

Bond University
Research Repository



Resolving the conflicts of sustainable world heritage landscapes in cities: Fully open or limited access for visitors?

Zhang, Xiaoling; Zhou, Ling; Wu, Yuzhe; Skitmore, Martin; Deng, Zhiping

Published in:
Habitat International

DOI:
[10.1016/j.habitatint.2014.11.004](https://doi.org/10.1016/j.habitatint.2014.11.004)

Licence:
CC BY-NC-ND

[Link to output in Bond University research repository.](#)

Recommended citation(APA):
Zhang, X., Zhou, L., Wu, Y., Skitmore, M., & Deng, Z. (2015). Resolving the conflicts of sustainable world heritage landscapes in cities: Fully open or limited access for visitors? *Habitat International*, 46, 91-100. <https://doi.org/10.1016/j.habitatint.2014.11.004>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

For more information, or if you believe that this document breaches copyright, please contact the Bond University research repository coordinator.

Resolving the conflicts of sustainable world heritage landscapes in cities: fully open or limited access for visitors?

ABSTRACT:

World Heritage Landscapes (WHLs) are receiving increased attention from researchers, urban planners, managers, and policy makers and many heritage values and resources are becoming irreversibly lost. This phenomenon is especially prominent for WHLs located in cities, where greater development opportunities are involved. Decision making for sustainable urban landscape planning, conservation and management of WHLs often takes place from an economic perspective, especially in developing countries. This, together with the uncertain source of funding to cover WHL operating and maintenance costs, has resulted in many urban managers seeking private sector funding either in the form of visitor access fees or leasing part of the site for high-rental facilities such as five star hotels, clubs and expensive restaurants. For the former, this can result in low-income urban citizens being unable to afford the access fees and hence contradicting the principle of *equal* access for all; while, for the latter, the principle of *open* access for all is equally violated. To resolve this conflict, a game model is developed to determine how urban managers should allocate WHL spaces to maximize the combination of economic, social and ecological benefits and cultural values. A case study is provided of the Hangzhou's West Lake Scenic Area, a WHL located at the centre of Hangzhou city, in which several high-rental facilities have recently been closed down by the local authorities due to charges of elitism and misuse of public funds by government officials. The result shows that the best solution is to lease a small space with high rents and leave the remainder of the site to the public. This solution is likely to be applicable only in cities with a strong economy.

Key Words: World heritage landscapes; City; Sustainable development; Conflicts; Game theory

1. Introduction

At the present time, the UNESCO World Heritage List comprises 1007 properties forming part of the world's cultural and natural heritage (UNESCO, 2014) and considered by The World Heritage Committee to be of outstanding universal value. However, WHLs are faced with a variety of threats, such as urbanization, industrialization, wars and social chaos. Currently, there are 44 WHLs in danger of deterioration or loss, making their sustainable development extremely urgent.

The management and protection of WHLs involves multiple parties, such as government bodies, political groups, local communities and associated business enterprises (Friedman et al., 2002). As stakeholder theory recognizes, these parties usually have conflicting interests, which, in this case, can hinder sustainable WHL

development. For example, The World Heritage Committee decided to remove the Arabian Oryx Sanctuary from the World Heritage List in 2007 due to poaching and environmental deterioration. Then in 2009, Germany's Dresden Elbe Valley was delisted due to the introduction of a four-lane bridge in the heart of the cultural landscape. As these two cases both illustrate, the priority need for regional development over the protection of WHLs can lead to their undue damage in the absence of any consultation process.

The situation is even more intense for WHLs in cities, where more threats and temptations exist. For example, WHLs in cities can be threatened by urban growth and urban sprawl (Al-hagla, 2010; Monteiro, Painho & Vaz, 2014; de Noronha et. al., 2012) as well as the presence of many highly profitable business opportunities. In addition, city WHLs also play multiple roles, such as in supporting economic development, serving taxpayers and performing an ecological function. It is crucial, therefore, that conflicts arising among city WHL stakeholders be resolved in advance of any development work taking place

Conflicts also exist in space allocation within WHLs. Managers can receive considerable economic benefits by leasing these spaces to high rental private sector facilities such as five-star hotels and expensive restaurants, but at the expense of reduced benefits for ordinary tourists and the social inequity that entails. As this situation and ensuing conflicts continues to grow, the need to find equitable solutions becomes increasingly necessary. With approximately 32% of WHLs in China located in cities, suggesting over 300 such WHLs worldwide, this is an important issue in need of serious research attention. One approach to this is to use game theory to analyse how managers should allocate space within WHLs. This is developed here in the form of a game model based on the analysis of the conflicts in different space allocation regimes and with different financial supports.

The paper is structured as follows. Section 2 reviews related literature concerning conflicts in the sustainable development of WHLs, the application of game theory and the innovative aspects of the paper. This is followed with a brief introduction to game theory in Section 3 and a theoretical framework in Section 4. Section 5 provides the main content of the paper in developing the game model. Section 6 contains a case study validation of Hangzhou's West Lake, located at the centre of the city, where the situation is further complicated by the government's current crack down on the misuse of high-end facilities. Section 7 provides a discussion concerning sustainable landscape development and policies, while some final remarks of the study's limitations and implications are presented in Section 8.

2 Literature review

The sustainable landscape of tourist cities has gained increasing attention from international organizations, governments and academics since the late 1980s. Sustainability in this context can be interpreted as the conservation of particular landscape types or values and implicitly the continuation of practices concerning their maintenance and organization (Antrop, 2006). The sustainable landscape concept has encountered several problems, disagreements and multidimensionality issues between

sustainability and landscape, leading to the lack of a commonly regarded definition.

<Insert Fig 1 here>

Musacchio (2009) introduced a conceptual framework comprising the six *Es* of landscape sustainability for designed landscapes, namely, environment, economy, ethics, experience, equity and aesthetics (Fig 1). Recently, Musacchio (2013) envisions that “landscape sustainability ... a key concept and research priority ... will play an important role in helping to redefine the debate about relationships among landscapes, ecosystem services and human well-being”. Nassauer and Opdam (2008) assert that landscape design acts as a bridge between science and society. From an environmental protection perspective, Turner (2010) and Wu (2013) incorporate the importance of resilience and vulnerability as essential perspectives. Through the lens of economics, landscapes are experiencing considerable changes that are greatly driven by the globalizing economy and urbanization process. This is particularly the case with the geographical situation and accessibility of places in the global networks of megacities (Sassen, 2000). In view of their special historic value, scientific, vulnerability and aesthetic qualities, WHLs play a vital role in the landscape literature. The unprecedented changes in landscapes raises concerns over the environmental and cultural integrity of WHLs and has also led to a re-examination of tourism growth in the light of sustainable development (Drost, 1996).

In this context, sustainable development and sustainable landscapes are mainly considered the theoretical basis of sustainable WHLs. In addition, theories of sustainable tourism, including carrying capacity, lifecycle and community participation also provide the basis for research on resource-, activity-, and community-based traditions of sustainability (Saarinen, 2006). The topic of sustainable WHLs encompasses a variety of aspects, such as sustainability assessment (Ko, 2005), legal study (Boer et al., 2005), policy research (Maikhuri et al., 2001) and conflict analysis (Maharjan, 2013). A conflict between authentic conservation and commodification is usually involved, particularly for WHLs in cities (Pendlebury, Short & While, 2009; Lee, 1996). The conflicts between stakeholders and the issue of resource equity often have a direct effect on sustainable WHLs, and is therefore one of the key features to be investigated. However, notwithstanding an extensive literature, there is often limited success in implementing sustainable WHLs. The root of this problem appears to lie in the lack of equitable solutions between stakeholders in resolving their conflicts.

A WHL is an interdependent system closely involving multiple stakeholders with a range of socioeconomic interests. With the advent of the World Heritage List in 1975, the high popularity (Shackle, 1998) and huge tourism demand (Wu et al., 2002) of WHLs has resulted in increasing conflict between stakeholders with opposing interests in the development and conservation of these areas. Conflicts over *sustainable development* (which aims to provide new development without jeopardizing the legacy of WHLs) can be classified into those between economic benefit and protection, social benefit and protection, and social and economic benefit

(Table 1).

