC), it was successful in financing economic growth and sustainable development of Dubai (Saidi, N. 2009) ; in 1959 the first urban planning project of the city has been created by Sir John Harris from UK as it is shown in (figure 4.2) (Dubai Historic. 2010b), by this time Dubai population was around 40,000 inhabitants, it was lacking urban infrastructure , as a respond to society

demand ,Hariss introduced road system, and the city was divided into different zones (industrial, residential, commercial and public buildings), in 1971 the plan included a tunnel and two bridges along Dubai creek in addition to the tallest building in the middle east at that time (The world trade center) as it is illustrated in (Figure 4.3) ,health education and leisure zones were added under the visionary guidance of Dubai Rulers; within 20 years the population of Dubai tripled to reach 674,000, consequently, Matly, M. and Dillon, L. (2007) recorded (Dubai structural plan) which was initiated by Dubai Municipality for 2003, the urban plan was flexible to fit the future changes .

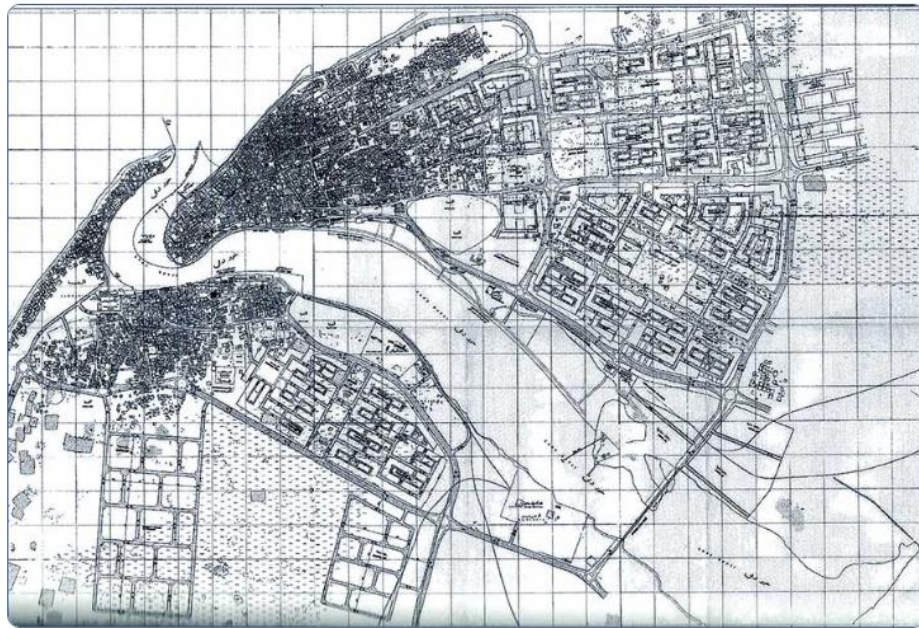


Figure 4.2 John Harris's First Dubai Master Plan 1960 (source: www.dubaiasitusedtobe.com)

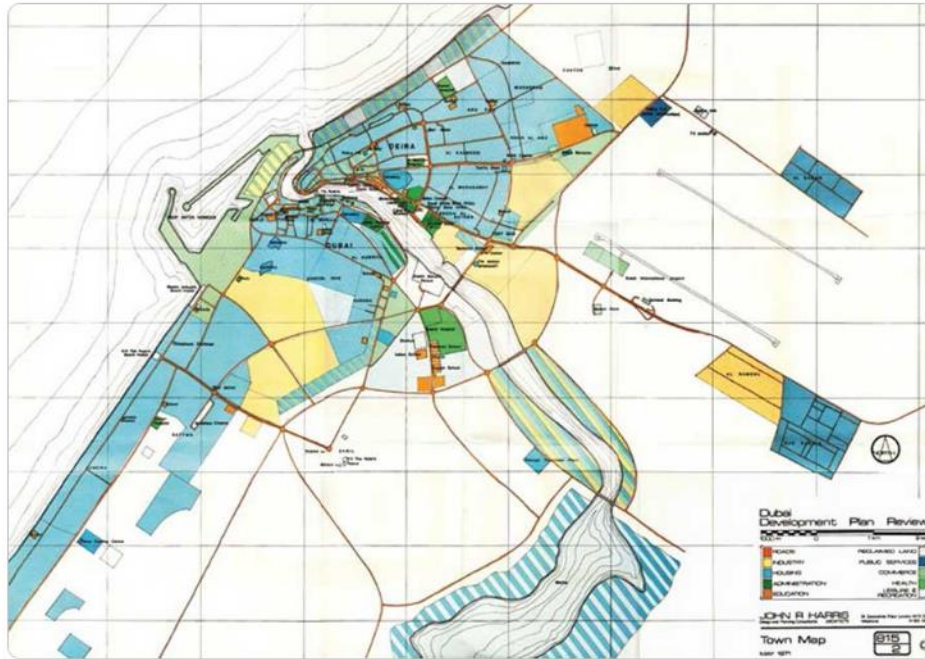


Figure 4.3 John Harris's Dubai Master Plan 1971 (source: www.dubaiasitusedtobe.com)

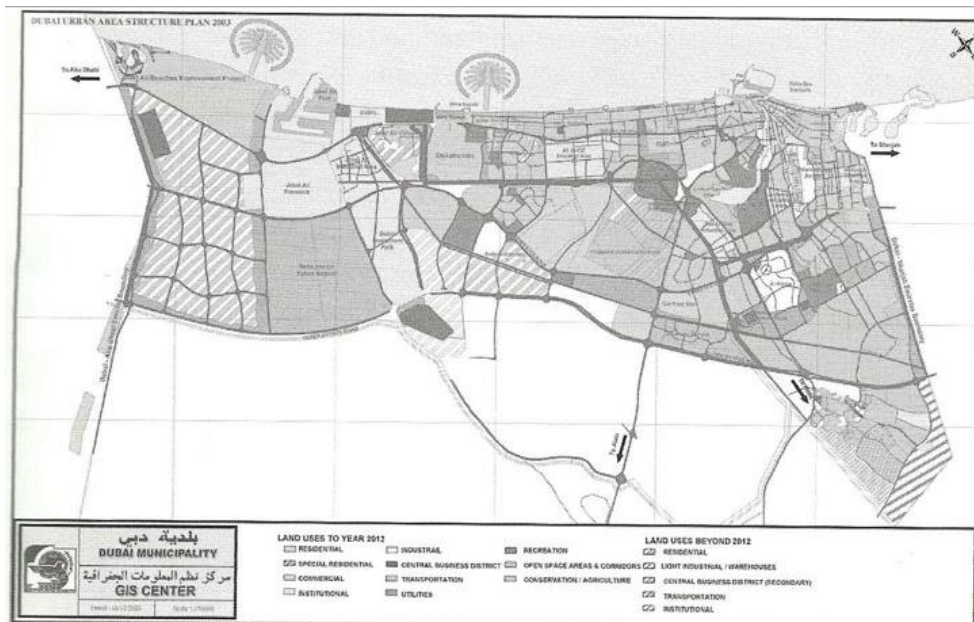


Figure 4.4 John Harris's Dubai Master Plan 1971 (source: www.rudi.net)

The rapid growth of the city helped in offering a modern life style which was attractive for people all around the world to experience the quality of living in Dubai, (figure 4.5) shows the population growth in Dubai at the end of each year.

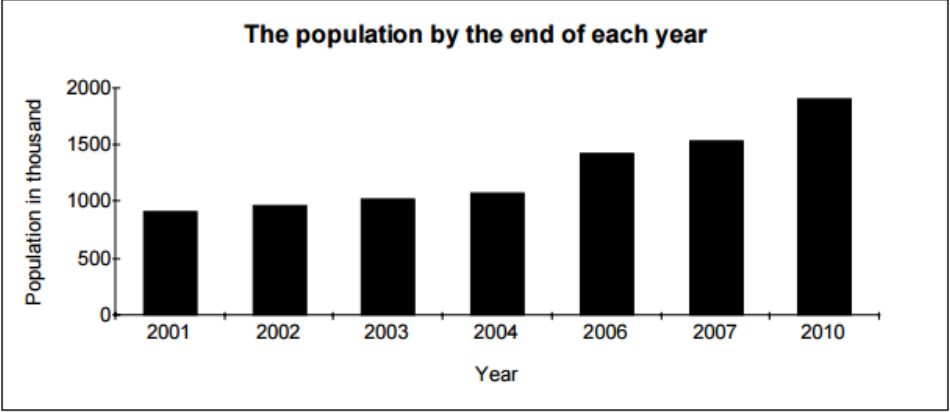


Figure 4.5 the population growth in Dubai inclusive foreign labor (Source: Dubai Statistics 2007)

On the other hand, the city had to pay the negative impact of the CO2 emission; the increased green house gases (GHG) in atmosphere caused by high emissions affected the urban plan development decision, and influenced new strategies and policies, to develop a successful response, the government considered the climate change as major player in developing the new urban planning; Dubai 2020 urban master plan is the result for what was mentioned above, Dubai new master urban plan extended on land and sea, it is divided into 4 main areas as it is shown in (figure 4.6), Government of Dubai (2012) listed the use of each area, starting with Area 1, it presents the off shore man made islands for urban and tourism use, Area 2 is the metropolitan area, it covers existing urban plan in addition to future mega projects such as Dubai EXPO 2020, Area 3 is a dessert area which is used for equestrians and camel racing sport activities, in addition to resorts, conservation areas, gas extraction areas, aquifer zones, farming settlements, utilities and special uses, Area 4 is a non urban area which has the same land use of Area 3 except the camel racing activities.



Figure 4.6 the urbanization parameters of Dubai (Source: Government of Dubai 2012, p.3)

The Government of Dubai (2012) noted the main objectives of the new urban master plan as follows:

- To achieve a sustainable spatial planning.
- It continues promoting existing government infrastructure investments which will offer guidance for other future spatial urbanization.
- Integrate land use planning and mobility networks.
- Keep developing facilities for quality living (hubs, centers, housing, resorts, hospitality and tourism).
- Provide affordable rental housing with community facilities.
- Promote environmental infrastructure.
- Promote environmentally friendly energy supply.
- Promote safe and healthy urban environment.

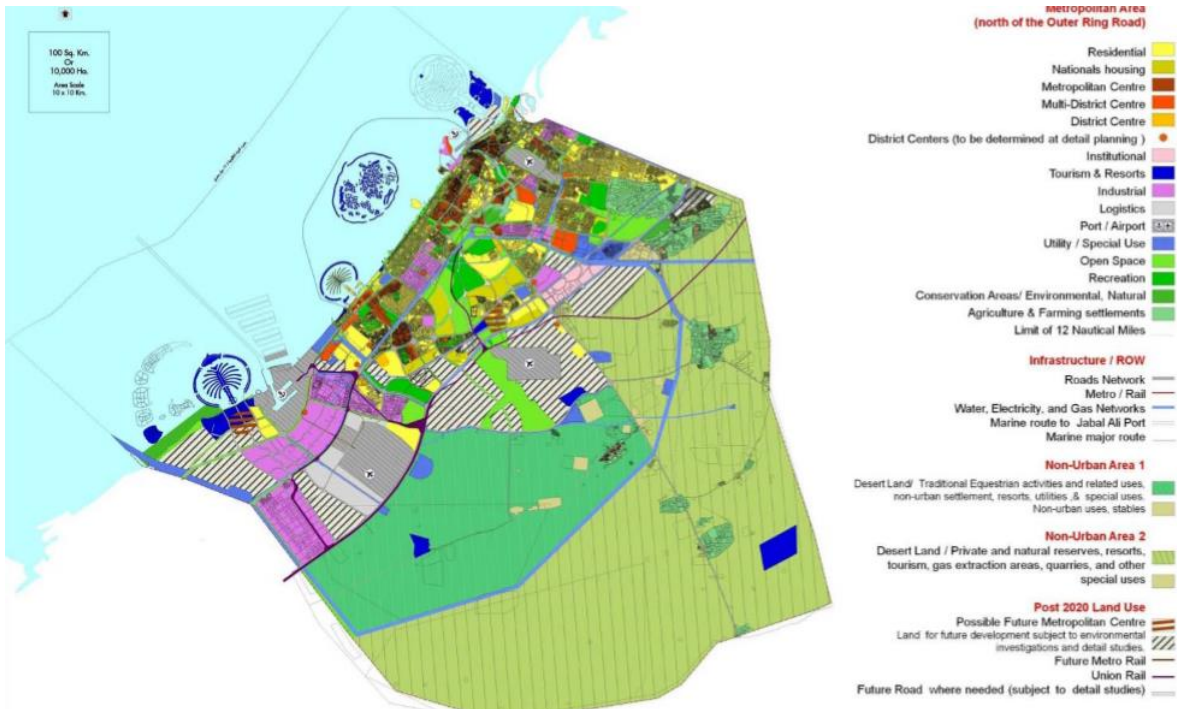


Figure 4.7 the urbanization context of Dubai 2020 urban master plan
 (Source: Government of Dubai 2012, p.13)

4.3 Environmental Revolution in Dubai

According to World Bank, “current and future damage from the region’s rapidly changing climate and calls for strong leadership in preparing countries and communities to face the threat” (World Bank news, 2012), speaking globally, in less than 30 years climate change became a global concern that required a quick response, therefore climate change governance was founded in 1992, it is “the diplomacy, mechanisms and response measures aimed at steering social systems towards preventing, mitigating or adapting to the risks posed by climate change” (Jagers, S.C. and Stripple, J. 2003), the climate change governance handles international, national, and local level cases to give an environmental guidance in terms of production and consumption, it is important for the climate change governance to have the government support towards making an environmental action, based on the governance guidelines, (figure 4.8) illustrates the hierarchical responsibility that must be adopted by the cities to respond to climate change.

