

TITLE

**Can World Cities Be Easier to Approach Sustainable  
Development? A Case Study of Taipei City**

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## **Abstract**

The paper suggests that environmental policies have effected changes in the areas with different economic structures, and from the concept of world cities (Sassen, 1991; Friedmann, 1986), which function as (1) key locations for finance and specialized services; (2) innovative sites of production in these leading industries; and (3) markets for the products and innovations of these industries (Orum and Chen, 2003), these cities have advantages and disadvantages for sustainable development. Owing to regional polarization, there are more resources and capital aggregated in world cities; therefore, they have more capacity to improve the living quality, the basic goal of sustainable development. Moreover, the sustainable issues can be an urban marketing strategy which can improve the urban image and attract more benefit for their world position. From the case study in Taipei City, the advantages of world cities to be sustainable cities, just like forward analysis, are their economic structure, the resources accumulation, and government promotion, while the disadvantages are the over-crowded population and capitalist consumption, and face the challenges of late public policy and policy budget repulsion.

## Introduction

In the 1990s, globalization and sustainable development become two important issues in the world. According to a prediction made by the United Nations, after 2025, more than 60% of the world's population will live in cities. At present, the popularity of Internet has resulted in a more effective globalization. National boundaries are blurred, and the importance of local areas is more emphasized. Many scholars call this century 'the Urban Century' (Hall, 2001; Clark, 1996). With these trends of globalization and urbanization, it is necessary that people in this century face the environmental changes and, at the same time, pursue environmentally sustainable development is what people in this century need to do.

From the end of the twentieth century, national economy has turned into global economy; governments in each country can no longer control the economic system, and their powers are now much weaker (Thurow, 1999). Capital of enterprise circulates in the world. One can see many different cultures in a single place, and states are no longer the only source affecting people, politics, life, and ideas. This trend of globalization has rebuilt the complicated relations and importance of economics, culture, and politics (Short and Kim, 1999).

Under globalization, the characteristics of economic activities also change, including changes in the way of production, and the increase of the freedom of capital causes of industries to spread deep and wide in territory, stimulating the locations of industries to compete and divide. Globalization also reflects on the structure of urban space, and becomes the new power for urban spatial transformation and intercity competition (Lai and Lee, 2003).

There is a current trend in which cities enter the global economic system. More and more cities in different countries welcome money and human resources from other places for the sake of their development. However, cities are the convergence of people and consumption, which is a key point for the implementation of sustainable development. World cities under globalization can become models for the cities in every country and region. Examining the economic and societal activities of these cities, and analyzing the effects of these activities on sustainable development can be very helpful in making positive decisions that are not too unrealistic environmental control, and can therefore save both time and effort.

In the past, Taiwan was a deserted island and has been highly developed for a relatively short period of time. Taipei, the capital of Taiwan, has been classified as a global city in literature since the 1980s. The changes aroused by globalization are clearly different from old western cities like London and New York, and therefore Taipei can provide a good example for other developing cities under the trend of globalization. Taipei faces the growth of global economic system and, at the same time, the ideas of environmental discourse and sustainable discourse discussions commencing in the 1970s and 1980s, respectively. This paper sets out to reach a deeper understanding of the interrelationships between world cities and sustainable cities, and to demonstrate the sustainability of Taipei as an example for other developing cities.

## **1. Sustainable development and sustainable cities**

### **Quality of life: the basic goal of sustainable development**

The origin of the current discussions about “sustainable development” comes from the