<Insert Table 1 here>

Firstly, undoubtedly the most intensive conflict is that between the need for protection and desire for economic benefit. Because of ‘backward conception’ (Wu, 2006) and ‘unreasonable appraisal of government performance’ (Zhao, 2006), there is a tendency for entrepreneurs to exaggeratedly pursue economic benefits, especially in cities (Zhao, 2013) due to the high potential profits involved. Secondly, the conflict between protection and social benefit includes that between residents’ living and production activities, as well as infrastructure construction, regional conflict and international war. The involvement of residents presents critical implications for sustainability (Nicholas et al., 2009). Thirdly, the conflict between the social and economic issues of WHLs is mainly reflected in the economic conflict between communities and the managers of WHLs (Xiao, 2008) – in fighting for land rights for example - and ‘internal contradictions in managers’ (Su et al., 2006). However, heritage conservation can contribute to community improvement if developed in a compatible way (Elsorady, 2012).

Game theory has been used to resolve conflict problems (Myerson, 2013), such as in conflicts over resource allocation (Ahmadi et al., 2013; Wu, 2007), social relations (Michael-Tsabari et al., 2013) and policy (Brams, 2013). The sustainable development of WHLs can be conceived as involving multiple independent rational stakeholders aiming to maximize their individual, but conflicting, interests. This makes game theory well suited to analysing the conflicts occurring. Consequently, many studies have used game theory to model the conflict between WHL protection and communities (Liu, 2010), WHL entrance prices (Zhao et al, 2013) and the introduction of franchising (Liu & Zhao, 2011).

In summary, the application of game theory to WHL conflicts mainly refers to communities, governments, tourists and managers. There has been little research to date analysing the conflicts from the perspective of landscape space however. Therefore, this study seeks to rectify this by using game theory to optimise landscape space allocation within WHLs by analysing the conflicts involved and the means by which they can be resolved.

3 Method

Game theory can be defined as the study of mathematical models of conflict and cooperation between intelligent rational decision-makers. It provides general mathematical techniques for analysing situations in which two or more individuals make decisions that influence one another’s welfare (Myerson, 2013).

The concept of games has existed since ancient times, for example, *The Art of War* by Sun Tzu, written in the 6th century BCE, and the Tianji Horse Game of unknown origin. The development of game theory is said to be a revolution of human thought (Yao, 2007), with early work on modern game theory being attributed to Zermelo (1913), Borel (1921) and von Neumann (1928) - culminating in von

Neumann and Morgenstern's (2007) triumphant *Theory of Games and Economic Behavior* in 1944. Game theory experienced a flurry of activity in the 1950s, during which time the core concepts of the extensive form game, fictitious play, repeated games, the prisoner's dilemma, Nash equilibrium and the Shapley value were developed.

Games can be classified in many ways. Basic classifications include two-person and n-person games, finite and infinite games, zero-sum and non-zero-sum games. The finite two-person zero-sum game, such as the prisoner's dilemma, is one of the most widely used. Game theory is also used in many disciplines, such as economics (e.g., Costa-Gomes, 2010), political science (e.g., Morrow, 1994), biology (e.g., Hammerstein & Selten, 1994), computer science and logic (e.g., Shoham, 2008) and philosophy (e.g., Stalnaker, 1996).

4 Theoretical framework

There are various modes for managing WHLs. In terms of operating and maintenance (O&M) costs, they can be divided into two types: O&M supported by public finances and O&M supported by special funds. Public finances mainly come from the government and special funds denote financial assistance other than from public sources, including income from sponsors and managerial authority action. As Mayer (2014) recently found, the economic impact of day-trippers is very limited and operators of parks should try to focus on other guests. From the perspective of landscape space allocation, WHL managers can allocate space that is entirely open to the public or restricted to a high-revenue earning activity such as, for example, by leasing space to the high rental private sector such as five-star hotels and expensive restaurants. The combination of these two modes is shown in Fig. 2, divided into four quadrants.

<Insert Fig 2 here>

1) Mode I: A WHL completely open to the public with the support of public finance. This mode is most commonly used in developed countries. Most of the WHLs impose token 'entry and use' fees that cover only a portion of the management costs (e.g. Garrod and Fyall, 2000), typically for a vehicle, or for use of a facility such as for a campsite. In many cases, no fees are charged. For example, USA national parks were prohibited from charging fees by law for many years. In addition, the tourism private sector usually objects to the imposition of fees, or at least any increase in existing fees (Eagles, 2002).

However, in developing countries, there is a strong likelihood of unsustainable WHL development due to insufficient management resistance because of shortage of public finance and large numbers of visitors. To avoid this consequence, WHLs in many developing countries use "user-pays" ticketing to restrict the number of visitors (Garrod & Fyall, 2000). In China, the sale of tickets provides the main source of revenue for most WHLs. However, the ticket price of some of China's WHLs accounts for an average of 11.3% of per capita annual cash consumption expenditure

on education, culture and recreation of urban households and 51.6% of that of rural households (China Statistical Yearbook, 2013). Therefore, in the absence of positive price discrimination in favour of low-income people, not all can afford to buy tickets. Hence, although the space is ostensibly completely open to the public, ticket prices can be socially inequitable in depriving low-income groups of access.

2) Mode II: Restricting access to a WHL to a specific group with the support of public finances. In this mode, while the WHL is supported by government subsidies, it is not open to the general public. This is an obvious departure from the accepted role of government in supporting the populace at large and therefore would be a consequent misuse of government funds. It will also result in loss of heritage status itself for, as Garrod and Fyall (2000) observe, “if potential visitors or tourists are prevented from experiencing the heritage property ... then whose heritage does the property represent and for whom is it being preserved?”. This is therefore clearly an untenable management mode.

3) Mode III: Restricting access of a part of a WHL to a specific group with the support of special funds. This mode partially meets the demand for WHLs to obtain supplementary private sector revenue while retaining open access to the remaining part of the WHL. It may seem to be unfair for some WHL space to be occupied in this way but, in developing countries, the additional funds obtained by leasing can alleviate the lack of public finance. In other words, this mode can provide sufficient funds for WHL management and protection and help subsidize ticket prices. Therefore, although violating the principle of the whole of national heritage being accessible to the whole nation, the general public is still able enjoy a portion of a WHL and with reduced access fees. This mode, therefore, goes some way to simultaneously reduce both the problems of finance and social inequality. However, a premise of this mode is that only cities with a strong economy can support high-rent services and spaces. With underdeveloped cities, these may be too expensive to run due to a lack of tourist visitors.

4) Mode IV: A WHL completely open to the public with the support of private sector funds. Here, the WHL is unsupported by public finances and its funds are mainly from donations and NGOs, which may well be insufficient for its management and protection. In this case, WHL managers are likely to adopt an unsustainable development approach due to the lack of funds.

It is clear that Modes II and IV are untenable and not conducive to sustainable development. It appears that WHLs managed by these modes will be either destroyed or converted to Modes I or III. In addition, Mode I is not applicable to WHLs in developing countries and often results in depending solely on ticket sales owing to the shortage of public funds – an undesirable situation as discussed earlier. Therefore, Mode III would seem to be the most suitable for developing countries. The next section develops a game model for Mode III aimed at trading off WHL funding arrangements with the social equity issues.

5 Game theory model

According to the analysis above, when faced with the shortage of public finance,

WHL managers should lease a minimum portion of the area to cover the WHL O&M costs and leaving as much open access area as possible for the public. In the next part of this paper, the appropriate action and proportional allocation of space and access prices will be obtained with use of game theory.

5.1 Analysis of economic benefits of a high-revenue earning facility

As is illustrated in Fig. 3, the equilibrium price is at point A when there is no high-revenue earning activity on the WHL. In other words, site visitors are willing to pay P^* for space Q^* . At this point, the consumer surplus can be described by the area of $\triangle ABC$ (Mayer, 2014). Then introduce an expensive high-rental facility that very few people can afford occupying a small amount of space. The consumer surplus is now the areas of $\triangle ADF$ and $\triangle DBE$, a decrease the area of rectangle CFDE, which can be understood as supernumerary income for the WHL. That is, leasing part of the WHL space to a high-rental facility could cover O&M costs. As Tye et al. (1995) conclude, better financed and protected areas are likely to be better managed, and consequently attract more visitors. Areas with more visitors also gain a higher political profile, with the likelihood of obtaining more government grants (Eagles, 2002).