As we mentioned earlier in the first chapter, nongovernmental organizations such as (CERES), (WWWF) and UN habitat II play a big role in shaping the future of sustainable cities.

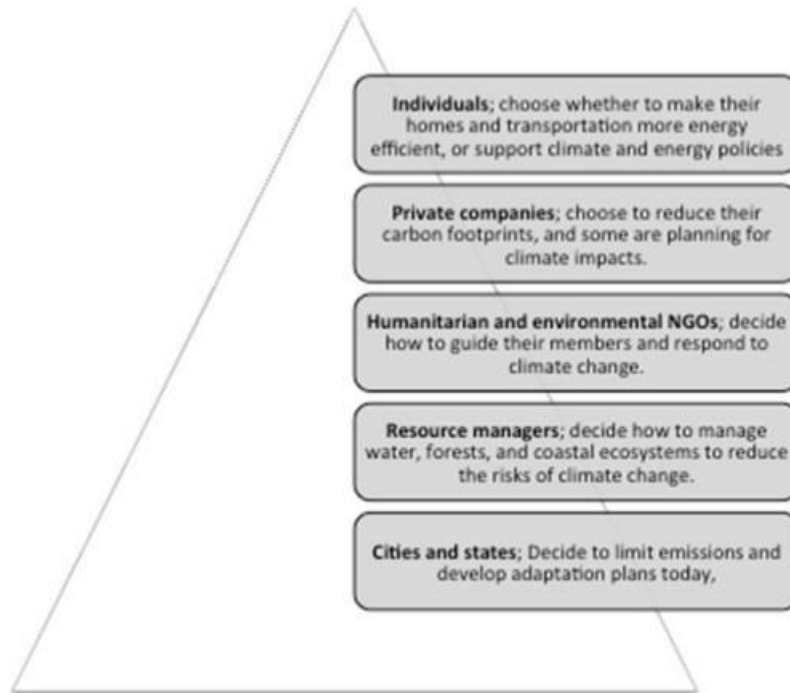


Figure4.8 The hierarchical responsibility to respond to the climate change

(Source: UN Habitat, 2011)

To do an action towards the environmental changes, it is important to declare the reason behind the high rate of footprint in the UAE, (figure 4.9) shows the CO₂ emissions in the UAE by sector, locally, the primary source of energy is fossil fuels (oil and natural gas), according to Debusmann, B. (2015) 33% of greenhouse emissions in UAE is accounted for water and electricity which relies on natural gas, after that comes the road transport as the second largest impact accounting 22% of emissions.

With collaboration among international, national and local authorities to build a climate change, Dubai's government is considering the climate change mitigation as the new objective for economic development.

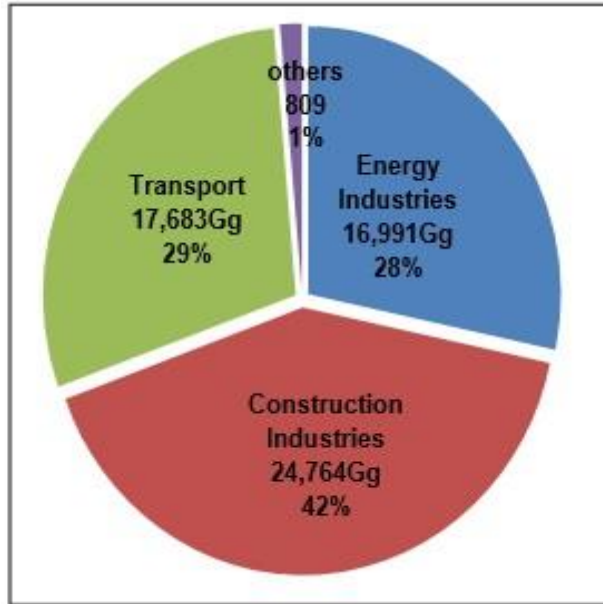


Figure 4.9 the CO2 emissions in the UAE by sector (Source: www.footprintnetwork.org)

As a result for what mentioned above, UAE vision 2021 was launched by H.H. Sheikh Mohammed Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, *“The vision aims to make the UAE among the best countries in the world by the Golden Jubilee of the Union, in order to translate the vision into reality, its pillars have been mapped into six national priorities which represent the key focus sectors of government action in the coming years”* (UAE vision 2010).

One of the main pillars of Dubai vision 2021 is sustainable environment and infrastructure, to achieve that, the agenda of Dubai Vision 2021 aims to improve the air quality, preserve water resources, increase contribution of clean energy and implement green growth plans, (table 4.1) illustrates the national key performance indicators to achieve a sustainable living.

INDEX	INDICATOR	DEFINITION	SOURCE	2012 RESULTS	2021 TARGETS	KEY SPONSOR
1	Air Quality Index	An indicator that measures the quality of air in terms of supplying daily information on pollution and the negative effects it may have on human health. The indicator measures the (4) main air pollutants: nitrogen dioxide, carbon monoxide, sulphur dioxide, ozone	Ministry of Climate Change and Environment in coordination with the National Center for Meteorology & Seismology	65.30% (2015)	90%	Ministry of Climate Change and Environment
2	Percentage of Treated Waste of Total Waste Generated	An indicator that measures the percentage of treated waste out of the total generated waste (solid municipal waste) using various treatment methods (recycling, incineration, waste-to-energy, chemical treatment, exporting for external treatment, except for the landfill), in line with the methodology used by the OECD.	Ministry of Climate Change and Environment in coordination with the Federal Competitiveness and Statistics Authority	20.77% (2015)	75%	Ministry of Climate Change and Environment
3	Share of Clean Energy Contribution	An indicator that measures the contribution of clean energy sources (renewable, nuclear) to the total energy mix.	Ministry of Energy	0.23% (2015)	27%	Ministry of Energy
4	Water Scarcity Index	An indicator that measures water overuse by monitoring fresh water usage (including surface water, renewable water and fossil water) as a percentage of overall renewable water in the UAE. The result is weighted to take into account desalination and waste water treatment.	Ministry of Energy	Ratio of 6.95 (2015)	Ratio of 4.0	Ministry of Energy
5	Networked Readiness Index (Telecommunication & IT sectors)	A composite indicator that measures the readiness of a country to capture opportunities provided by information and communication technology to increase competitiveness based on (4) perspectives: Environment (the regulatory environment for information and communication technology and the environment for business and innovation), Readiness (Infrastructure for information and communication technology and availability of expertise / skills), Usage (use of ICT by individuals, businesses, and government), Impact (the economic and social impact of information and communication technology).	World Economic Forum - Global IT Report	Rank 26 (2016 Report)	Among the top 10 countries	Telecommunications Regulatory Authority
6	Quality of Air Transport Infrastructure	An indicator that measures the overall level of infrastructure at airports in the country and its adherence to international standards	World Economic Forum - Global Competitiveness Report	Rank 2 (2015 - 2016 Report)	Rank 1	General Civil Aviation Authority
7	Quality of Port Infrastructure	An indicator that measures the overall level of infrastructure of ports in the country and its adherence to international standards	World Economic Forum - Global Competitiveness Report	Rank 3 (2015- 2016 Report)	Rank 1	Federal Transport Authority- Land & Maritime
8	Logistics Performance Index	A composite indicator that measures the quality of infrastructure support for logistics activities based on a global survey on the performance of logistics in (6) perspectives: the effectiveness of border and customs management in terms of simplicity and speed, the quality of trade and transport infrastructure, the ease of shipping at competitive prices, the efficiency and quality of logistics services, the ability to track and trace cargo, and arrival of cargo to destinations on time.	World Bank	Rank 13 (2016 Report)	Among the top 10 countries	Federal Transport Authority- Land & Maritime
9	Quality of Overall Infrastructure (such as transportation, electricity and telephone lines)	A composite indicator that measures the overall level of infrastructure based on (2) perspectives: the infrastructure for transport and the infrastructure for electricity and telecommunication. The first perspective assesses the overall level and quality of road networks, air transport infrastructure and port infrastructure, while the second perspective assesses the quality of electricity supply and telecommunication infrastructure.	World Economic Forum - Global Competitiveness Report	Rank 4 (2015-2016 report)	Rank 1	Ministry of Infrastructure Development
10	Online Services Index	An indicator that measures the evolution of e-government services (smart services) in terms of availability, quality, connectivity and diversity of channels and the use by the public of these services.	United Nations E-Government Survey	Rank 8 (2016 Report)	Rank 1	Telecommunications Regulatory Authority
11	Time to Obtain a Loan/ House from the Government for UAE Citizens	An indicator that measures the extent to which the country meets the housing needs of UAE citizens by measuring the waiting time between the date of application and the date of obtaining the loan/house (NKPI specific to UAE)	Sheikh Zayed Housing Programme	Work in progress	2 years from application date	Sheikh Zayed Housing Programme

Table 4.1 national key performance indicators for sustainable environment and infrastructure

(Source: www.vision2021.ae)

4.4 Dubai's Location

Dubai is located on the Persian Gulf; it is located on the north-eastern coast of the Arabian Peninsula, Dubai is the largest emirate in the United Arab Emirates with an urban area of (3885 sq.km), it shares borders with a number of countries, the southern and western borders are shared with Saudi Arabia, the southern and eastern borders are shared with Oman.



Figure 4.10 Dubai's location (Source: www.infoplease.com)

Dubai's topography is highlighted with sand desert pattern, it is blessed to be extended along the coast of the Arabian Gulf, in addition to having the creek where the trade city developed, the creek divides the city into two regions, Deira side (the northern side) which is known with its local market and Bur (old) Dubai side which is full of residential areas with live markets.

Dubai's significant location at the cross-roads of Europe, Asia and Africa allows it to become a leading centre for logistics and trade (Aspinall, S. 2005).