imminent possibility of a destroyed environment and exhausted natural resources. There are some scholars who believe that “quality of life”, or human well-being, should be the goal of sustainable development. According to the World Development Report (2003), “Sustainable development is about enhancing human well-being through time”. Costanza (1991), a proponent of the anthropocentric view, thinks that “Sustainability is a relationship between dynamic human economic systems and larger dynamic, but normally slower-changing ecological systems, in which 1) human life can continue indefinitely, 2) human individuals can flourish, and 3) human cultures can develop; but in which effects of human activities remain within bounds, so as not to destroy the diversity, complexity, and function of the ecological life support system” (Costanza, 1991). Pezzey’s (1989) argument that “quality of life should not decline over the long-term future”, also puts “quality of life” as the core issue, and this argument fits in with the Brundtland Report, which states that sustainable development is “the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987). Many people agree that “sustainable development is about the achievement on a global scale of three principles: economic development, social justice and ecological responsibility” (Gleeson and Low, 2000: 6), and “a good quality of life for all is closely related to the concept of sustainable development which emphasizes the integration (not just balance) of social, environmental and economic concerns” (Ng and Hills, 2003: 154). There are many debates about sustainability, from the human-centered to environment-centered, or from weak sustainability to strong sustainability;

however, when there are still more than several hundred millions of people trapped by famines and unhealthy water, with their basic needs “living” may be threatened, “quality of life” should not be an excessive or deficient goal.

### **Goal, actions, and measurements of sustainable cities**

Anders (1991), in his “The Sustainable Cities Movement--Working Paper”, states that action of sustainable cities is a part of environmental concerns and movements. Since more than half of the people in the world live in cities and these inhabitants also consume the most resources, urban development must move forward to sustainability, or there will be no chance for the world to, as a whole, be sustainable. What can cities do for sustainable development? Satterthwaite (1999) said, “the key issue is not really ‘sustainable cities’ but cities whose built form, government structure, production systems, consumption patterns and waste generation and management systems are compatible with sustainable development goals for the city, its wider region and the whole biosphere”. Therefore, urban development must be combined with ideas of sustainable development. The issue of “quality of life” provides the ideas of “livability” and “livable cities” as indicators and goals for cities in attaining sustainability (Newman et al., 1996). However, the purpose of sustainable development is not only the maintenance or improvement of the current quality of life, but also to do so for future generations. Satterthwaite (1999) observed that many cities with high living quality achieve it by transferring environmental problems to other locations, people, or even the future. In order to avoid the misuse of the concept of “quality of life” for sustainable development, Satterthwaite (1997) has determined

five categories of environmental action within which the performance of all sustainable cities should be assessed. These are: 1) controlling infectious and parasitic diseases and the health burden they take on city populations, including reducing city populations' vulnerability to them; 2) reducing chemical and physical hazards within the home, workplace and wider city; 3) achieving a high quality city environment for all city inhabitants; 4) minimizing the transfer of environmental costs to the inhabitants and ecosystems surrounding the city; and 5) ensuring progress towards what is often termed 'sustainable consumption'. The first two categories concern about health issues, the third involves living quality, from waste disposal to preservation of open space and cultural heritage, and the last two are concerned with environmental loading and territorial capacity. An undeniably central dimension of sustainable cities is livability, which includes the concept of a clean environment, like clean air, unpolluted land, effective solid waste disposal, and safe drinking water. Livability should be a very important and essential point for sustainability, although measuring a city's sustainability should not ignore its environmental loading or ecological footprint on other places or the future.

## **2. The economic and spatial characters of world cities**

World cities are the essential spatial nodes of the global economy, and they are distinctive political actors on the world stage as well (Scott et al., 2001). In the past few decades, the main transformation of the global economy has been from Fordism to post-Fordism, or from mass production to capital flexible accumulation, and after 1980 the neo-liberalism wave increased globalised productive activity. However, these trends have all been part of the capitalist

market-oriented economy. Wallestein's modern world-system (1974) argues that advanced areas have more advantages in technology, resources, and labour force than undeveloped areas, and the undeveloped countries only use their cheap labour force and natural resources to exchange with advanced countries; therefore, the world economic system is composed of core, semi-peripheral, and peripheral areas (Wallestein, 1974; Hong, 2003:2-20). This is also the idea behind international division. The earliest statement classifying world cities (primary cities and secondary cities in core-countries and in semi-peripheral countries) is from Cohen (1981), and forms the basis of international division. Other researchers, such as Friedmann and Wolff (1986), have analyzed the character of world cities which described the following characteristics in the "World City Hypotheses":