<Insert Fig 3 here>

5.2 Analysis of conflict

The conflicts faced by WHLs management in the Mode III situation are mainly reflected in the allocation of space and economic support. These conflicts affect WHLs in cities more directly and strongly because of their multi-roles and high economic benefits. As is illustrated in Fig 4, the WHL managers allocate a proportion of the space available for expensive facilities from which the managers receive economic benefit in the form of rent, with the remaining space being available for access by ordinary tourists as a social benefit in the form of visitation rights. From this, it is clear that increasing the proportion of space allocated to the high-rental facilities will simultaneously increase the economic benefits to the site and decrease the social benefits of the ordinary tourists and *vice versa*. At one extreme, allocating the whole site to ordinary tourists is effectively the same as Mode I, which we have already judged to be untenable for developing countries. At the other, allocating the whole site to high-rental facilities is equivalent to Mode II, which we have also deemed to be untenable.

Deciding on the best proportions to allocate, therefore, constitutes an optimisation process involving the trade-off between the resulting economic and social outcomes. The next section explains the second part of Fig 4 in the use of game theory to further analyse the conflict between the needs of ordinary tourists and WHL managers, and the corresponding measures the managers should take in the optimal allocation of space and access pricing.

<Insert Fig 4 here>

5.3 Model building

The game involves two sets of players, the WHL managers and the WHL tourists, which are both assumed to comprise rational economic beings. The goal of the managers is to maximise the economic benefits to pay for O&M costs and future sustainable development, while the goal of the tourists is to maximise their net benefit of enjoying the WHL.

Let the benefit of all the tourists by enjoying the WHL be A and the total ticket revenue be B . The O&M costs of the WHL are indicated by C . Next, denote the proportion of specific space as $1/m$ and the rent of unit proportion as n times the benefit of tourists A . The payoff matrix of players is then as shown in Table 2.

<Insert Table 2 here>

It can be seen from the matrix that when managers choose to open the WHL to the public completely, the tourists will obtain benefit $A-B$ when ticketing is in operation and A when access is free. As rational players therefore, the tourists prefer to have free access as this provides the greater benefit. Similarly, when there is $1/m$ of space occupied by high-rental facilities, the total benefit to the tourists falls to

$\frac{m-1}{m}A - B$ and $\frac{m-1}{m}A$ respectively, with free access still being the preferred option.

Managers, on the other hand, obtain benefit $B-C$ when the WHL is completely open to the public and tourists have to pay for access. When $1/m$ of space is rented,

managers receive $\frac{n}{m}A$ as rent and benefit $B - C + \frac{n}{m}A$, which is higher than when

completely open to the public. The same applies when access is free. Thus, when the tourists exercise their preference for free access to the WHL, managers will choose to

lease part of space for high-rental facilities, and hence $(\frac{m-1}{m}A, \frac{n}{m}A - C)$ is the

equilibrium payoff of the game.

To simplify the model, assume $A=B$ and $B=C$, which means tourists and managers both realize the balance of payments. Then the payoff matrix can be

simplified as Table 3 and the equilibrium is $(\frac{m-1}{m}B, \frac{n-m}{m}B)$.

<Insert Table 3 here>

This shows that the benefits of tourists and managers are related to n , m and B . However, B is a stable value for the WHL, so the sole factors in need of study are n and m .

From the tourists' viewpoint, increases in m provide increases in ticket revenue B .

In other words, tourists prefer m to be as large as possible. Based on the generally accepted threshold of a significant event occurring with a probability of $p=0.05$ or 1 in 20, we set $m>20$. From the managers' perspective, after first meeting the requirement of the tourists, they then maximize their benefit. As $\frac{n-m}{m} > 1$, then it is necessary that $n>m$ in order to cover their O&M costs. For example, when the proportion of high-rental space is 5%, the rent of unit specific space should be more than 20 times A , the total tourist benefit, in order to gain sufficient funds to cover O&M costs.

6 Case study of West Lake: model validation

Razzu (2005) indicates that city centres are places where historical buildings of various uses and types are located. West Lake is a freshwater lake located at the centre of Hangzhou city, the capital of Zhejiang province in eastern China (Fig. 5). Hangzhou is one of China's most developed cities as well as a famous tourist, historic and cultural city. It is the economic, political and cultural centre of Zhejiang province. In 2013, its Gross Domestic Product (GDP) ranked 10th in the nation. With a GDP of 15220 dollars per capita, Hangzhou is already equal to a rich country. Taken together, all these factors enable the West Lake Scenic Area to attract many tourists able to afford to high-end clubs, indicating the suitability of Mode III for this WHL.

It was inscribed an UNESCO World Heritage Site in 2011, described as having "influenced garden design in the rest of China as well as Japan and Korea over the centuries" and reflecting "an idealized fusion between humans and nature" (UNESCO NOW, 2011). The management of the West Lake Scenic Area is the responsibility of the West Lake Scenic Area management committee. The management of West Lake is distinctive in China, leasing part of the WHL space to exclusive high-end clubs such as Bodhi Vihara, the Jiangnan Club and Rong Chinese Cuisine, most of which are former residences of celebrities or adapted historic buildings. In addition, access to the remainder of the West Lake WHL is free of charge, involving no land grants, and no damage to historic relics or appropriation of public resources.

Hangzhou's exclusive clubs are a typical form of high-rental facility in developing countries such as China. Clubs provide entertainment, business, hobby, politics or religion, etc., and vary in their quality, amenities and membership fees. Membership of exclusive clubs is a symbol of wealth and status and many people strive to join the most prestigious club they can afford. Most clubs are rented by businesses and used as a reception site for important visitors. For these enterprises, the clubs' mission is to provide a private and individualized service for a limited membership, create a communicative platform for business and gain intangible assets, rather than making real profits. For example, the Jiangnan Club was built by MA Yun, the founder of Alibaba and is located in an historic building and used as a gathering site for elite members. The rent of the clubs is very high, especially for those next to the lake.

It is usual in developing countries to lease a small part of space within WHLs to these high-rental clubs, which cannot be accessed by most people because of their

very high membership fees. Although the lucrative income of a club from its fees, food and merchandise sales etc. may not be utilized directly in support of the site's O&M costs, some income from these sources is earned indirectly through concessionaire royalty payments and fees (Eagles, 2002). In addition to economic factors, high-revenue earning clubs are more suited to WHLs than the usual commercial facilities of tourism service and restaurants. This is because they focus more on the management level, protection of buildings, natural environment and have fewer visitors. Therefore, the relationship between the West Lake Scenic Area management committee and the users of exclusive high-end clubs is not only one of lessor and lessee. To some extent, they are co-workers. Because the facilities are generally located in ancient buildings, the clubs have a responsibility to protect and maintain their state and not carry out any alterations. In this case, they are protectors rather than lessees.

<Insert Fig 5 here>

Until recently, there were 38 such high-end clubs located around West Lake out of 1760 service firms supporting tourism in Hangzhou (Fig. 6), and with some influence on the benefit of ordinary tourists. In terms of space, the clubs occupy a 1000m² area around the lake within a WHL total area of about 50km².

With Xi Jinping's rise to General Secretary of the Communist Party of China in 2012 and President of the People's Republic of China in 2013, however, there has been a strong move towards what has been termed "The Chinese Dream". This envisages a "great renaissance of the Chinese nation" by bringing the country's increasingly fragmented society together in order to return China to its former central position in the world (Daily Telegraph, 17 March 2013). A significant aspect of this defragmentation process is seen to be in combatting bureaucracy and government waste, with particular emphasis on hitherto government profligate spending on hospitality. In the New York Times' predictably cynical words

President Xi Jinping has imposed a form of austerity on the nation's famously free-spending civil servants, military brass and provincial party bosses. Warning that graft and gluttony threaten to bring down the ruling Communists, Mr. Xi has ordered an end to boozy, taxpayer-financed banquets and the bribery that often takes the form of a gift-wrapped Louis Vuitton bag" (New York Times 27 March 2013).