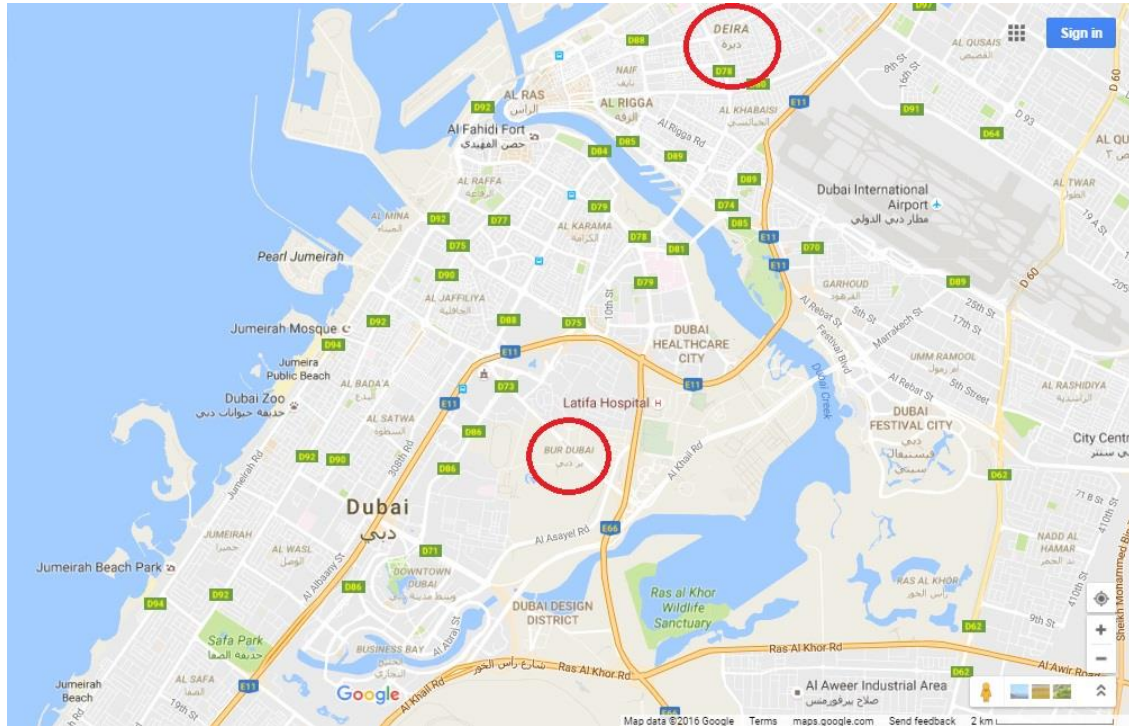


Figure 4.11 The location of Creek Dubai – the location of Bur Dubai and Deira
(Source: Google map)

4.5 Dubai's Climate

Dubai has a hot arid climate with two main seasons (summer and winter), the humidity can reach to 90% on the coast during summer or winter, while average annual humidity declines to 45% inland; in Summer the highest temperature can reach to over 50 °C in July, while in Winter the lowest temperature can reach to 12- 15°C and less than 5 °C in the desert or on the mountain, the temperature is generally in mid twenties at day time in Winter.

Rainfall in Dubai does not last for long time; it rains in winter period mainly in February and March.

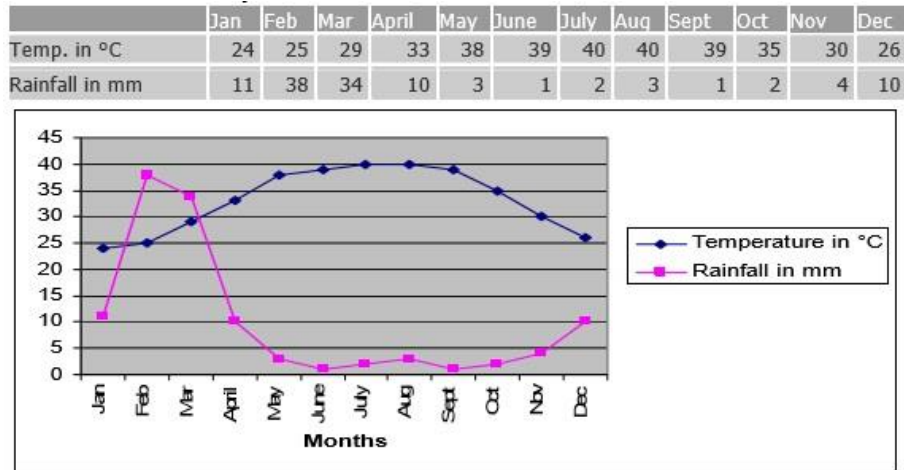


Figure 4.12 Mean monthly maximum temperature (Abu Dhabi) and national mean monthly rainfall. (Source: www.avmet.ae)

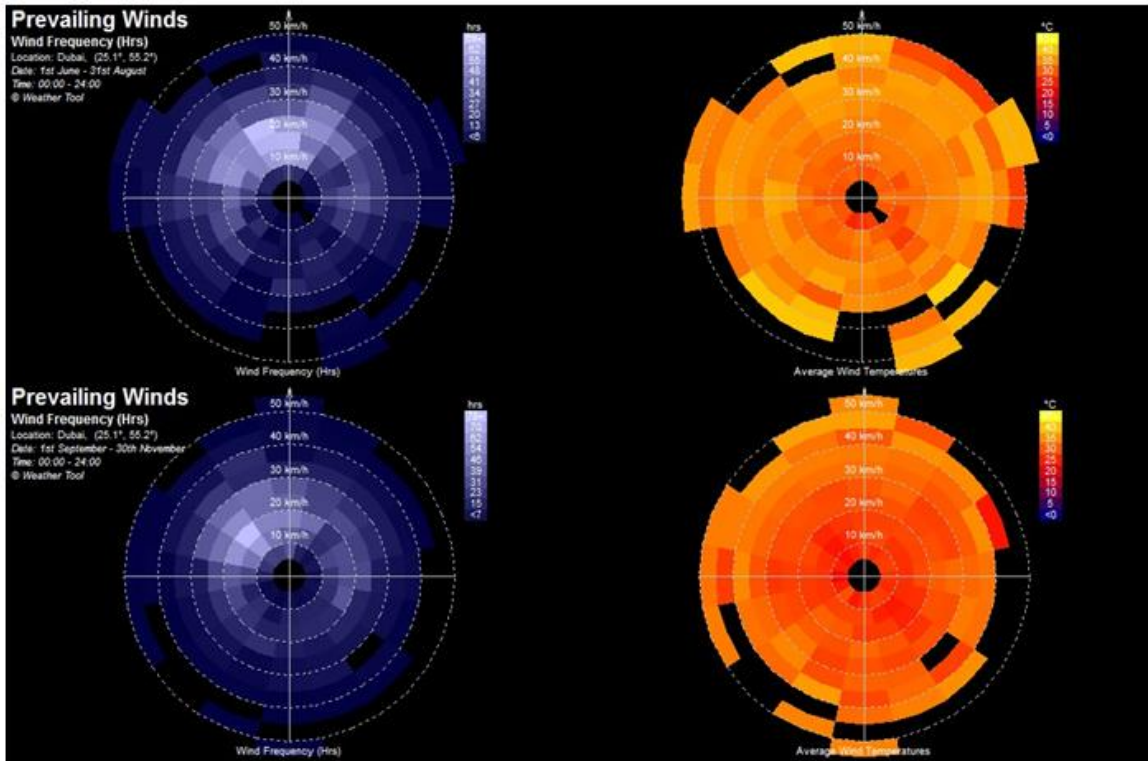


Figure 4.13 Figure 22. Wind Temperature and Direction in Dubai (Source: Ecotect 2016)

The prevailing wind in Dubai comes from the north western direction, (figure 4.13) highlights the wind frequency in all directions and the annual wind temperature through the whole year.

4.6 The preparation for EXPO 2020

On the 27th Nov 2013 Dubai won the bid to host EXPO 2020 under the theme “Connecting minds, creating the future” which will take place At Dubai trade center- Jebel, Dubai will be fully prepared to welcome 25 million visitors from all around the world within six months starting from 20th of October 2020 till 10th of April 2021; Dubai is planning to host the most sustainable world EXPO event, therefore it will be a great challenge for the fastest growing metropolis to present globally what are the strategies for other countries to follow for a sustainable development.

In order to achieve a sustainable event, the executive council of Dubai had established a steering committee to co-ordinate Dubai policy on EXPO plan, (figure 4.15) illustrates the key stakeholders of Expo 2020 (Serkal 2014).



Figure 4.14 The key stakeholders of Dubai Expo 2020 (Source: Author)

First of all the Key stake holders initiated public plans to pave the path for Dubai’s urban development and work as a guidelines for EXPO 2020 to follow to form the Dubai Vision 2021:

Dubai Plan 2021:

In 2015 H.H Sheikh Hamdan Bin Mohammed Bin Rashid AL- Maktoum Crown Prince of Dubai and Chairman of Dubai Executive Council initiated the development of Dubai plan 2021, it aims to continue on the growth of Dubai in many fields, despite of the challenges, Tachouali, D. and Altan, H. (2015) noted that Dubai plan 2021 is a long- term strategy to achieve a greener economy for sustainable development and to create a city of a happy citizens.

Dubai plan 2021 will enhance the government’s role to optimize the metropolis structure and interact with other forces (civil society and private corporation) to promote growth, Dubai plan 2021 (2015) addresses 6 themes (The people, The Experience, The place, The economy, The government and the society), each theme highlights strategic development aims of Dubai as follows:

- **The place:** The citizens of Dubai are the first priority of Dubai Plan 2021, the theme aims to enhance the feeling of responsibility each individual must have to support his/her family and the society, this can be achieved by educating the people and offering a healthy living trends.
- **The Society:** Dubai has the highest percentage of different nationalities that have come to call Dubai home, the diversity of Dubai’s society enriches the city and supports the growth by dedicating the talents of its global population towards developing the city.

1	A Vibrant and Sustainable Multi-Cultural Society: A population that is economically and demographically sustainable and for which multiculturalism is a source of strength and pride.
2	A Tolerant and Inclusive Society Embracing the Civic Values of Dubai: A society in which people are treated equally and fairly and share a set of core civic values including tolerance, and personal responsibility.
3	Cohesive Families and Communities Forming the Bedrock of Society: Families and communities that provide nurturing environments for personal development, including the raising of children inculcated with core values of personal responsibility, creativity and tolerance.

Table 4.2 the aims of the society theme (Source: www.dubaiplan2021.ae)

- **The Experience:** Dubai always offers the best quality experience to its visitors, and the highest living quality to its residents, moreover, this theme focuses on enriching Dubai’s experience by investigating the people’s demands through education, health

care, housing services, in addition to creating happy moments through parks, beaches and sport facilities in a safe environment.

1	A City with the Best Educational, Healthcare and Housing Services Catering to Everyone's Needs: High quality housing, education, and healthcare services that are accessible for each socio-economic segment of society and a globally competitive cost of living.
2	Vibrant and Active, Providing a Rich Cultural Experience and Globally Distinctive Entertainment Outlets: Dubai offers a diverse set of cultural and recreational options, including green spaces, beaches, sporting facilities, entertainment options and cultural experiences making it an attractive and entertaining city for residents and a popular destination for tourists.
3	The Most Secure Place: A feeling among residents and workers living in Dubai and tourists visiting Dubai, that the city is a safe and secure place to be and that any personal security concerns are dealt with efficiently and transparently by law enforcement authorities.

Table 4.3 The aims of the experience theme (Source: www.dubaiplan2021.ae)

- **The Government:** H.H Sheikh Mohammed Bin Rashid Al- Maktoum Vice-President and Prime Minister of the UAE and Ruler of Dubai declares that the government's first priority is the people, the reason behind people's happiness is a successful government that pave the path towards meeting the needs of its residents in all aspects.

1	Proactive and Creative in Meeting the Needs of Individuals and Society as a Whole: The government is forward-looking, proactively listening to and engaging all stakeholders, to ensure that its policies and services meet the needs of individuals and society as a whole, in the present and the future. It also aims to simplify the lives of people through the provision of smart, high quality government services reflecting the individual activities and institutional requirements.
2	Sustainable and Innovative in the Management of its Resources: The Government of Dubai adopts a culture of innovation and excellence in its approach to the management of public finances in a manner that sustainably supports city development and environmental friendliness, and human resource practices that ensure the accumulation and continuity of knowledge and experience for the government.
3	Transparent and Reliable: The Government of Dubai ensures a fair and reliable application of all laws and regulations in order to preserve the rights of the individuals and institutions. It is also committed to adopting a transparent approach in the development and implementation of all policies, legislations and services.