- contemporary employment restructuring within cities is related to the form and extent of their integration with the world economy;
- key cities are used by international capital as basing points in the spatial organization and articulation of production and markets. The resulting linkages make it possible to arrange world cities into a complex spatial hierarchy;
- global control functions can best be measured by the number of representative offices of transnational corporations;
- world cities are theatres of concentration and accumulation of international capital;
- world cities are points of destination for both domestic and international migrants;
- world city formation brings spatial and class polarization; and
- world city growth generates social costs at rates that tend to exceed the fiscal capacity of the state.

From the function of world cities, Sassen describes four characteristics: 1) highly concentrated command points in the organization of the world economy; 2) key locations for finance and specialized services; 3) innovative sites of production in these leading industries; and 4) markets for the products and innovations of these industries (Orum & Chen, 2003:). Integrating



the debates about world cities, Hall (2001) concludes that the status of world cities can be identified by assessing the following four approaches. These are: 1) analyzing and ranking the location preferences and roles of multinational corporation (MNC) headquarters in the “developed” world; 2) centering upon the decision-making corporate activities and power of MNCs, in the context of the new (spatial) international division of labor discovered in the late 1970s; 3) associating the cities within the urban hierarchy with their propensity to engage with the internationalization, concentration, and intensity of producer services in the world economy; 4) identifying major cities and their relative positions through rankings of international financial centers. All of the current world cities are high (or even the highest) ranking cities from at least one approach. From these hypotheses and analyses, the economic activities highly concentrated in world cities are from four particular clusters of advanced services: command and control functions; financial and business services; tourism of both the leisure and business varieties; and cultural and creative industries, including the live performing arts, museums and galleries, and the print and electronic media (Hall, 2001). In addition, due to their function as transportation centers, activities and events like higher education training, research, exhibition and professional medical treatment accumulate in most of the world cities. As nodes of international transportation, world cities not only accumulate international capital easily, but also stimulate various consumption.

What kind of environmental conditions are needed for the world cities? According to Douglass (2000) research, the condition of the urban environment in world cities should be a livable

environment, which includes 1) access to safe drinking water, clean waterways, effective solid waste disposal and management, clean air and unpolluted land; 2) Green spaces; 3) smoothly flowing transport systems and greatly reduced traffic congestion.

### **3. The advantages and disadvantages of world cities in approaching sustainable development: a theoretical analysis**

From the definition of sustainable cities and characteristics of world cities, the activities happening in world cities and environmental conditions of world cities lead to both advantages and disadvantages in attempting to approach sustainable cities. As governments try to push their cities to become world cities, the enacted policies should have some effect on sustainability. These can be classified into two areas:

- 1) The spatial and productive characters of world cities;
- 2) The policies for intercity competition and promotion of world cities.

First, the economic activities in world cities are not characterized by high pollution or high-energy usage, therefore, there may not be as serious environmental pollution in world cities as in some industrial cities. When local governments carry out environmental policies, due to not conflicting with economic activities, there should not be great resistance from interest groups. However, from Friedmann's world cities hypotheses, world cities are "points of destination for both domestic and international migrants", which may come with some public and social problems, including a rise in property values, traffic problems, and conflicts of land usage (Friedmann 1995). Increased property values push some urban residents to move to

sub-urban areas, but the long added commute still makes residents and visitors uncomfortable and generates social costs at rates that tend to exceed the fiscal capacity of the state (Fujita, 1991; Hong, 2003; Friedmann, 1986). Moreover, world cities are global or regional capital concentration areas, with mature infrastructures and an ability to attract more people and resources, although this results in spatial and class polarization (Friedmann, 1986).