By the end of the year as a result, the Beijing Commission for Discipline Inspection in China's capital, the city branch of the Central Anticorruption Agency, said that it noted "the unhealthy trend in its clubs" in recent times, and now intends to shut down all high-end private clubs in the city (Epoch Times, 21 Jan 2014). At the same time the Commission asked Beijing party officials to "lead by example" by signing a declaration that they will not enter private clubs or hold membership cards of such venues (Want China Times, 16 January 2014)

At the same time, high-end clubs such as those at West Lake had come under increasing scrutiny from the municipal government. By early 2014 it had followed Beijing's lead by shutting down a number of high-profile private clubs around the city;

threatening the closure of all high-end venues near the West Lake; strengthening supervision of party officials and to punish cadres who head to private clubs; and prohibiting the establishment of further venues inside the scenic park area (Want China Times, 16 January 2014). By 17 January 2014, ten West Lake high-end clubs had been ordered to close (Global Times, 19 January 2014) with promise of more closures to come.

The real-world situation in Hangzhou is therefore more complicated than one simply of the economics of ticketing and space allocation but of “packaged” suitably regulated high-rental space. That is, to assume that the solution to the misuse of such clubs is for the municipal authorities to *discharge their responsibilities* towards the general public by better controlling the behaviour of their own officers instead of the simple expedient of *removing temptation* by their closure. As Li Keqiang, the Chinese prime minister rightly asserts, “since we have chosen public office we should give up all thought of making money ... clean government should start with oneself”. This being the case, we first apply the game model to identifying the optimal solution to the ticket prices and proportion of this packaged high-rental space. The implications relating government policy will be considered in the following discussion section.

Before closure, the proportion of club area in West Lake was 0.076% or $m=1316$ in the game model, which means the impact of the clubs on tourists was very small. In addition, the general O&M budget expenditure of the West Lake Scenic Area in 2013 was 1.16 billion yuan based on the data published by the Financial Bureau. The payoff for the tourists and management committee is provided in Table 4.

<Insert Fig 6 here>

<Insert Table 4 here>

As Table 2 shows, completely opening the WHL to the public with ticketing is a lose-lose strategy. In this mode, neither player obtains a positive benefit. If the West Lake Scenic Area is completely open to the public and tourists have to pay for entry, the management committee will lose 1.16 billion yuan. If the WHL is ticketed and part of the space is leased to clubs, the tourists will obtain negative benefits. Only when the management committee leases a small part of the space with high rents and offers the remaining space free to the public will both players receive positive benefits.

The rent from buildings in the West Lake Scenic Area is as high as 8 to 10 yuan/($m^2 \cdot d$) and 5 yuan/($m^2 \cdot d$) for those further away. This provides a total estimated income of approximately 110.96 million yuan. However, when compared to the general budget expenditure of the West Lake Scenic Area, it is obvious that this cannot meet its funding needs. In other words, n is too small and income is too low. Low income means low revenue, which is often not conducive for government subsidy. As Laarman and Gregersen (1994) point out, this situation can lead to a vicious cycle of ‘low fees, inadequate revenue and deficient public investment – followed by continued low fees, revenue and investment’. Should this be the case for

the West Lake Scenic Area, it is likely to engender excessive tourists and poor management and undermine the prospects of sustainable development as a result.

Similarly, increasing the income through entrance ticketing is equally counterproductive. Firstly, as previously discussed, tickets reduce social welfare. In addition, ticketing has a low multiplier effect. That is, ticketing is unable to promote the development of other industries and may even restrict their development due to fixed total consumption. Secondly, the West Lake Scenic Area Management Committee has a social responsibility to promote the economic development of Hangzhou. The development concept of Hangzhou is to extend the influence of the West Lake Scenic Area from the WHL to the whole city and make tourism one of the city's industries – the so-called 'eyeball economy'. Ever since the West Lake Scenic Area Management Committee introduced free access, although ticket income was lost, the visitors and the time they stay increased greatly, providing an increased income to the site's service industry much higher than that from ticketing. In short, it is not practicable to increase West Lake income by ticketing. High-end clubs, however, have several prominent advantages. On one hand, clubs protect the former residences of celebrities and historic buildings with restricted access and careful management. On the other hand, if the rent and number of clubs is increased appropriately, the high-end clubs will certainly bring considerable economic benefits to the West Lake Scenic Area. Therefore, the appropriate development of high-end clubs and free access to the main WHL are reasonable measures for the sustainable development of West Lake Scenic Area and even Hangzhou as a whole.

7 Discussion

Having demonstrated the need for the high-end club 'package' in the West Lake WHL there is now the difficult problem of satisfying the country's mission towards their responsible use. In approaching this, it first needs to be recognised that, within the Chinese setting, distinct differences exist between market-based economies where tourism plans "have been degraded into master plans and marketing schemes" and those countries where social and economic lives "at large have been considerably shaped and framed by political and bureaucratic factors" (Zhang & Yan, 2009, p. 168). In welfare states such as the USA and Canada, for example, development began with leisure and supported by recreation agencies and national park systems for the well-being of its people. This made WHLs' tourism a newcomer to the recreation and leisure business and hence in education, research and policy practices. In contrast, landscape tourism development in China followed exactly the opposite path of growth, beginning with international/inbound landscape tourism driven by an economic impetus of earning foreign currency or international tourist receipts. Typically, in western destination development, the public sector imposes regulation and governance on the private sector, while in China the public sector is often pro-economic development and in many ways acts like the west's private sector. In the early stages, such government-led and subsequently combined efforts with the private sector effectively foster a destination's development, with the key role of policies implemented by local governments and the roles of institutions being critical.

In contrast, the private sector and central government tend to dominate in many western countries. In the later stages, however, the increased involvement of the private sector and empowerment of other stakeholders in China has exerted a huge impact on the government, which has gradually started to assume the roles of destination marketing and the regulation of the markets for a sustainable outcome (Zhang & Xiao, 2013).

In China, therefore, landscape tourism develops through a high degree of institutionalization under strong government inputs and regulations. The centrality of institutions and governments in China foster destination development through policy orientation, attracting investments and regulations in their capacity as producers, protectors and promoters of desired processes of change. Despite the strong role of government as decision-/policy-makers, regulation executors and often investors in landscape tourism, destination development in China has its own complications and contexts. These are often constrained by existing institutional conflicts such as *disordered management systems, multiple and unclear authorities, lack of distinction between the functions of governments and those of enterprises or businesses and confusions or ambiguities in the division of interests* (Jiang, 2007; Wang, Lu, & Liu, 2003).

It is within this chaotic transitional situation that the case of Hangzhou's West Lake WHL predicament needs to be viewed. Unlike reports of serious illegal activities associated with some high-end clubs in the west (e.g., Dong-Hoon, 2004; Joe-Laidler & Hunt, 2008; Rusch et al 2010), China's problems are centered solely on the behaviour of public officials and doctrinaire antipathy to elitism. The local government's strategy of simply removing the offending clubs solves both these problems at a stroke but in doing so, also results in a lack WHL funding, the inevitable rise of unsustainable development and consequential demise of the area – a win-win-lose situation. Our analysis above indicates that, instead, something approaching a win-win-win situation at West Lake would be to retain a minimum number of high-end clubs to support sustainable development but with a more western style increased government regulation and policing over their operations and, in the case of intransigent government officials, clientele. To do this, would involve less direct government participation in the landscape tourism industry as at present in favour of the simple regulation and governance of the private sector's activities.

8 Conclusion

Conflicts in the landscape space allocation of WHLs in developing countries are essentially caused by economic factors that are more intense for those located in cities due to their multi-roles and considerable business opportunities offered. A game theoretic conflict analysis within a theoretical framework is used to identify the allocation approach to maximize the benefits involved. The results indicate that placing a small amount of around 5 percent of WHL space on the private sector high-rental market will enable sufficient funds to be raised to cover O&M costs, avoid entry fees, promote the development of the local community and minimize the negative impact of WHL tourism. This implies the negotiation of an appropriate level

of rental to cover O&M costs and the local government exercise a strict control over the lessees. This approach is more effective for WHLs located in cities with a strong economy.