Table 4.4 The aims of the government theme (Source: www.dubaiplan2021.ae)

- **The economy:** Dubai became a major business centre for trade, logistics, finance and tourism, Dubai was announced as the capital of Islamic economy which adds more value to the city, the theme focuses on sustaining the growth of Dubai’s economy by the most business friendly environment, moreover, the theme aims to diversify the economic activities that would develop Dubai’s economy.

1	A City that Enjoys Sustainable Economic Growth: Economic growth that is resilient to disruptive shocks because it is underpinned by a diversified base of economic activity, innovation in business models and increasing productivity of labor and capital.
2	One of the World’s Leading Business Centres: Consistently ranked as one of the top 5 global centers for trade, logistics, tourism and finance as well as internationally recognized as the leading financial and trading center at the heart of the Islamic economy.
3	The Most Business Friendly City and a Preferred Investment Destination: Dubai is the preferred investment destination for foreign capital, and takes its position as the most business friendly city in the world.

Table 4.5 The aims of the economy theme (Source: ww.dubaiplan2021.ae)

- **The Place:** The theme focuses on addressing Dubai as a smart and sustainable city by building and integrating infrastructure that offer accessible mobility for all citizens and tourists, to reach economic centers and social services easily, the theme enhance the importance of sustainability for Dubai’s growth through integrating clean energy sources and mitigating the use of natural resources.

1	A Smart, Integrated and Connected City: The infrastructure that supports the economic and social life of Dubai as a city matches world-class levels of efficiency and citizen accessibility, and that allows for future growth of the city.
2	Sustainable with its Resources: A city that uses its resources sustainably over the long-term and in line with international best practice levels in terms of consumption, efficiency, and management, and in its dependence on renewable energy sources.
3	Environmental Elements are Clean, Healthy and Sustainable: Dubai enjoys a clean and healthy environment in all its elements and ensures its sustainability in the long-term, and in line with the world’s best practices.
4	A Safe and Resilient Built Environment: Safety standards across the built environment — including building and transport safety codes and emergency services and crisis/ disaster response capabilities — that match international best practices.

Table 4.6 The aims of the place theme (Source: www.dubaiplan2021.ae)

4.7 Dubai EXPO 2020 Theme and Sub-Themes

Under the theme of EXPO 2020 “Connecting minds, creating the future” Dubai is aiming to welcome 180 participants from different countries to explore by connecting and exchanging knowledge to solve global issues and create a new future; this EXPO will work on achieving a sustainable legacy of knowledge and best practices that serve the nation and the next generation.

Dubai EXPO will be a great opportunity to put a long- term solutions to global problems by global collaboration, the world greatest challenge is to shape a better future, especially that the human’s impact on the environment and the society is becoming more intense, this can be a major concern, therefore, EXPO will contribute to sustain Dubai’s growth within a healthy environment to be a role model for other countries.

The sub-themes will help in facilitating the collaboration and inspire the participants; Expo2020 will focus on three sub-themes:

- **Opportunity:** it enables everyone and the communities to have a voice, share their priorities, and investigate new strategies to approach their social and economic potential, this can be achieved by education, physical and virtual connectivity.
- **Mobility:** it is the bridge to a better future; it helps in facilitating the connection between people to trade and force the link between people and communities; through subtheme of mobility Dubai aims to use mobility to create opportunities.
- **Sustainability:** it is the key to pursue progress without compromising the needs of future generation, it is important to highlight the responsibility of individuals and communities to protect the environment and mitigate the impact of climate change by considering the right choices, technologies and policies that will affect on the planet positively.

4.8 EXPO 2020 Site

Starting with the site choice, EXPO 2020 is chosen to be in phase 2 according to the urbanization parameters of Dubai, it is located in South Dubai project at (World Trade Center- Jebel Ali) which is considered to be the new emirate's flagship urban project for 2020, it covers a total area of 4.38 square kilometers, including a 200 hectare gated area with 4 main entrances, it is expected that the number of visitors will reach to 25 million, the site can accommodate 300,000 guests at once, (figure4.15) shows the location of EXPO 2020 (Rahman, S. 2013) .

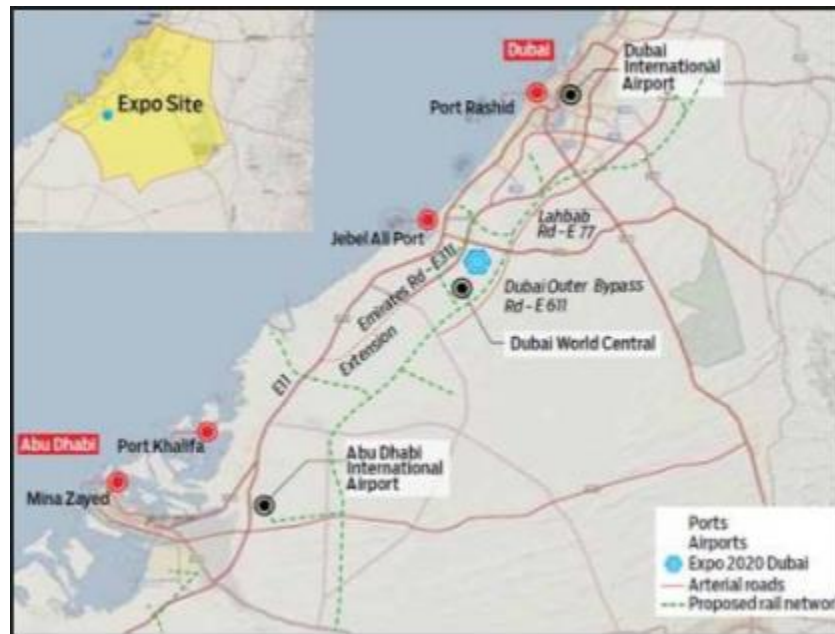


Figure 4.15 The location of Expo 2020 (Source: www.gulfnews.com)

This area is considered to be part of the new urban development of Dubai; the site plan was designed according to the requirement of Dubai plan 2021, the location is distinguished with different factors, the main street is located on the north side (E 311- Mohammed bin Zayed road), on the west side the site is bordered with Dubai south HQ, the south side is sharing borders with Al- Maktoum International Airport and the villages project, the west side is populated by Dubai investment park as it is shown in (figure 4.16).

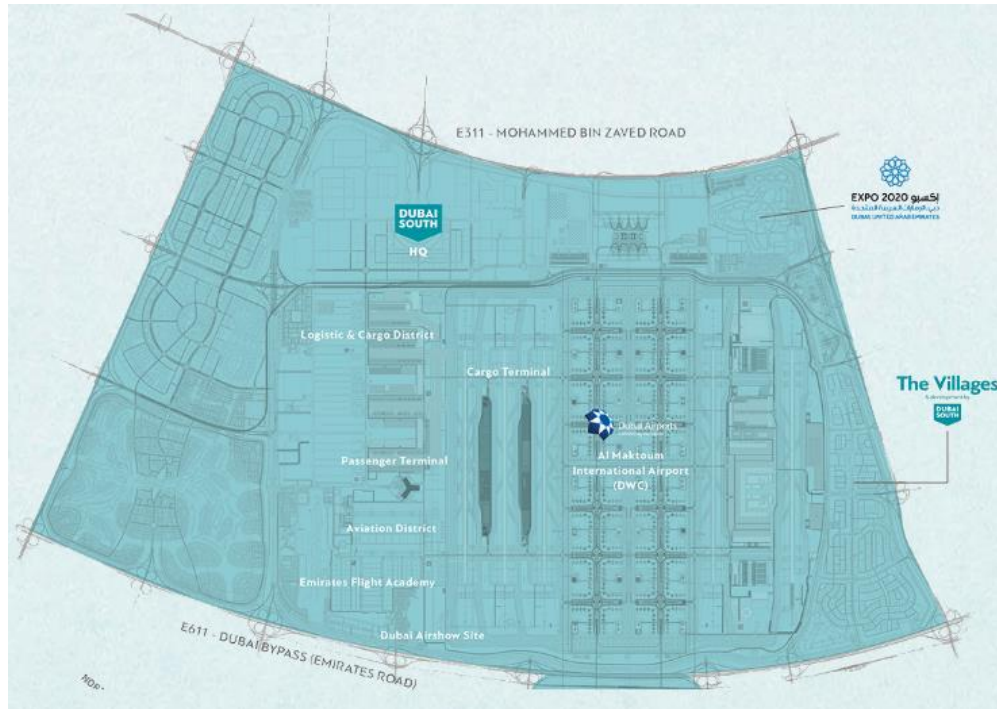


Figure 4.16 Dubai Expo neighbor boundaries (Source: www.Dubaisouth.ae)

According to the master plan of Dubai 2020, the EXPO site will prepare Dubai south to be livable by 2020, therefore, Dubai EXPO contexts will adopt Dubai plan 20201 aims and present Dubai theme and subthemes through its elements; adgeco (2014d) noted that the master plan has been developed by Dubai municipality in cooperation with other key stakeholders of EXPO 2020 and major developers, the team leaders of Hok-Arup were chosen for their successful experience in designing sustainable projects and international mega events, the master plan is designed to serve EXPO requirements, in addition to Dubai future urban, economic and social development.

The site is designed to create lasting legacy, it consists of main (8) elements: Al Wasl, Opportunity pavilion, Mobility pavilion, Sustainability pavilion, Performance park, Children park, UAE pavilion and Expo village (figure4.17) illustrates the site contexts of EXPO 2020.



Figure 4.17 Expo 2020 site context (Source: Author)

Al Wasl: Al Wasl (meaning the connection in Arabic) is the central plaza of the event, it is connected with the three main zones and four main pavilions which are dedicated for the subthemes and the UAE pavilion.

Opportunity Pavilion: The pavilion is designed by Bjarke Ingels Group (BIG) which is known for its innovative approach to architecture, the pavilion features a dynamic form of fins that is arched at the core to embrace a garden landscape and restaurant, it covers an area of 1200 m², the pavilion can be used for big events or small ones, in addition to private and public ceremonies to connect people together and achieve the aim of the subtheme by creating opportunities (big 2013).



Figure 4.18 The opportunity pavilion (Source: www.m.big.dk)

Mobility Pavilion: Deulgaonkar, P. (2016b) shared that the London-based practice Foster + Partners won the competition to design the mobility pavilion which is featured in a tiered trefoil shaped building.



Figure 4.19 The mobility pavilion (source: www.emirates247.com)

Sustainability Pavilion: Grimshaw architects the leaders in the field of sustainable architecture won the competition to design sustainability pavilion, the building is meant to be a long-term cluster center to promote innovative technologies, the design is featured in an elliptical shape, with a replica of a large solar collector, the curved form will be surrounded by small collectors which will be distributed around the main pavilion (Fahy, M. 2016)



Fig www.emirates247.com)

The UAE Pavilion: The concept by the Spanish architect Santiago Calatrava won the competition with design inspired by a falcon in flight, it carries the spirit of UAE and connects the UAE to the minds of the world; the pavilion will cover an area of 15,000 m² facing Al-Wasl plaza; the pavilion consists of exhibition areas, an auditorium, food and drinks outlets and special visitors lounges. (MyownDubai 2016)

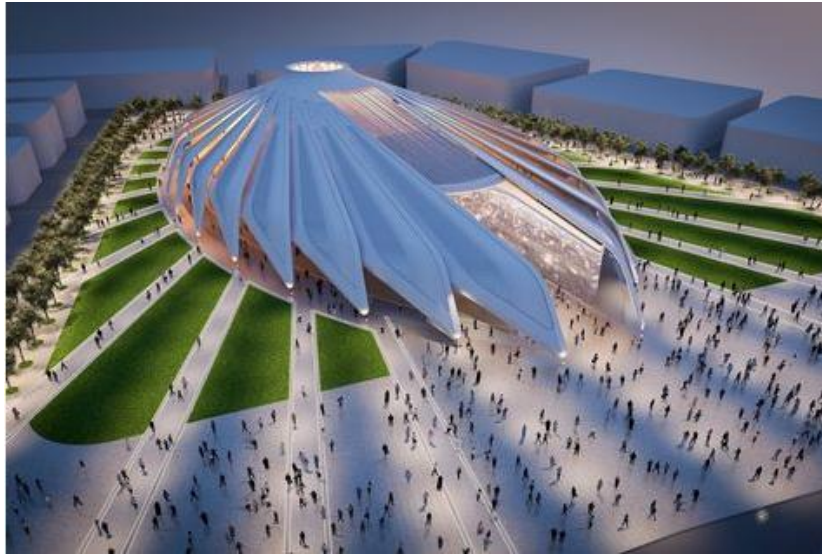


Figure 4.21 The UAE pavilion in Expo 2020 (Source: www.arabianbusiness.com)

4.9 The Summary

In Chapter four, the research covered the pre-event phase of Dubai EXPO 2020, to evaluate the local study, it is important to go through the history of Dubai urban development and the environmental revolution to estimate the recent environmental and urban condition of the host city, based on the given information.