Second, as Castells (1996) says, the flexible accumulation of capitalism and global economic restructuring cause urban development to rely not on urban contexts or natural resources, but to depend on future status while rethinking the position of world cities in the global capital market (and the flowing resources). With increasing globalization, cities cannot escape this trend, and competition between cities becomes inevitable. Moreover, from his research in Pacific Asia, Douglass (2000) argues that cities in this area compete with each other for classification as world cities or even for better rankings in the world cities hierarchy, in order to further their economic development. He uses the examples of Seoul, Hong Kong and Singapore where their government now promoting these cities and put them in competition with cities in their regions for world city functions and status. "For most governments it is seen as the answer to the critical problem of making a successful transition from low-wage assembly platforms to technologically advanced production and higher order corporate service centers. Other motives include a shift from Third to First World status, from cultural periphery to creator of cultural symbols for global consumption and regime maintenance based on legitimization through internationalisation, which has become a common cornerstone of state development

ideology throughout the region.” Some competitiveness researchers, such as Rogerson (1999) and Webster (2000) believe that living quality is an important determinant of urban competitiveness. As Rogerson argues, quality of life strongly connects to the attraction of highly skilled labour, which is the main factor in enhancing productivity. If the urban environment is inadequate, it seems to affect urban economic development. As Douglass (2000) says, “While this may be successful in attracting investment in the first instance, urban regions that cannot successfully sustain their environments may begin to be abandoned in favor of other localities where environmental deterioration is not as great. In some cities, there is already concern that deteriorating environments are part of the reason for difficulties in attracting foreign direct investment (World Bank, 1993)”.

Can governments do something to promote cities toward becoming world cities? Douglass’s (2000) analysis states that public policy is only way to promote cities into world cities actively and directly. “From Japan to Singapore and beyond, governments have begun to promote the advancement of principal MURs <sup>1</sup> into world cities” (Douglass). Kotler et al. (1999) determined “quality of life” as one of the soft factors that can attract business firms. It is undoubtedly true that quality of life is an important indicator for urban competitiveness and is also a (environmental) condition for becoming a world city. According to our understanding of sustainable cities, a basic goal is also quality of life; therefore, world cities should have more reasons to approach sustainability.

#### **4. Case study] Taipei City**

Although population increase may cause world cities to become over-crowded and simultaneously generate serious traffic pollution, Baldasano and Jimenez's (2003) research data show that air quality in most of the world cities, like London, Paris, and Los Angeles, has continually improved over the past ten years (1990~2000), especially in the cities in developed countries. This phenomenon is not evident only in the mega-cities (not world cities) in low-income countries. Due to different social and economic backgrounds the development trajectories of cities in developing countries are dissimilar to those in current western cities. Taipei City, like many other cities in developing countries has developed from extreme impoverishment (in 1950s), to industrialization and involvement in the global economic system over the past few decades, and should be a good example for showing developing cities the conflicts and benefits between "globalization" and "sustainable development". Cohen (1981) is the earliest scholar to mention that Taipei is a secondary world city in a sub-peripheral country in the global capital system, and is also one of the core cities gathering capital and serving as an economic and spatial center in a newly industrialized country. Friedmann (1986) classified Taipei as a sub-global city among sub-peripheral countries in the capitalist world economic system. Advanced producer services are used as a basis by Beaverstock et al (1999) to build a detailed list of global cities in which the 55 global cities are classified on 3 levels, according to dimensions of accounting, advertisement, banking/finance and law. The first and the second levels each consist of 10 cities. The third level, to which Taipei belongs, consists of 35 cities. Knox's research divides world cities into "the control and command world cities" (1-5<sup>th</sup>), "the

main world cities” (6-15<sup>th</sup>), and “the secondary world cities” (16-35<sup>th</sup>). Taipei was ranked last (35<sup>th</sup>) in 1960 and 1970, but 30<sup>th</sup> in 1980, and 25<sup>th</sup> in 1988 (Shi, 2000). The different positions determined factors such as “importance” or “the number of foreign banks in the city”; and represent the development of Taipei City through different eras. In order to analyze the relationship between world cities and sustainable cities, we can use the development of Taipei City to divide it into three stages: the initial stage as a world city (1960-1980), the mature stage as a world city (1980-1990), and the last stage, approaching urban environmental sustainability (1990-).