The management approach in this paper divides WHL service into high-end service and general service, with different charging standards. This reflects the social responsibility of WHLs as well as economic benefits. Therefore, it is necessary to provide a diversity of services for the heritage landscape to realize the multi-goals involved and enable future sustainable development. A WHL is a semi-public good and full market exposure would be inequitable in disadvantaging potential low-income visitors. However, a complete lack of market involvement will inevitably lead to inefficiencies. Therefore, as the services provided by WHLs are transformable into public or private modes, it is necessary to provide a balanced solution between equity and efficiency (Xu et al., 2010). To achieve this balance, the WHL can set up different departments for each kind of service for a differentiated management. It has been proved that the management of private sector leases is as much a rational process as the management of the public access of WHLs. As for high-rental activities, Eagles (1999) has documented that the private sector is better equipped and therefore should be more heavily involved in the upper range market, which needs a more business-like management structure to handle the potentially significant revenue gains involved (Parks Canada, 2001). As for the normal public, it is fairer to provide low-price or free access with total or partial cost compensation from governments and managed by the public sector. In conclusion, only when the market and government manage the WHL jointly can it achieve a comprehensively optimal efficiency and fairness.

Acknowledgement:

This study received financial support from the China National Natural Science Foundation (Project No: 71303203 and Project No: 71373231); It was also substantially supported by a grant from the City University of Hong Kong (Project No. 6000504 and Project No. 9610282 and Project No. 7200376).

References

- Ahmadi, A., & Salazar Moreno, R. (2013). Game Theory Applications in a Water Distribution Problem. *Journal of Water Resource and Protection*, 5(1), 91-96
- Al-hagla, K. S. (2010). Sustainable urban development in historical areas using the tourist trail approach: A case study of the Cultural Heritage and Urban Development (CHUD) project in Saida, Lebanon. *Cities*, 27(4), 234-248.
- Antrop, M. (2004). Landscape change and the urbanization process in Europe. *Landscape and Urban Planning*, 67(1), 9-26.
- Antrop, M. (2006). Sustainable landscapes: contradiction, fiction or utopia?. *Landscape and Urban Planning*, 75(3), 187-197.
- An D. (2005). Research on the predicament and its practical solutions in sustainable

- conservation of medium-and-small historic cities in west China [D] (Doctoral dissertation, Tianjing University).
- Aplin, G. (2007). World Heritage cultural landscapes. *International Journal of Heritage Studies*, 13(6), 427-446.
- Boer, B. & Wiffen, G. (2006). *Heritage law in Australia*, Melbourne: Oxford University Press., 43.
- Borel, E., 1921. “La Theorie de Jeu et les Equations Integrales a Noyan Symetrique.” *Comptes Rendus de l'Academie des Sciences* 173, 1304–1308; English translation by L. Savage, “The theory of play and integral equations with skew symmetric kernels.” *Econometrica* 21
- Costa-Gomez, M. A. (2010). *Behavioral Economics and Game Theory*. Wiley Encyclopaedia of Operations Research and Management Science.
- Daily Telegraph, 17 March 2013, “Xi Jinping calls for a Chinese Dream”
- de Noronha Vaz, E., Cabral, P., Caetano, M., Nijkamp, P., & Painho, M. (2012). Urban heritage endangerment at the interface of future cities and past heritage: A spatial vulnerability assessment. *Habitat International*, 36(2), 287-294.
- Dong-Hoon, S. (2004). International Sex Trafficking in Women in Korea: Its Causes, Consequences and Countermeasures¹. *Asian Journal of Women's Studies*, 10(2), 7-47.
- Drost, A. (1996). Developing sustainable tourism for world heritage sites. *Annals of Tourism Research*, 23(2), 479-484.
- Eagles, P.F.J. (1999) Maloti-Drakensberg Transfrontier Conservation and Development Area Project mission report on tourism (unpublished report). Washington, DC: World Bank.
- Eagles, P. F. (2002). Trends in park tourism: Economics, finance and management. *Journal of Sustainable Tourism*, 10(2), 132-153.
- Elsorady, D. A. (2012). Heritage conservation in Rosetta (Rashid): A tool for community improvement and development. *Cities*, 29(6), 379-388.
- Epoch Times, 21 Jan 2014, Beijing Sees Corruption in Expensive Dining Clubs.
- Friedman, A. L., & Miles, S. (2002). Developing stakeholder theory. *Journal of Management Studies*, 39(1), 1-21.
- Garrod, B., & Fyall, A. (2000). Managing heritage tourism. *Annals of Tourism Research*, 27(3), 682-708.
- Global Times, 19 January 2014 “Fancy clubs in parks closed in E. China”
- Hammerstein, P., & Selten, R. (1994). Game theory and evolutionary biology. *Handbook of Game Theory with Economic Applications*, 2, 929-993.
- Haynes, D., Müller, J., Carter, S. (2000). Pesticide and herbicide residues in sediments and seagrasses from the Great Barrier Reef World Heritage Area and Queensland coast. *Marine Pollution Bulletin*, 41(7), 279-287.
- Joe-Laidler, K., & Hunt, G. (2008). Sit down to float: The cultural meaning of ketamine use in Hong Kong. *Addiction Research and Theory*, 16(3), 259-271.
- Kaltenborn, B. P., Thomassen, J., Wold, L. C., Linnell, J. D., & Skar, B. (2013). World Heritage status as a foundation for building local futures? A case study from Vega in Central Norway. *Journal of Sustainable Tourism*, 21(1), 99-116.

- Ko, T. G. (2005). Development of a tourism sustainability assessment procedure: a conceptual approach. *Tourism Management*, 26(3), 431-445.
- Laarman, J. Gregersen, H. (1994) Pricing policy in nature-based tourism. Working Paper, EPAT/MUCIA, St Paul, MN: University of Minnesota.
- Landorf, C. (2009). Managing for sustainable tourism: a review of six cultural World Heritage Sites. *Journal of Sustainable Tourism*, 17(1), 53-70.
- Lee, S. L. (1996). Urban conservation policy and the preservation of historical and cultural heritage: The case of Singapore. *Cities*, 13(6), 399-409.
- Li J. (2006). Unfair problems in protection and utilization of world heritages. *China Place Name*, (6).
- Liu C. (2010). Game relationship analysis of world heritage protection and the peripheral community (Master's thesis, Fujian Agriculture and Forestry University).
- Liu H., Zhao L. (2011). Franchising applied to world heritage based on of principle-agency analysis. *Journal of Xidian University (Social Science Edition)*, 21(3).
- Maharjan, M. (2013). Conflict in World Heritage Sites of Kathmandu Valley: A Case Study on the Conservation of Private Houses in Three Durbar Squares. *Nepal Tourism and Development Review*, 2(1), 87-104.
- Maikhuri, R. K., Nautiyal, S., Rao, K. S., & Saxena, K. G. (2001). Conservation policy–people conflicts: a case study from Nanda Devi Biosphere Reserve (a world heritage site), India. *Forest Policy and Economics*, 2(3), 355-365.
- Mao L. (2004). Tourism development and world heritage protection. *Commercial Research*, 19, 169-170.
- Monteiro, V., Painho, M., & Vaz, E. (2014). Is the heritage really important? A theoretical framework for heritage reputation using citizen sensing. *Habitat International*.
- Musacchio, L. R. (2009). The scientific basis for the design of landscape sustainability: a conceptual framework for translational landscape research and practice of designed landscapes and the six Es of landscape sustainability. *Landscape Ecology*, 24(8), 993-1013.
- Musacchio L. R. (2009). Key concepts and research priorities for landscape sustainability, *Landscape Ecology*, 28,995-998
- Mayer M. Can nature-based tourism benefits compensate for the costs of national parks? A study of the Bavarian Forest National Park, Germany [J]. *Journal of Sustainable Tourism*, 2014 (ahead-of-print): 1-23.
- Michael-Tsabari, N., & Weiss, D. (2013). Communication Traps: Applying Game Theory to Succession in Family Firms. *Family Business Review*, 1-15.
- Morrow, J. D. (1994). *Game theory for political scientists*. Princeton, NJ: Princeton University Press.
- Myerson, R. B. (2013). *Game theory: analysis of conflict*. Harvard University Press.
- Nassauer, J. I., & Opdam, P. (2008). Design in science. *Landscape Ecology*, 23, 633–644.
- National Bureau of Statistics of China. (2013). *China Statistical Yearbook 2013*.