In Chapter five based on Dubai's recent condition, the study will evaluate the planning for EXPO 2020 according to the demonstrated strategies and Shanghai EXPO 2010's experience.

CHAPTER 5. THE EVALUATION OF PLANNING FOR EXPO 2020 BASED ON SUSTAINABLE WORLD EXPO STRATEGIES AND SHANGHAI'S EXPERIENCE

Introduction

Due to the fact that Dubai EXPO 2020 is still in the pre-event phase, the plans for the pre-event phase are still not complete; however the research will investigate the planning process based on sustainable world EXPO strategies which have been demonstrated in chapter 2 to highlight the main sustainable urban planning aspects that every mega event should consider to contribute in the urban planning development of the host city; based on the China's experience, the analyzed practices from Shanghai Expo 2010 will path the way for Dubai to achieve a sustainable event especially these two cities have developed in parallel and they considered sustainability as a first priority in planning process.

Firstly, the research will cover Dubai's planning process through the pre-event phase based on the sustainable World EXPO strategies; secondly, based on Shanghai's case study, the research will suggest guidelines for Dubai EXPO to follow in different aspects to harness the role of EXPO in developing the urban plan of the city based on Shanghai's experience.

5.1 The Planning Process for Dubai EXPO Based on Sustainable World EXPO Strategies

5.1.1 Social Development

Pre-event:

-Restructuring the social life:

One of the most important facts that supported Dubai's bid to host EXPO 2020 was the national support; however, the fervor of Dubai's population to host the event was overwhelming, Augustine, B.D (2014) pointed out that according to a recent survey of more than 1,000 residents, 95% of the Dubai residents believed that EXPO will impact their lives positively.

Since Dubai won the bid, the city's urban development plan was been adjusted to adapt with the impact of EXPO 2020, the EXPO stakeholders took in consideration Dubai growth rate of 4.2 percent per year which will reach to 2.8 million people by 2020 (Todorova, V. 2014),

therefore, Dubai World Central will be developed in parallel with EXPO event to adapt the population growth of the city, according to the Master Plan of Dubai 2020, EXPO site will catalyze the development of Dubai south to sustain the livability of the surrounding area after EXPO, (figure 5.1) shows the population growth of Dubai by 2020.

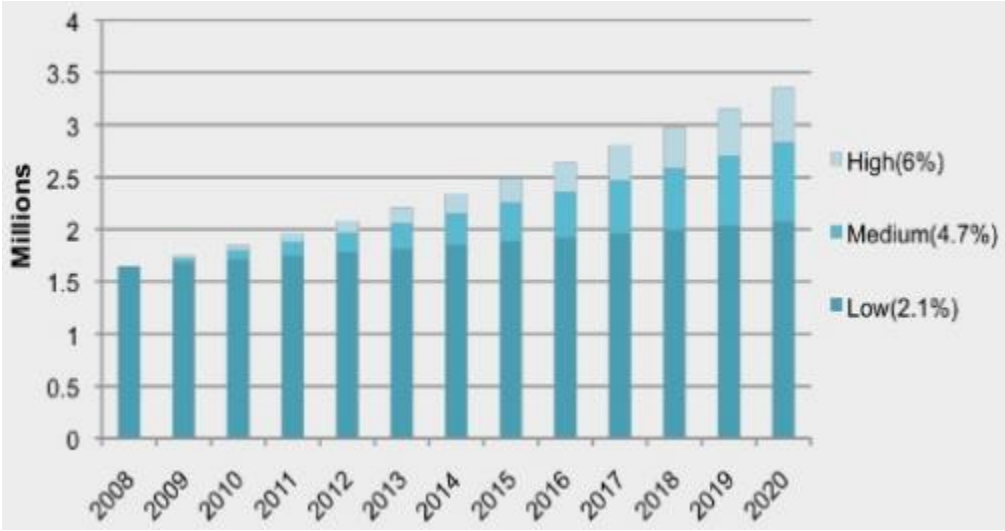


Figure 5.1 Dubai population growth by 2020 (Source: www.lookup.ae)

According to (Figure 5.1) Dubai Municipality will consider the medium scenario of the population growth, (figure 5.2) shows Dubai World Central District which is part of Dubai new urban extension by 2020.



Figure 5.2 The location of Dubai World Central District (Source: www.2daydubai.com)

5.1.2 Economic development

Pre-event:

-Main public investments: Dubai EXPO 2020 is a great opportunity to boost the economic growth of the city, as Dubai aware of depletion of oil reserves, Dubai EXPO will focus on diversifying the economic activities that would develop Dubai's economy, therefore, in 2014 Dubai Electricity & Water Authority initiated the inaugural World Green Economy Summit which was held in Dubai for the first time as a first action towards innovative solutions seeking to accelerate the transition in to the green economy (WGES 2016c); WGES highlighted important commitments to achieve a sustainable economy under the UAE vision 2021 by achieving the following:

- Developing WGES as key global green- economy platform
- Establishing a Public- Private Partnership Platform to facilitate and showcase innovative projects, partnerships and technology
- Actively support initiatives and platforms launched out of WGES 2014
- Support the development of innovative financing mechanisms for green projects and investments
- Develop and showcase leading-edge green innovation
- Engage the youth in green-economy activities
- Publish an annual Dubai Green Economy Report as a platform for discourse

Table 5.1 the commitments of the World Green Economy Summit in Dubai

(Source: www.dcce.ae)

(Interviewee A) added that the stakeholders of EXPO are committed to delivering a world-class mega-event with a budget of EUR 6.5 billion (Dh32.33bn), it is important to mention that most of this investment, particularly the investment devoted to the physical infrastructure is a commitment to generating value throughout the journey, event and legacy, and it is looking to deliver an event which will add an estimated Gross Value of EUR 17.7bn to Dubai's economy. (Return on Investment).

According to Ratcliffe, V. (2014) the main sectors will benefit from EXPO are the construction and hospitality industries, starting with EXPO site and Dubai World Central district, the site will include building 700000 m² of pavilions and 500000 m² of permanent structures; a massive expansion in Dubai hotel infrastructure to accommodate 25 million

visitors during Exp2020; (Table 5.2) shows that 270.000 jobs will be created, 40% in the travel and tourism sector and 30% in the construction sector which will be generated between 2018 and 2021.

WORLD EXPOS' ECONOMIC EFFECTS								
Year	City	Country	Visitors (m)	Area (Ha)	Countries	Cost USD bn	Total Spending (USD bn)	Jobs Created
2020E	Dubai	UAE	25	438	182	8.1	18	270,000
2015E	Milan	Italy	20	110	140	3.5	N/A	NA
2010	Shanghai	China	73	528	192	4.2	53	220,000
2005	Aichi	Japan	22	173	121	3.3	N/A	N/A
2000	Hanover	Germany	18	160	155	3.4	N/A	N/A

Source: Expo events; e=estimated

Table 5.2 World EXPO's economic effect (Source: www.meed.com)

5.1.3 Urban Governance

Pre- event:

-New system to regenerate urban areas: Dubai EXPO 2020 is supported by the government with international significance and associated with national ambition; as it was mentioned above Dubai EXPO stakeholders include governmental organizations to ensure the role of local authorities in delivering sustainable event, based on (Dubai plan 2021) the government's new system will enhance transparency, its first priority is the people, therefore, in 2014 H.H Sheikh Mohammed Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai launched a strategy to transform Dubai to a smart city which aims to provide a better connection between the people and the government, it will dedicate EXPO to meet people's needs by 2020, starting with the financial support for big investments such as Al-Maktoum airport which will be the first tourist experience within EXPO journey, moreover, the government will focus on the legacy of EXPO by supporting the development of EXPO site and the surrounding urban fabric.

One of the major investments for EXPO is "route 2020" project for metro extension; the line's extension is 15km long and includes seven new metro stations as it is shown in (figure 5.3) to encourage the use of public transportation by residents and tourists; the Route 2020

project harness the vision of the Dubai Government for achieving sustainable development and developing a world-class infrastructure and services.



Figure 5.3 “Route 2020” project shows the extension to EXPO 2020 site (Source: www.rta.ae)

-fostering the relation between government and private sector: (Dubai plan 2021) enhance the relation between the government and all stakeholders to meet the needs of individuals and the society, the stakeholders of EXPO 2020 believe that private sectors are economic drivers and offer important contribution to Dubai evolution as a sustainable city, therefore the government will provide the opportunity for private sectors to be part of the preparation of EXPO through regular workshops to engage private sectors, individuals and the society, in addition to international business economy to share expertise.

5.1.4 Sustainable Built Environment:

Pre-event:

-Improving regional continuity planning: Dubai EXPO 2020 will be used to improve the regional continuity planning of Dubai south, as part of preparation for EXPO 2020, EXPO stakeholders aligned the infrastructure of the event with the city’s urban planning objectives

to demonstrate a new city in Dubai south which will cover the population growth by 2020, according to (interviewee B) to keep attracting people to Dubai by 2020, Dubai south will be developed as a gem in the heart of the south with feeling the existence of EXPO even after the end of the event, (figure 5.4) shows the location of the new project (Dubai World Central) which include EXPO site as an exhibition city, it is a 145 km² city that will accommodate 1million people by 2020, EXPO will catalyze smoothly the development of Dubai south which will be the new emirates flagship urban project and new bench mark for the city.



Figure 5.4 The location of Dubai World Central (Source: www.dubaisouth.ae)

-Utilization of built environment: (Interviewee A) explained how Dubai EXPO will be the most sustainable EXPO by considering the legacy plan in the preparation phase:

“Legacy was at the core of master plan and includes identifying key anchor initiatives and programs that will drive the economic sustainability of the site, and form an enduring ecosystem that promotes innovation and education in the areas of the subthemes, the vast majority of the material used in permanent construction on the site (90% of the total) will be reused or repurposed in the legacy state of the buildings and infrastructure.”

The physical legacy is one of the main objectives of EXPO:

- The site itself: A state of the art exhibition centre, academic and research institutions and a technology cluster.
- Iconic structures: Starting with the Sustainability Pavilion, it will serve as a permanent destination where visitors will continue to immerse themselves in the wonders of Nature and learn about the latest developments around sustainable practices. In addition to showcasing these developments it will also be a platform that will allow for research in this field, the Mobility Pavilion will be converted into an education institution, focusing on the area of logistics, the Opportunity Pavilion is being developed as a flexible structure that can accommodate multiple developments such as commercial offices and educational facilities.
- Infrastructure which will lie at the heart of the development of Dubai South. The utilities infrastructure and equipment installed for EXPO 2020 Dubai will also be maintained for legacy purposes, as will the majority of the roads and transportation infrastructure built to facilitate access to the site, including the extended Metro service and Expo 2020 Dubai station.