#### **Initial stage: Becoming a world city in a resource-dependent country (1960-1980)**

After 1949, Taiwan was under martial law, and focused on its military development. In 1960, in order to adjust itself to the new international division in the capitalist world, and to solve its problem of overflow in domestic production, Taiwan began involve itself in the international market. Its main role was to be a kind of dependency country of the U.S. and Japan, providing a cheap labour force. Its economic development policies were based on export by economic processing. Because of the internal division for spatial specialization, Taipei City and Kaohsiung City (the biggest cities in northern and southern Taiwan at that time) were selected to be developed and to serve as foreign windows, which caused a large number of people from rural areas to move to these cities.<sup>2</sup> At the beginning of this stage, Taipei City was a manufacturing center for export processing, and the main labour force of northern Taiwan accumulated here for the growing industries. However, with more and more capital and

population gathered in Taipei City, local government limited factories to enlarge, which coerced factories to leave Taipei City and relocate in Taipei County. After this, the economic structure of Taipei City transferred to a service industrial structure. Taipei City became, therefore, a political, financial and service sector center (Hsia, 1988; Chang, 1987; Sun, 1987; Xu, 1989).

The environmental problems in the beginning of this stage were similar to those in any other low developed countries, including poor hygienic conditions, infectious diseases, and many low quality unlicensed buildings. The basic infrastructure was inadequate, as well, since the economic development during 1950-1960 focused on armaments. The expenditure of the city government was still insufficient to solve environmental problems. The use of kerosene without other energy substitutions for both living and for production became a major source of air pollution. After 1970, with a continually increasing population in Taipei, the pollution from traffic and waste became very serious. At the same time, the United Nations' economic development policies provided help from experts for solving these environmental problems in a modern city. This, in which Taipei City was becoming a "world city" in a sub-peripheral country (Taiwan), was characterized by increased traffic and waste pollution from an over-crowded population, and by an inadequate infrastructure, as well; the government, however, did not have the power and resources to prevent and solve these problems, and the people were not alerted to these problems, under the leading martial law Central Government.

#### **Mature stage: A world city (1980-1990),**

The 1970s saw the launch of the development of the petrochemical and electronic industries.

Although with the export processing strategies introduced in 1960s, Taiwan developed as a dependency country of the U.S. and Japan in the global market, with Taipei City as its capital and economic command center. Although many environmental problems followed the high economic growth, people were not concerned with these problems due to the unopened civil society. At the end of the 70s, the beginning of protectionism in the U.S. requested Taiwan to open its market, which caused Taiwan to release exchange control, allow more investments from multinational companies, and so on. Under the prosperity of the international trade, many kinds of service industries extended, and the activities of consumption were expanded.

The liberalization and democratization of Taiwan, in the beginning of this era, partly came about through a push by the new international new protectionism. Central Government then canceled the import restraint, opened Taiwan up to found foreign banks, and allowed currency revaluation; politically, the government suspended martial law and permitted the existence of opposition parties. These actions allowed international capital to flow into the city and helped re-build the urban space. Democratization allowed more classes and groups to express their feelings, which brought environmental problems to light. The main environmental problems, at this point, were waste, air and water pollution, and traffic jams. Air pollution was caused mainly by traffic. Furthermore, in the beginning of the 1980s, local government allowed people to build constructions in some environmental conservation zones in order to contain more people, as a response to the continually increasing population.