- China Statistics Press.
- New York Times 27 March 2013, "Elite in China face austerity under Xi's rule"
- Nicholas, L. N., Thapa, B., & Ko, Y. J. (2009). Residents' perspectives of a world heritage site: The Pitons Management Area, St. Lucia. *Annals of Tourism Research*, 36(3), 390-412.
- Parks Canada. (2001). *Parks Canada Revenue Report 2000-01*. Hull, Quebec: Parks Canada.
- Pendlebury, J., Short, M., & While, A. (2009). Urban World Heritage Sites and the problem of authenticity. *Cities*, 26(6), 349-358.
- Razzu, G. (2005). Urban redevelopment, cultural heritage, poverty and redistribution: the case of Old Accra and Adawso House. *Habitat International*, 29(3), 399-419.
- Rusch, M. L., Brouwer, K. C., Lozada, R., Strathdee, S. A., Magis-Rodríguez, C., & Patterson, T. L. (2010). Distribution of sexually transmitted diseases and risk factors by work locations among female sex workers in Tijuana, Mexico. *Sexually Transmitted Diseases*, 37(10), 608-614.
- Saarinen, J. (2006). Traditions of sustainability in tourism studies. *Annals of Tourism Research*, 33(4), 1121-1140.
- Shackley, M. (Ed.). (1998). *Visitor management: case studies from world heritage sites*. Routledge.
- Shoham, Y. (2008). *Computer Science and Game Theory. Communications of the ACM*, 51(8), 74-79.
- Smith, M. (2002). A critical evaluation of the global accolade: the significance of World Heritage Site status for Maritime Greenwich. *International Journal of Heritage Studies*, 8(2), 137-151.
- Stalnaker, R. (1996). Knowledge, belief and counterfactual reasoning in games. *Economics and Philosophy*, 12, 133-164.
- Su Y., and Deng H. (2006). current situation, problems and countermeasures of management of world heritage in China. *Research on Development*, 5, 78.
- Sun K. (2008). Study on protection and sustainable development of the World Heritage in China. *Journal of China University of Geosciences (Social Sciences Edition)*, 8(3), 36-40.
- Turner, I. I. (2010). Vulnerability and resilience: Coalescing or paralleling approaches for sustainability science?. *Global Environmental Change*, 20(4), 570-576.
- Tye, H. and Gordon, D.M. (1995) *Financial and Human Investments in Biosphere Reserve Management*. Cambridge: World Conservation Monitoring Centre.
- UNESCO (2014) *World Heritage List*. UNESCO World Heritage Centre 1992-2014 <http://whc.unesco.org/en/list/> (visited 27 October 2014)
- UNESCO NOW. (2011). Ancient Chinese cultural landscape, the West Lake of Hangzhou, inscribed on UNESCO's World Heritage List [EB/OL]. UNESCO Media Service.
- von Neumann, J. (1928) Zur Theorie der Gesellschaftsspiele. *Math. Ann*, 100, 295-320.
- Von Neumann, J. and Morgenstern, O. (2007). *Theory of Games and Economic Behavior (60th Anniversary Commemorative Edition)*. Princeton University Press.

- Wall, G., and Black, H. (2004). Global heritage and local problems: Some examples from Indonesia. *Tourism* 7(4/5), 436-439.
- Wang, D., Lu, L., & Liu, C. (2003). A study on improving the present management system of scenic areas in China. *Tourism Tribune*, 18(3), 67-72. (in Chinese)
- Want China Times, (16 January 2014) "Beijing, Hangzhou shut down private clubs in public parks"
- Wu B., Li M., and Huang G. (2002). A study on relationship of conservation and tourism demand of world heritage sites in China. *Geographical Research*, 21(5), 617-626.
- Wu, J. (2013). Landscape sustainability science: ecosystem services and human well-being in changing landscapes. *Landscape Ecology*, 28(6), 999-1023.
- Wu T. (2006). Analysis on the current status and countermeasure of the World Heritage of PRC. *Journal of the Postgraduate of Zhongnan University of Economics and Law*, 1, 037. [in Chinese].
- Wu Y. (2007). On regional equilibrium of industrial land price and management strategy based on game theory. *Journal of Zhejiang University (Humanities and Social Sciences)*, 37(4), 124-133. [in Chinese].
- Xiao Y. (2008). Community conflict and its settlement mechanism in the protection of world heritage in China. *Journal of Leshan Teachers College*, 23(8), 67-70.
- Xu F., and Shi X. (2010). Research on ticket price of scenic spots from the perspective of Quasi-public products. *Shandong Social Science*, (1), 126-129.
- Xu S. (2002). On the Management of World Heritage in China - the Evaluation and Renewal of Huangshan Model. *Tourism Tribune*, 17(6), 10-18.
- Yao G. (2007). *Game Theory*. Higher Education Press.
- Zermelo, E., 1913. Über eine Anwendung der Mengenlehre auf der Theorie des Schachspiels. In: *Proceedings of the Fifth International Congress on Mathematics*.
- Zhao J., Li X., and Gao Z. (2013). Game analysis on prices of the entrance tickets rising in World Heritage sites - A Case Study on Part of World Heritage Sites in Sichuan. *Journal of Southwest University of Science and Technology*, 30(1), 16-021 [in Chinese].
- Zhao X. (2006). Research on the questions and measures of the World Heritage surroundings of China [D], Doctoral dissertation, Sichuan University [in Chinese].
- Zhao N. (2013). Study on conversion planning of World Natural Heritage in the urban fringe- Take Danxia Mountain in Guangdong Province as example (Master's thesis, Beijing University of Civil Engineering and Architecture). [in Chinese].
- Zhang, C., and Xiao, H. (2013). Destination development in China: towards an effective model of explanation. *Journal of Sustainable Tourism*, (ahead-of-print), 1-20.

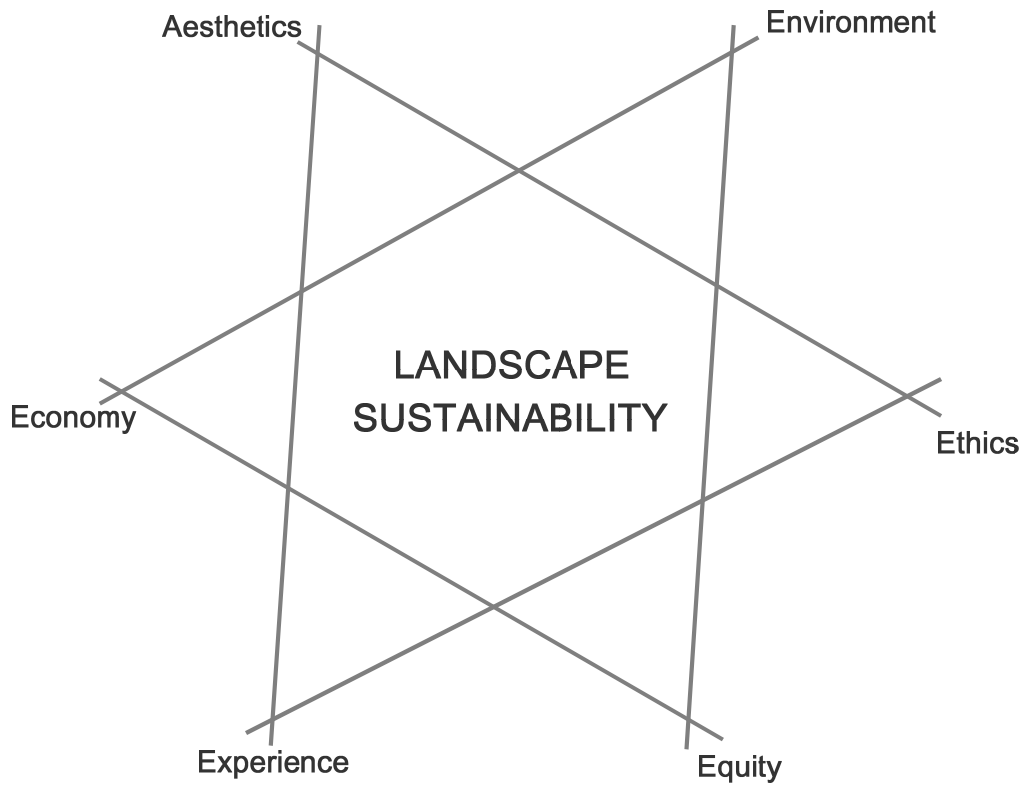


Fig. 1. The six Es of landscape sustainability: environment, economics, equity, aesthetics, experience, and ethics (Musacchio, 2009)