5.1.5 Improving Technology and Innovation:

Pre- event:

-Green technologies to serve sustainable urban planning: Dubai EXPO will be a platform to present the latest technology that serves the human's needs; the research will focus on the green technologies that serve the urban planning of EXPO site; a list of green technologies were applied to transform EXPO site to a sustainable smart city; as it was mentioned earlier, EXPO 2020 will contribute to achieving the UAE 2021 Vision by supporting the growth of tourism, stimulating the development of innovative businesses, and enhancing the country's international reputation as a location to do business, therefore, in 2014 Smart Dubai is a new initiative which will focus on: smart life, smart transportation, smart society, smart economy, smart governance and smart environment. Dubai Expo will focus on the six pillar, the green technologies that will serve the urban planning are as follows:

-Smart grid implementation: according to Dubai carbon 1 green economy Enabler (2015) as part of Dubai plan 2021, Dubai Electric and Water Authority (DEWA) is putting a 10 years plans to implement a smart grid deployment to connect renewable energy recourses to the

grid to reduce energy consumption and improve carbon footprint, DEWA plans to install one million smart meters by 2020 across Dubai, moreover, DEWA's solar power plants at the Mohammed bin Rashid Al Maktoum Solar Park, it will be the first largest single site solar energy projects in the world, the solar park's capacity will be 5,000 MW by 2030, and will help reduce 6.5 million tons of carbon emissions yearly.

-smart transportation: DEWA is planning to set up car charging stations for smart cars and smart buses to offer smart transportations for the visitors.

-Technologies for urban waste management: Dubai EXPO is planning for 25% reduction in consumption of water across the pavilions, moreover, a source and waste management strategy will be working on managing waste that would arise through the preparation for EXPO, during Expo and during legacy phase by re-using materials and recycling waste materials.

5.1.6 Environmental Management

Pre- event:

-City situation and context determine the environmental challenge: According to Debusmann, B. (2015) 33% of greenhouse emissions in UAE is accounted for water and electricity which relies on natural gas, after that comes the road transport as the second largest impact accounting 22% of emissions, H.E Reem Ebrahim Al Hashimy UAE Minister of state and managing director of Dubai EXPO 2020 higher bid committee ensured that EXPO 2020 will contribute to achieving the UAE 2021 Vision by developing a sustainable city that keeps humanity footprint within planetary boundaries; as a result, the first edition of the State of Energy Report 2014 was launched in collaboration with the United Nations Development Programme (UNDP) and Dubai Carbon, the report path the way towards achieving green building for generation to come (State of Energy Report Dubai 2014).

(Interviewee A) declared that EXPO 2020 Dubai aims to have LEED (Leadership in Energy and Environmental Design) Platinum certified sustainable building that reflects the subtheme of sustainability including the UAE National Pavilion at the EXPO 2020 Dubai. The Santiago Calatrava designed pavilion will be a highly innovative and sustainable pavilion that will be one of many LEED certified structures to populate EXPO 2020 Dubai site, moreover, 50%

of energy requirements met from renewable sources, of which half will be produced on-site, and Buildings on the EXPO 2020 Dubai site will use 25 per cent less water than the regulatory requirement, and all water used for irrigation and cooling will be recycled.

5.2 What can Dubai EXPO 2020 Learn from Shanghai for Legacy

5.2.1 Economic Development

Dubai and Shanghai are two cities, arguably transformed into high rise clusters at a similar space, moreover, both long to become the largest economic trading centre worldwide; Huihao, T. (2009) stated that EXPO 2010 boosted the annual GDP growth of Shanghai, it increased 7 % by 2015, and Shanghai succeeded to record \$158 million profit while welcoming 73 million visitors, the reason behind a successful event was setting a long-term strategic objective for social and economic development, the key element of the city's economic development strategy include:

- The government of People's Republic of China has set a strategic objective to optimize urban spatial distribution and divide the city into 3 tires to create multi centre urban form for the city to work as multi economic zones and transfer economic density away from the core of the city while helped in diversifying the economic sectors and mitigate the coal factories.
- Initially modernize the city's physical infrastructure by developing the external transport infrastructure.
- Participate in international labor division and the circular flow of the international economy by linking the domestic with markets demands and be part of world network of economic.
- Introduce the operational mechanism of a socialist market economy
- Pursue the balanced social, economic and environmental development.

In Dubai case, the city is fostering the growth of green economy to become a new growth engine as Dubai is aware of depletion of oil reserves, Dubai is targeting to be the most sustainable city by 2020, subsequently, the government continues to assist the metropolitan economic strategy by initiating the World Green Economy Summit to achieve a sustainable economy under the UAE vision 2021.

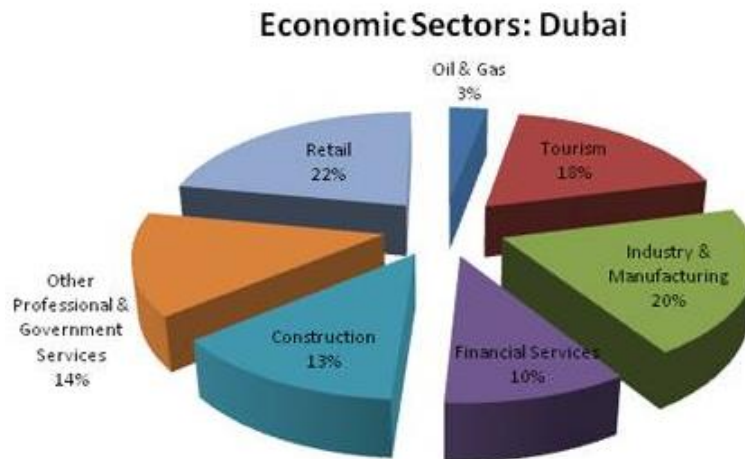


Figure 5.5 Dubai Major Manufacturing Industries (Source: www.2daydubai.com)

As it is shown in (figure 5.5) retail and tourism are the country's key sector, Dubai will expand the growth of retail space within the urban planning, it is expected to add 1.8 million square meters according to 2020's demand, the city urban planning also will include the required amount of office and retail space by 2020, the demand for 2020 is expected to add 1.8 million square meter to 5.3 million square meters existed in 2010. (Alserkal, mariam 2016).

. 5.2.2 Sustainable Built Environment

Shanghai's main target was to upgrade the image of the city and build for legacy, the site design aimed to demonstrate harmony between past, present and future, and to create human and physical interaction; Shanghai succeeded in re-using the clusters of industrial legacies as exhibition halls, in addition to building eco-friendly and energy efficiency pavilions, and improving the streetscapes for the public; EXPO site was treated as a city, therefore, the organizers of the event focused on developing green internal transportation such as clean-energy buses, tram, people conveyors (Wu, 2008, March 5).

The new function of the built environment will serve the business activities as the site is located in the core of the city and to achieve Shanghai's ambition to be a world economic trading center, it will be used for international and cultural exchange uses, in addition to turning an industrial area into a public hot spot along the river.



Figure 5.6 A graphic timeline of major milestones of the EXPO 2010 site evolution

(Source: Deng, Y., Poon, S.W. and Chan, E.H.W. 2016, p.13)

(Figure 5.6) illustrated the transformation of EXPO site before and after the event, Shanghai was considering EXPO as a new opportunity for urban renewal which helped in sustaining the success of EXPO, it is important to create a methodological framework than just a spatial planning for a certain period of time empowers the legacy planning.

Dubai made it clear by defining the use of the permanent pavilions after EXPO based on the domestic demand and the theme of the event, in order to keep the site livable after EXPO, it is important to study the plan on a site level as follows:

- Create a strong connection between EXPO site and the surrounding fabric.
- Survey the site thoroughly to identify development potentials and constraints.
- Encourage the link between the surrounding fabric with avoiding obsolescence and redundancy.

- Adopt sustainable strategies within planning process by avoiding too specific zoning and creating mix-use structure.
- Integrate environment-friendly transport system, to create a modern international metropolis.
- A universal upgrade of external transportation infrastructure – airports, freeways, railways, coach stations and ports in order to accommodate the arrivals of EXPO.

As part of EXPO facilities, the site will be served with (EXPO village) to accommodate the participants which will be a residential area for rent after EXPO, in addition to the mall, it is important to think of the link between the facilities and the site even after EXPO.



Figure 5.7 The connection between surrounding facilities and EXPO site
(Source: the author)

5.2.3 Environmental Management

As part of the preparation for EXPO, Shanghai has set environmental initiatives, it was important to consider that Shanghai is an industrial city which produces a large amount of pollutants mainly from coal burning and vehicle emissions.

Shanghai aimed to improve its environmental quality by focusing on 3 main objectives:

- Minimize negative environmental impact.
- Showcase green solutions for sustainable future.

- Make the city greener.

The UNEP was involved with EXPO 2010 to support the event globally by providing expertise and conduct an environmental assessment of EXPO 2010.

Based on Shanghai's climate, Shanghai EXPO was able to practice a range of passive designs which have an impact on the energy consumption, Tachouali, D. (2014) found that thermal insulation is considered that most powerful element for passive cooling to reduce energy consumption in Dubai.

On Urban scale Shanghai one of the main contributions was the (3 tiers project) to create multi center urban forms, the core tier was transformed into cultural industry to mitigate the negative environmental of coal factories, primary and secondary industries were located in the third tier in rural areas.

Shanghai EXPO was thrifty with land use, 21 major industrial polluting sources were identified in EXPO site that were transformed into EXPO facilities such as pavilions, cafes and restaurants); although Shanghai EXPO was considered as a successful event in many ways, but the air quality remained uncertain, the CO₂ emissions were reduced by 3% by 2008 due to the fast pace of urbanization, but the concept of sustainability and eco-friendly value have become deeply rooted in mind of the society, investors, and the government.

As an overall view, Shanghai lacked the comprehensive environmental guidelines, although the work of EXPO was guided by (Three- Year Environmental Action Plans) but the environmental aspect was the weakest amongst all other plans.

To learn a lesson from Shanghai, Dubai EXPO should consider the following guidelines during preparation phase:

- Detect the main environmental problems in the city.
- Focus on Ecological conservation and construction in developing areas.
- Support the infrastructure of EXPO site.
- (AIR NOW-I) is a great global support to keep monitoring air quality as a partnership between the U.S Environmental protection Agency and the host city.
- Government should tighten the environmental controls and regulations to be able to mitigate environmental impacts.

- Setting up an environmental task force by the Bureau to control and regulate the plans.
- Adopt the 5R strategy which was mention earlier to encourage further refinement after EXPO as it shows in (figure 5.8).
- Fostering an innovation-minded environment through opportunities in the business and market environment and creating a platform (site, venues, etc.) to experiment with innovative solutions in the design, operations and infrastructure

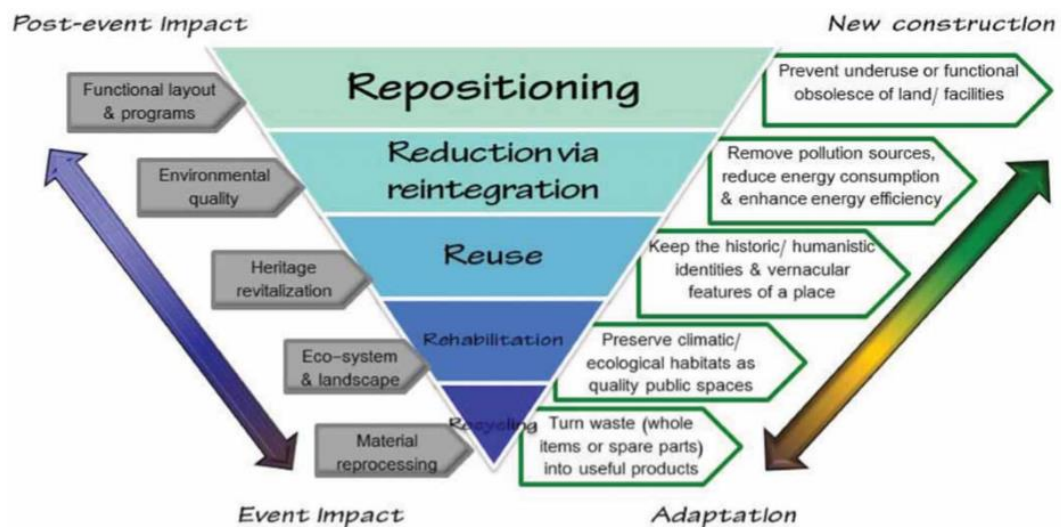


Figure 5.8 The 5R strategy hierarchy (Source Deng, Y. 2014, P.21)

5.2.4 Urban governance and Social Development:

Shanghai was a privileged meeting place for international organizations and countries to take part in EXPO 2010, the government was able to build bridge with global communities and connect the developed and developing countries, on the other hand it was challenging for the government to pursue the balanced social, economic and environmental development.