Because a considerable sum of international capital entered and accumulated in Taipei during



this period, the real estate development was stimulated in Taipei, increasing property values and ensuing only the wealthy could live in Taipei City. The well-off members of the population had more power to push the government to improve the environment.

According to Xu's (1989) research, the city beautifications actions from 1980, including the construction of a rapid transit system, were not only for improving living quality, but also for improving Taipei City's reputation and overcoming international isolation.

### **The last stage: approaching to urban environmental sustainability (1990-)**

In the late twentieth century to 2002, Taipei ranked in Asia's top five "best cities", and was even ranked 2nd in 1999.<sup>3</sup> Its image is now completely different from its image before the 1980s – crowded, poor environment, and lack of public facilities.

After the 1990s, Taipei has been expected to become more international, and its people there have a much greater consciousness of environmental protection; at the same time, the attention to environmental protection in the world has peaked. The Taiwanese government gradually came to view environmental protection as important as economic development. In the 1970s, Taipei City was planned as an economic and trade center. The economic structure of the northern was mainly focused on high-tech and light industries. Because of this, prevention of pollution was more effective in the northern part of Taiwan than in the south, where petro-chemical and heavy industries were mainly located. (Figure 1) <sup>4</sup>

Taipei's budget has always been much higher than that of the other cities in Taiwan and therefore, more money and effort can be focused on environmental protection. Take rubbish for

example. From 1990 to 1999 the average quantity of rubbish per person in Taipei City is 1.23 times higher than that in Taiwan (Figure 2),<sup>5</sup> but the average workload of the environmental workers there is only 0.57 times of that in other cities in Taiwan (Figure 3).<sup>6</sup> It is evident that Taipei has more resources than any other city in Taiwan to deal with environmental problems. Consequently, the environment in Taipei has improved vastly in the last ten years. In 2000, its air quality was much higher than the health standard set by WHO, and not much worse than other international cities (Figure 1).

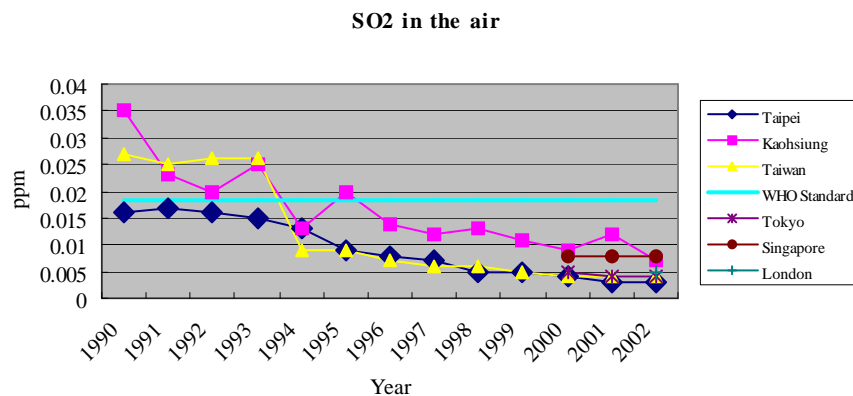


Figure 1. SO2 in the air in Taipei, Kaohsiung, Taiwan, and other international cities (1990~2002)