From an environmental aspect, the government supported the environmental development by setting (The Three Years Environmental Plans) which combined short-term and long-term objectives, but it wasn't controlled enough to mitigate the environmental pollution in the city. Socially speaking, the government used EXPO to achieve a sustainable regeneration in urban areas and improve the physical structure along Huangpu River, to enable the process of urban developing, the local residents were affected, and they were relocated into the rural areas

(NUS) in order to be replaced by luxury housing and new markets for urban living; this action led to economic loss as lots of traditional and the original residents of this area lost their network and resources in the city center, this action showed how the government was devoted to the mega-event and economic driven, the local residents hardly participated in decision making process which would affect on the long-run on the residents adaptation with the new circumstances.

Speaking about Dubai's case, the site choice avoided Dubai to fall in the same problem as the site chosen is part of Dubai 2020 urban master plan, Dubai EXPO will contribute in the urban growth of the city as it will be a dynamic part of (Dubai south) project.

The lessons learnt from Shanghai to enhance the role of the government in supporting the urban planning for the host city:

- Improving the mechanism of urban planning based on the future economic analysis.
- Involve the public to guarantee a smooth implementation of spatial regeneration.
- Construct a rational infrastructure, both soft- and hardware infrastructure.

(Figure 5.9) illustrates the government promoted vision, policies and themes from national and municipal levels to the district and site level, but it is important to integrate the framework with public demand to guarantee the sustainability of the urban change.

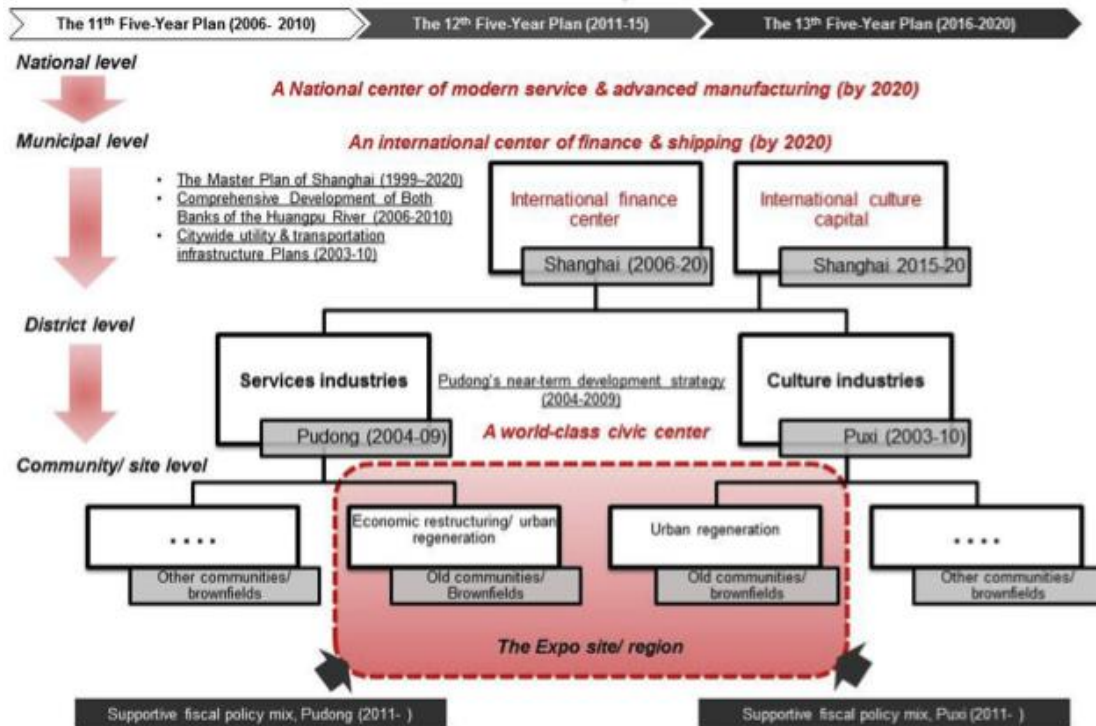


Figure 5.9 A top-down paradigm for the EXPO 2010 led urban renewal

(Source: Deng, Y.2016, p.12)

5.2.5 Improving Technology and Innovation:

Shanghai EXPO mastered the best practices of green technologies to help Shanghai achieve building efficiency, both cities green building design is guided by LEED, therefore, Shanghai EXPO will pave the way for Dubai to list the latest green technology that serve the human needs and the urban development.

Dubai will not only be a platform to present the latest green technologies, it is aiming to be the most sustainable city by 2020, Shanghai's experience will help to investigate the impact of each green practice and what will serve creating a sustainable smart city.

For Shanghai's case, Zhang, X. (2013) found that (solar photovoltaic power generation, roof garden and green wall) are the most efficient practices to reduce energy consumption; however, it is important to mention that this finding can guide the future development of Dubai, it is a long-term process, so, long term efforts are required.

5.3 The Summary

Chapter five explored how Dubai was preparing for hosting EXPO 2020 based on the sustainable world EXPO strategies, however, Shanghai EXPO 2010 paved the way for Dubai to plan for legacy by demonstrating lessons to follow for post-event phase, EXPO 2010 succeeded to achieve an economic growth, in addition to the presenting a good example for urban spatial development, on the other hand it didn't show its best from a social and environmental aspect.

CHAPTER 6. CONCLUSION

The focus of this study was to investigate how Dubai EXPO 2020 can avoid post-EXPO slump through the preparation phase for the event; it is important that Dubai achieves a healthy trend and creates a sustainable legacy, many scholars and researchers generally address the preparation for the event phase without considering the legacy phase, therefore, the research mainly focused on revealing the causes of post EXPO slumps in previous mega-event host cities, and how was the planning for EXPO related to the developing a sustainable city, moreover, the study demonstrated a legacy plan for EXPO site to sustain the growth of the city.

The research found that the success of EXPO can be sustained by contributing EXPO in the urban sustainable development of the host city; the research identified EXPO's role from sustainable urban aspect.

As the world is concerned about climate change, Dubai EXPO will be a powerful tool to catalyze the future sustainable development of the city, therefore, the research created strategies that can be used by EXPO stakeholders to utilize the infrastructure of EXPO 2020 for Dubai long-term sustainable planning needs especially urban planners.

To create the strategies, the research evaluated four international case studies and found that main reason behind EXPO slump is preparing for EXPO without considering the planning for post-EXPO phase, indeed, the research identified difficulties in achieving sustainability are very similar to issues associated with assessing the impacts of mega events through the time cycle of EXPO.

As a result, the research demonstrated a theoretical framework which clarified the relation between planning for EXPO and developing a sustainable city by understanding the nature of mega events and knowing the principles of a sustainable city.

The frame work proposed strategies that will avoid the host city to fail from an urban planning aspect; it is a holistic planning that links (economic, environmental, social concerns, government, conservation and rehabilitation, technology and innovation) to sustain the urban development of the city for future generations.

The research will summarize the strategies to achieve a sustainable world EXPO as following:

EXPO Cycle	Sustainable Urban Planning Aspects						
	Social Development	Economic Development	Environmental Management	Urban Governance	Conservation & Rehabilitation	Improving Technology innovation	Built Environment
Pre-event	-Structuring the social life.	-Main public investment -economic restructuring.	-City's situation & context determine the environmental challenge.	-new system to regenerate urban areas. -fostering relating between government & private sector	-conserve historic heritage while meeting temporary needs.	-green technologies to serve sustainable urban planning.	-improve regional continuity planning -utilization of built environment
During event	-Engage the community to embrace sustainability issue	-exchange business opportunities -present green economy.	-universal measurement	-connecting different forces.			-presenting green architecture
Post Expo	-Study market demand. -Integrate social groups in decision making.	-redoing economic Opportunities.	-environmental input and output to assess the quantitative impact	-government support through the whole cycle.		- environmental benefits of using green technologies	-new landmark -upgrade the city's image -new adaptation, temporary, permanent projects

Table 6.1 Proposed strategies to achieve a sustainable world Expo. (Source: Author)

As Dubai is still in the preparation phase the research covered the pre-event level from sustainable urban planning aspect, and extracted lessons from Shanghai which hosted EXPO 2010 with a sustainability related theme, Shanghai was a significant example to follow on how to achieve a good urbanism.

6.1 Recommendation for Dubai EXPO 2020 legacy

With regards to Shanghai EXP 2010, the research suggested guidelines for Dubai EXPO 2020 to follow based on the sustainable world EXPO strategies:

6.1.1 Economic Development

- The government of People's Republic of China has set a strategic objective to optimize urban spatial distribution and divide the city into 3 tires to create multi centre urban form for the city to work as multi economic zones and transfer economic density away from the core of the city while helped in diversifying the economic sectors and mitigate the coal factories.

- Initially modernize the city's physical infrastructure by developing the external transport infrastructure.
- Participate in international labor division and the circular flow of the international economy by linking the domestic with markets demands and be part of world network of economic.
- Introduce the operational mechanism of a socialist market economy
- Pursue the balanced social, economic and environmental development.

6.1.2 Sustainable Built Environment

- Create a strong connection between EXPO site and the surrounding fabric.
- Survey the site thoroughly to identify development potentials and constrains.
- Encourage the link between the surrounding fabric with avoiding obsolesce and redundancy.
- Adopt sustainable strategies within planning process by avoiding too specific zoning and creating mix-use structure.
- Integrate environment-friendly transport system, to create a modern international metropolis.
- A universal upgrade of external transportation infrastructure – airports, freeways, railways, coach stations and ports in order to accommodate the arrivals of EXPO.

6.1.3 Environmental Management

Although Shanghai EXPO was considered as a successful event in many ways, Shanghai lacked the comprehensive environmental guidelines, it is important to address the reason behind the failure of the environmental strategy through the given guidelines:

- Detect the main environmental problems in the city.
- Focus on Ecological conservation and construction in developing areas.
- Support the infrastructure of EXPO site.
- (AIR NOW-I) is a great global support to keep monitoring air quality as a partnership between the U.S Environmental protection Agency and the host city.

- Government should tighten the environmental controls and regulations to be able to mitigate environmental impacts.
- Setting up an environmental task force by the Bureau to control and regulate the plans.
- Adopt the 5R strategy which was mention earlier to encourage further refinement after EXPO.
- Fostering an innovation-minded environment through opportunities in the business and market environment and creating a platform (site, venues, etc.) to experiment with innovative solutions in the design, operations and infrastructure.

6.1.4 Urban Governance and Social Development:

- Improving the mechanism of urban planning based on the future economic analysis.
- Involve the public to guarantee a smooth implementation of spatial regeneration
- Construct a rational infrastructure, both soft- and hardware infrastructure.

6.1.5 Improving Technology Innovation:

- The research found that (solar photovoltaic power generation, roof garden and green wall) are the most efficient practices to reduce energy consumption.
- It is important to mention it is a long-term process, and so long term efforts are required.

The research illustrated a legacy planning guidelines to pursue a long-term livability of EXPO site as it is shown in (figure 6.1).

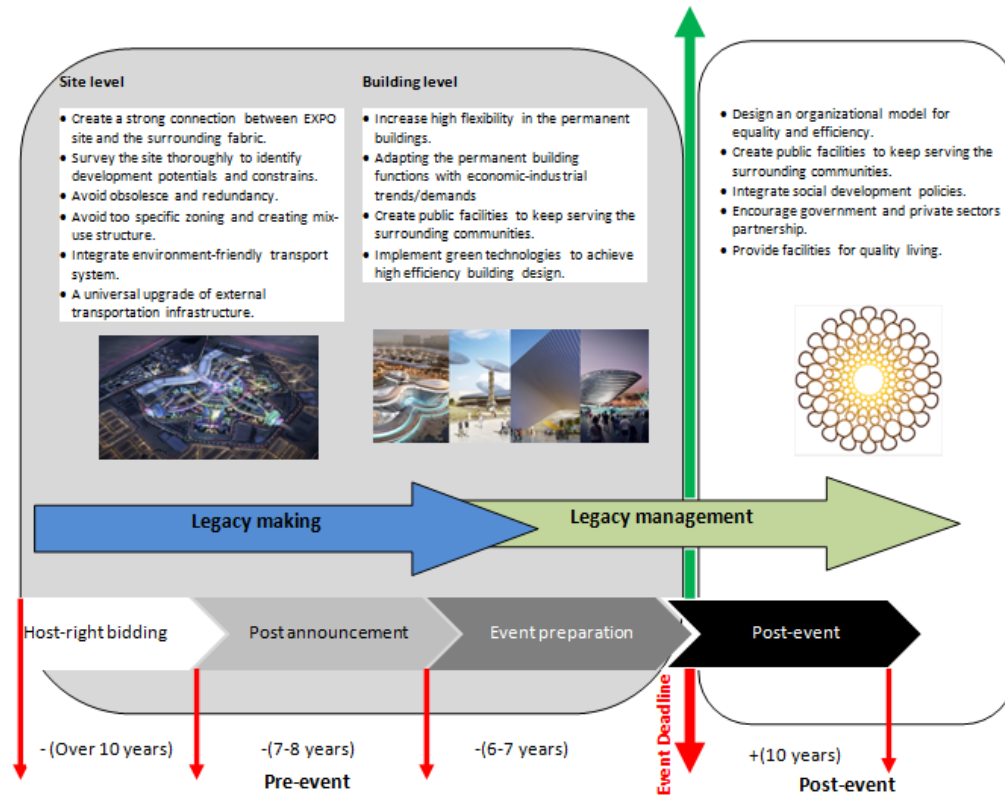


Figure 6.1 Legacy planning guidelines (Source: Author)

6.2 Recommendation for Future Research

Due to the fact that Dubai EXPO 2020 is still in the pre-event phase, the legacy plan is still uncertain, further studies can be done after 2018 before the beginning of the event as several areas were lacking information like the land use after EXPO to bridge the research into practice.

Equally important, Dubai EXPO 2020 is the first EXPO to host in Arab country; despite of differences in cultures, the thesis mainly relayed on the western theories to support the research findings, therefore, (the social, economic and environmental) aspects will vary from one country to another, future studies can cover Qatar preparation to host 2020 Summer Olympics, Olympics games can be inspiring especially in demonstrating sustainable practices.

As a conclusion four legacy for mega-events should be planned to avoid post-EXPO slump, a holistic plan should be considered to pursue the balanced social, economic and

environmental development of the event which will reflect on the growth of the city, the legacy plan should be informative to symbolize the know-how of all practices of the event, another essential point is the theme legacy as it was mentioned above EXPO will promote sustainability through projects and initiatives that are the results of the related theme, moreover, the cultural legacy of the EXPO will enhance the education of the future generation based on the theme value of the mega-event, more importantly is the legacy management, it is a challenge to keep sustaining a mega-event organization, in this case the public organizations will keep supporting legacy- related project and develop the partnership with international organizations which were founded within EXPO journey.

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APPENDIX I – TRANSCRIPT OF INTERVIEW B

(Dr. Robert Platt- Vice President Urban Planning & Public Realm EXPO 2020

Dubai) Interview Date: June 14, 2016

Interview Time: 9:30pm – 10:30 am

Interview Place: EXPO 2020 Site Office

1- What is your role in Dubai Expo 2020 Planning?

I'm the Vice President Urban Planning & Public Realm of EXPO 2020 Dubai to deliver the planning vision for the event and legacy.

2- How is the planning design related to Dubai future plan? How does Dubai Expo 2020 help the sustainable development of Dubai?

The Dubai EXPO site is located in Dubai near Jebel Ali. It is a significant component of the DUBAI South urban development that includes the new international airport and the new Trade Centre Exhibition facilities of the Dubai World Trade Centre.

Based on H.H Sheikh Mohammed bin Rashid Al-Maktoum Vice President and Prime Minister of the UAE and Ruler of Dubai's vision, most of what we will build for EXPO 2020 will remain as significant parts of our legacy development.

3- How the sustainability principles were integrated in Expo's planning and design (Environmental/Economic/Social)?

Sustainability is a key driver of the EXPO 2020, and the physical legacy is one of the main sustainability principles of EXPO. Our Vision is to retain the memory of the event through the master planning, public realm and physical development that we produce for the event. All of the buildings developed by us are targeting LEED Gold certification, and the landscaping is targeting high level CEEQUAL certification. This means, for example, careful use of indigenous plant species to minimise irrigation demand, and shading of public areas. To meet LEED requirements our buildings will target water and power usage that is less than the regulatory requirements.

We also have to meet renewable energy targets. Our commitment is that 50% of our energy requirement will be generated from renewable energy, much of which will have to be generated on site. So we are exploring many forms of energy generation, including photo voltaics and wind generators.

4- What is the after-use planning of Expo site? Has the planning been started? What is the function of the permanent infrastructure?

The plan has been started, and the infrastructure is designed to accommodate the legacy development vision. When EXPO finishes the national pavilions will be removed and the permanent structures will remain. We are developing master plans that can adapt to future future market demand and that can respond to the market change.

5- In your opinion how can a city integrate an “inorganic” city into “organic” fabric? What is the role of Expo in community building?

EXPO 2020 will contribute to community building; our Vision is to identify how we can best serve DUBAI with our legacy development.

6- As an ordinary citizen, how is Expo affecting your life?

National citizens and other residents are all dedicated to making this project successful, and to achieving something has not been done before in this part of the world. Through many initiatives we are encouraging all residents to be involved in all aspects of the project. For example we will be sourcing building design, art work and furniture design and elements of construction from local designers and companies. We have also set up many forums to attract and encourage local talent and business enterprise in all aspects of the project.

7- Who would be responsible for after-use planning? What would be the development mode and who will fund the after-use re-development?

Our Vision is to provide a legacy for Dubai that remains long after the completion of the Expo event. We are therefore investigating the most appropriate forms of post Expo development, and creating a master plan that can accommodate this Vision. We are also

aware that we have to cater for market fluctuations, and our planning will ensure sufficient flexibility for changes to be absorbed into the framework.

8- Analyzing the economic impact of Expo, how can Dubai maximize the benefit from Expo 2020? And how to sustain the economic growth after the Expo?

There are opportunities for Dubai companies and individuals to benefit across a very broad spectrum. We have infrastructure and building development projects, there are tourism and transportation opportunities in all sectors, and we are talking constantly with small business and subject matter experts. All of these stand to benefit directly from the Event. Post Expo we have the benefit that the effort put into the event provides a solid foundation on which to help to build the future growth and achievements of Dubai and the UAE.

9- What is in Dubai Plan to make Dubai more Attractive to live and visit after Expo 2020?

Expo is a world event, and our Vision for legacy, coupled with the iconic buildings we will be developing, will add to the numerous attractions DUBAI already offers to visitors and tourists. In this way the legacy of Expo will support the growing attractiveness of Dubai as a tourism destination in future years.

10- Is Dubai inspired by successful previous mega events or designing new concept for (Pre-event/during-event/post-event) planning?

We are of course inspired by previous events, and we are learning from them through detailed research, and through the knowledge and experience of our Expo team. Our Expo differs on a number of fronts, and part of our Vision is to enhance our location and cultural uniqueness in many ways.

APPENDIX II – TRANSCRIPT OF INTERVIEW A

(Tameem Oliveira Shayya- Associate Communications at EXPO 2020)

Interview Date: July 11, 2016

1-How is the planning design related to Dubai future plan? How does Dubai Expo 2020 help the sustainable development of Dubai?

Expo 2020 will contribute to achieving the UAE 2021 Vision by supporting the growth of tourism, stimulating the development of innovative businesses, and enhancing the country's international reputation as a location to do business.

2-How the sustainability principles were integrated in Expo's planning and design (Environmental/Economic/Social)?

This will be one of the most sustainable World Expos ever:

- a.50% of energy requirements met from renewable sources, of which half will be produced on-site.
- b.90% of materials used in permanent construction will be retained for the legacy phase.
- c.75% of sustainability features will be used to promote educational awareness in line with Dubai and the UAE's drive towards a knowledge-based economy.
- d.Buildings on the Expo 2020 Dubai site will use 25 per cent less water than the regulatory requirement, and all water used for irrigation and cooling will be recycled.
- e.Expo 2020 Dubai aims to have LEED (Leadership in Energy and Environmental Design) Platinum certified sustainable building that reflects the subtheme of sustainability including the UAE National Pavilion at the Expo 2020 Dubai. The Santiago Calatrava designed pavilion will be a highly innovative and sustainable pavilion that will be one of many LEED certified structures to populate the Expo 2020 Dubai site.

3-What is the after-use planning of Expo site? Has the planning been started? What is the function of the permanent infrastructure?

1. Legacy was at the core of master plan and includes identifying key anchor initiatives and programs that will drive the economic sustainability of the site, and form an enduring ecosystem that promotes innovation and education in the areas of the subthemes.
2. The vast majority of the material used in permanent construction on the site (90% of the total) will be reused or repurposed in the legacy state of the buildings and infrastructure.
3. The physical legacy:
 - a. The site itself: A state of the art exhibition centre, academic and research institutions and a technology cluster.
 - b. Iconic structures: Theme Pavilions, UAE Pavilion
 - c. Infrastructure which will lie at the heart of the development of Dubai South: The utilities infrastructure and equipment installed for Expo 2020 Dubai will also be maintained for legacy purposes, as will the majority of the roads and transportation infrastructure built to facilitate access to the site, including the extended Metro service and Expo 2020 Dubai station.

**4-In your opinion how can a city integrate an “inorganic” city into “organic” fabric?
What is the role of Expo in community building?**

- a. Identified value-maximizing strategy to transition the Expo Site into an economically attractive & sustainable development:
- b. Detailed research has been undertaken to select the UAE’s strategic national champion industries and to understand how to up their global competitiveness. The outcome of this effort has been the identification of technology as the main driver of competitiveness with three technologies key to the future of these industries: Big Data & Analytics, the Internet of Things and Wearables & Virtual/Augmented reality.
- c. The Expo site’s infrastructure will therefore be transitioned into a combination of commercial, hospitality & residential developments centered around these 3 technologies. It will be an emerging technologies ecosystem that brings together SMEs, bigger corporate & start-ups.

d. The team has also explored types of social & commercial entities that could be set up on site.

5-Who would be responsible for after-use planning? What would be the development mode and who will fund the after-use re-development?

The ultimate success of Expo 2020 Dubai will not only be measured by the number of national participants or international visitors, but also by the legacy the event leaves behind.

Planning is already underway to ensure that Expo will deliver lasting benefits for the participants and visitors, for the UAE's prosperity and reputation, for business, for knowledge creation and for Dubai itself.

6-What is Dubai's strategy in covering the cost of Expo infrastructure on the long run?

a. We are committed to delivering a world-class mega-event with a budget of EUR 6.5 billion (Dh32.33bn).

i. Note: Much of this investment, particularly the investment devoted to the physical infrastructure is a commitment to generating value throughout the journey, event and legacy.

b. We are entering partnership agreements to plan and deliver an event which will add an estimated Gross Value of EUR 17.7bn to Dubai's economy. (Return on Investment)

7-What is the Landmark for Expo 2020 Dubai?

The physical legacy will be the site, iconic structures and its infrastructure which will lie at the heart of the development of Dubai South. This will include a state of the art exhibition centre, academic and research institutions and a technology cluster.

The Sustainability Pavilion will serve as a permanent destination where visitors will continue to immerse themselves in the wonders of Nature and learn about the latest developments around sustainable practices. In addition to showcasing these developments it will also be a platform that will allow for research in this field.

The Mobility Pavilion will be converted into an education institution, focusing on the area of logistics.

The Opportunity Pavilion is being developed as a flexible structure that can accommodate multiple developments such as commercial offices and educational facilities.

The utilities infrastructure and equipment installed for Expo 2020 Dubai will also be maintained for legacy purposes, as will the majority of the roads and transportation infrastructure built to facilitate access to the site, including the extended Metro service and Expo 2020 Dubai station.