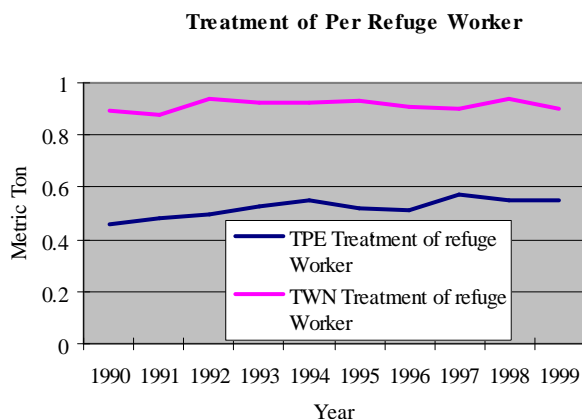


Figure 2. Energy usage per year per person in Taipei and in Taiwan

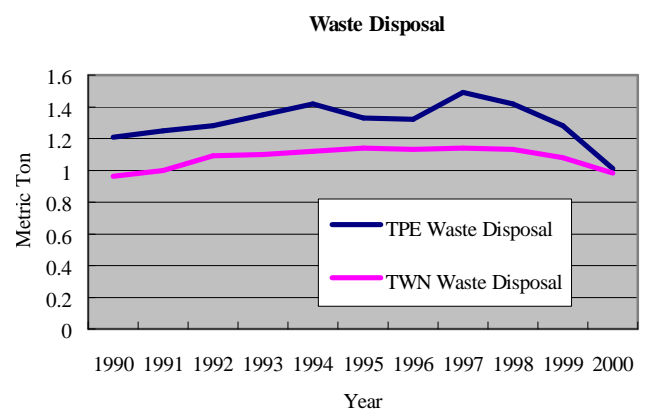


Figure 3. Energy usage per year per person in Taipei and in Taiwan

In terms of urban policies, Taipei takes active steps in executing environmental protection policies. For example, the implementation of the “per bag trash collection fee” policy, introduced in 1999, became very successful in a short time.<sup>7</sup> The goal of urban policy in the past ten years

has been making Taipei City a modern international city and a regional marketing and traffic center. Several international conferences have also been held during this time. In these conferences, environmental protection and energy saving have been the main concerns in improving the environmental quality of Taipei and working it more appealing (Lan, 2002). In 1996, some scholars were authorized to make an evaluation system for sustainable development in Taipei.<sup>8</sup> In 1999, a research project entitled "Taipei sustainable development policies" was presented, and in 2003, a Taipei sustainable development committee was set up. These policies and actions have not yet been carried out in the other cities in Taiwan. Although only one goal, improving living environment, has been achieved in Taipei, it still has much more possibility of accomplishing the aims of sustainable development than any other place in Taiwan. It should be noted that although living environment in Taipei has improved greatly in recent years, there are not yet specific procedures for solving the main concerns of sustainable development, such as CO<sub>2</sub> emission, energy-consumption, and ecological footprint. Due to overcrowded in Taiwan in the 1970s and 1980s, building was allowed in many environmental protection zones, which reduced many green spaces. Take energy usage as another example: in the last ten years, the average consumption of electricity per person in Taipei is 1.31 times higher than that of Taiwan, and has risen almost every year in the proportion of 4%. Overuse of energy not only affects CO<sub>2</sub> emission, but also makes the ecological footprint deteriorate. It seems that Taipei City has extended consumerism to the overuse of resources in this global economic system centered on capitalism.

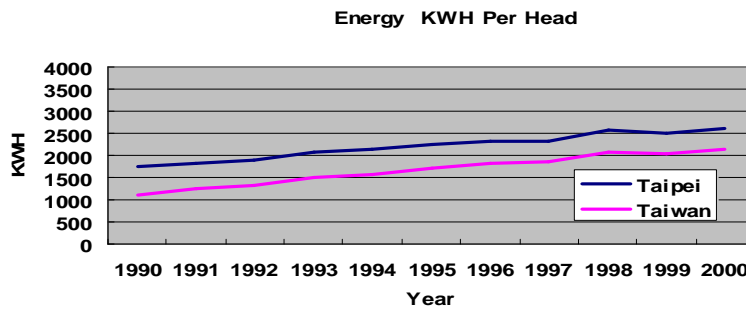


Figure 4. Energy usage per year per person in Taipei and in Taiwan

## 5. Conclusion

Castells(1983) argued that governments' policies are the main influences on social change, because governments play a role in distributing capital, such as its housing and financial policies, which directly affect the building of urban and regional space. In the case of Taipei City, national and urban economic development policies are the main factors in determining environmental quality. However, the formation of these policies comes from many other directions, and two of the most powerful forces, from the case study, the international division and globalization, not only affect economic development policies and economic activities through the capitalist system in the global market, but also direct the political and social consciousness towards changing the environment in Taipei.

To be one of the world cities, before 1980, Taiwan developed its economy mainly through its cheap labour force and natural resources. After 1980, main industries in Taiwan relied on technology from advanced countries. Taipei is the political, financial, and service sector center in this country. Because the environmental problems resulted not from urban industries, but from an over-crowded population, Taipei City can improve its living quality by carrying out

environmental policies which matched the global environmental wave in the 1990s, and still maintain economic development.

The advantages of Taipei City, one of the world cities, in becoming a sustainable city, just like forward analysis, are its economic structure, its resource accumulation, and government promotion. However, the disadvantages are 1) too rapid and over-crowded population, which “may lead to increased traffic congestion and less attractive environments for residents, representing a difficult balance to be struck” (Champion, 2001); 2) capitalist consumption.

Harvey (1988) argues that industrial capitalism sustains nothing but economic growth. From the 1960s, Taiwan became involved in this system, and also came to see economic growth as the national development goal. However, increasing economic growth would meet the capital over concentration and goods over production, and then meet its limit. Two methods that can help to solve this crisis are, first, leading the capital to service sector and, second, stimulating or expanding consumption (creative destruction) (Harvey, 1985). According to Chen’s (1994) research, Taipei metropolis’ ecological footprint scale in 1994 was 21 times bigger than itself.

Lai and Lee deduced that Taipei City’s ecological footprint scale was 268.85 times bigger than itself. Although Taipei now has a good living quality, it is still a severely consuming city, and is not sustainable. Furthermore, we should note the impact from the accumulation of international capital and national resources from not only local areas, but also the whole country. Taipei City has more resources to improve the environment and has achieved some of its goals; however, other cities or counties have suffered environmental problems from the pollution caused by

production or even from the activities in Taipei. After Taipei improved its own environment at the end of 20<sup>th</sup> century, many other cities still suffered serious environmental pollution. Furthermore, rapidly increasing population but late public policies caused many environmental problems. The policy budget repulsion effect which means that local government may not afford economic and social or environmental budgets at the same time makes government select alternatively, like the situation happened in Taipei in 1960s and 1970s.

## Notes

1. MURs is made up of the first letters of the "Mega Urban-Regions".
2. In 1950, the population of Taipei City was 503450; in 1967, when Taipei City became a municipality directly under the jurisdiction of the Taiwan Central Government, its population was 1224642, and in 1980, it was 2220427.
3. The ranking was made by ASIaweek magazine. 40 Asian cities were selected for the ranking. In 1996, Taipei City was not in the first 10 best cities list. But in 1997, Taipei was ranked 10<sup>th</sup>; in 1998, Taipei was ranked 5<sup>th</sup>; in 1999, Taipei was ranked second, and in 2000 it was ranked 4<sup>th</sup>. Source: <http://www.asiaweek.com/asiaweek>.
4. Sources: Taipei: Department of Environmental Protection, Taipei City Government. Tokyo, Singapore, and London: Department of Budget, Accounting and Statistics, Taipei City Government. Kaohsiung and Taiwan: Environmental Protection Administration, Taiwan.
5. Sources: Urban and Regional Development Statistics, R.O.C.
6. Sources: Urban and Regional Development Statistics, R.O.C.
7. According the Department of Environmental Protection, Taipei City Government, it shows that "from the beginning of implementing the per bag trash collection fee in July 1, 2000 up to March 31, 2004 the average volume of household waste collected dropped to 1,710 tons represents a 42.4% reduction over the 1999 daily average of 2,970 tons". Source: <http://www.epb.taipei.gov.tw/english/official/930423.htm>
8. Prof. Huang, S. -L. in National Taipei University helped Taipei City Government draw up a evaluation system for "Sustainable Taipei".

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