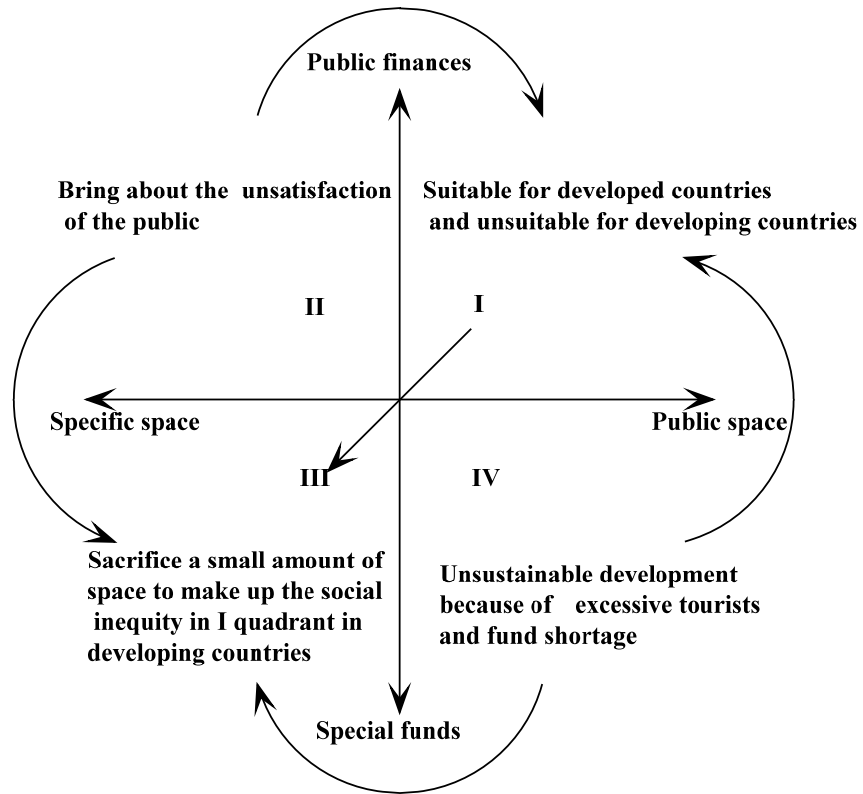


Fig.2 Theoretical framework

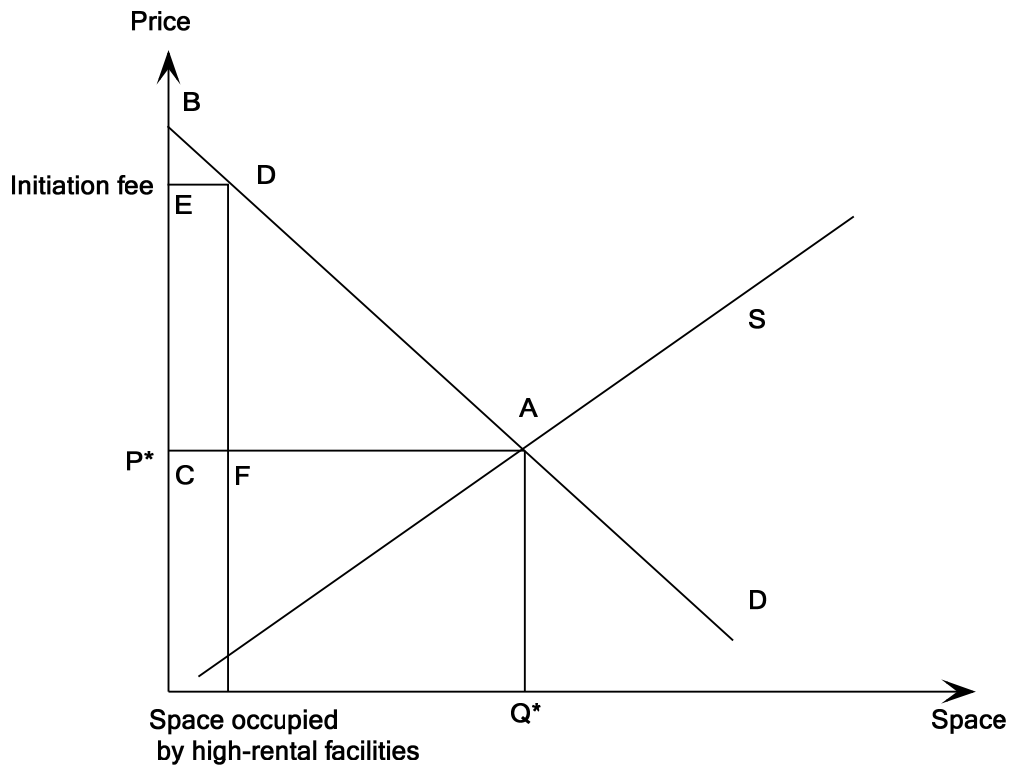


Fig. 3 Supply-and-demand diagram

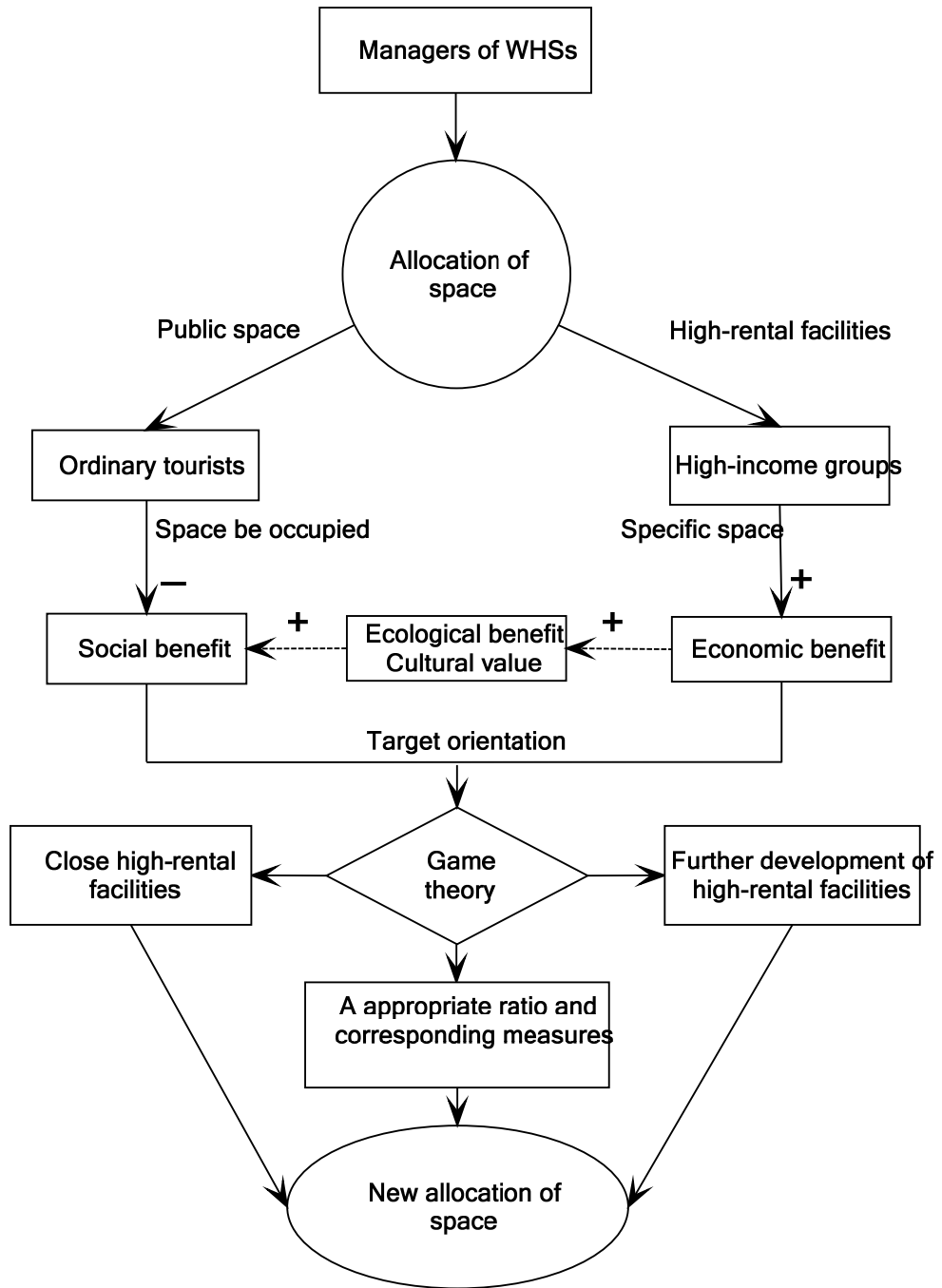


Fig. 4 Conflict in WHLs

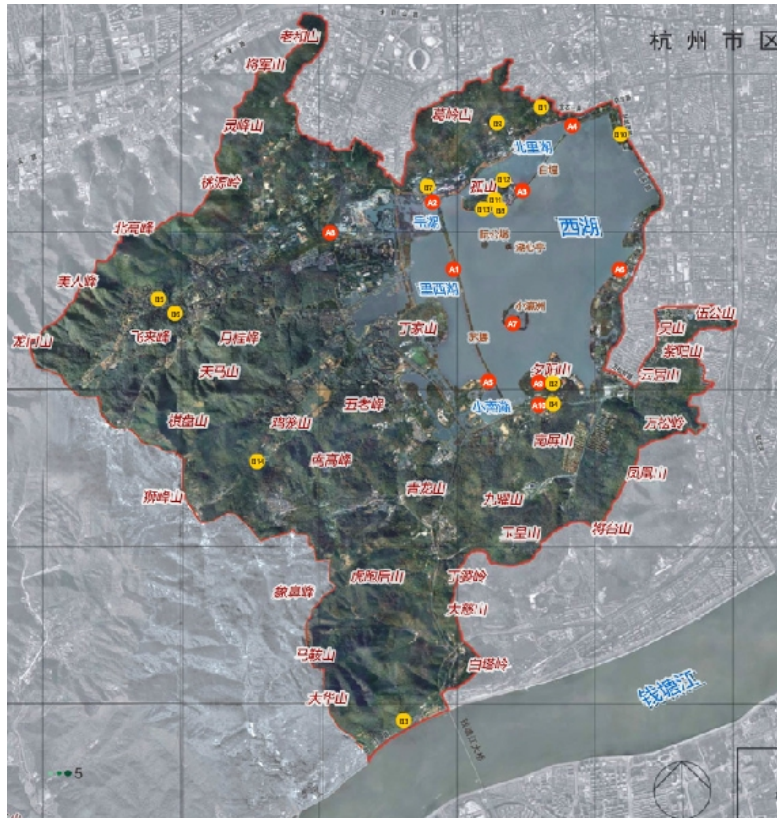


Fig. 5 The West Lake Cultural Landscape

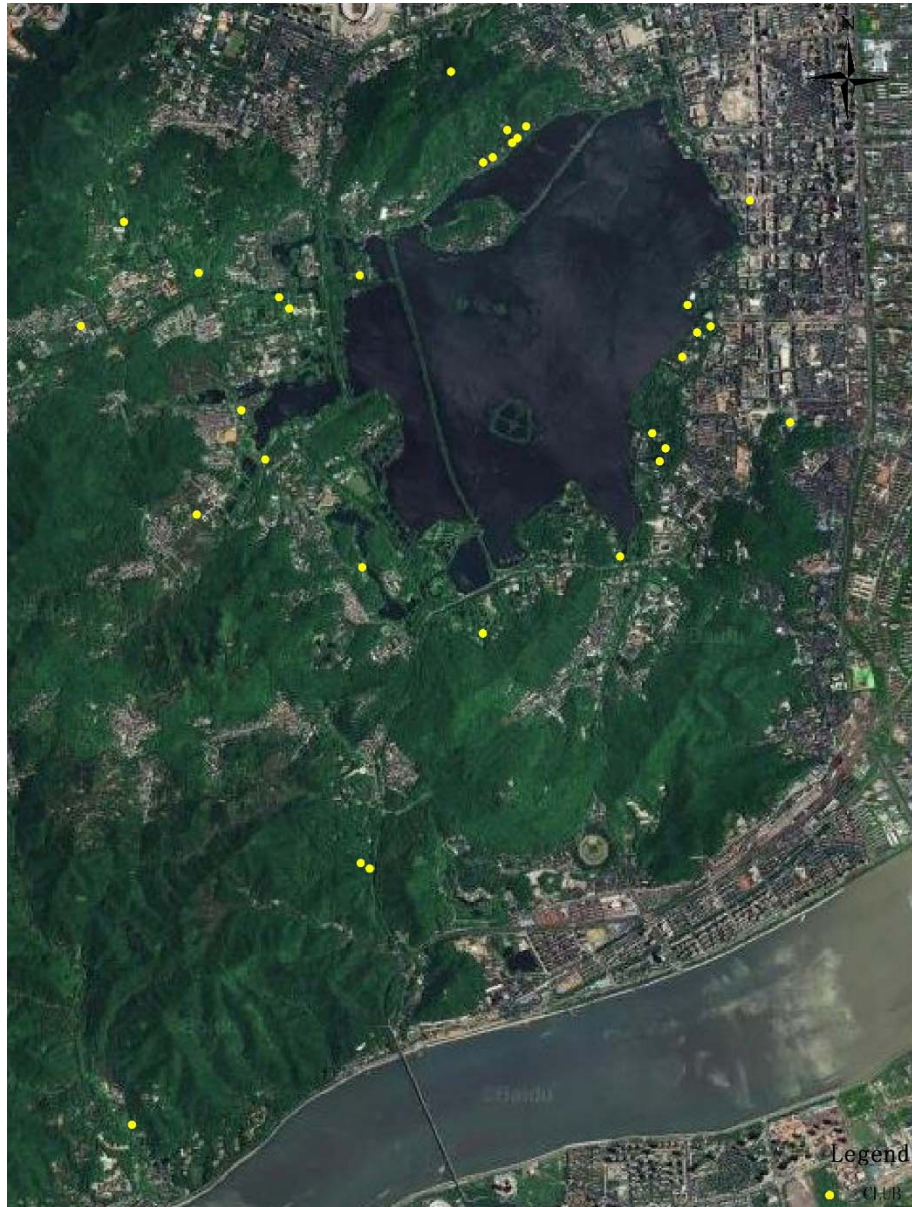


Fig 6 Distribution diagram of high-end clubs in scenic area

Table1. Conflicts in the sustainable development of WHLs

Types	Conflicts
Economic benefit and protection	<ul style="list-style-type: none"> ● Excessive tourist facilities (Xu, 2002) ● Phenomenon of WHL being islanded (An, 2005) ● Excessive tourists (Smith, 2002)
Social benefit and protection	<ul style="list-style-type: none"> ● Limit residents' living and production (Maikhuri et al., 2001) ● Impact of resident's production on ecology (Haynes et al., 2000) ● Deprive residents of the right to develop (Aplin, 2007) ● Impact of infrastructures on heritages (Sun, 2008) ● Threats of regional conflict and international war (Mao, 2004)
Social and economic benefit	<ul style="list-style-type: none"> ● Conflict between communities and managers of WHLs (Maharjan, 2013; Kaltenborn et al., 2013) ● Low degree of the public participation and decisions mainly reflecting the interests of governments (Wall et al., 2004; Li, 2006;) ● Conflict in managers (Su & Deng, 2006)

Table 2. Payoff matrix of players

Managers Tourists	Open to the public completely	Lease part of space
Paid access	$A-B, B-C$	$\frac{m-1}{m}A - B, B - C + \frac{n}{m}A$
Free access	$A, -C$	$\frac{m-1}{m}A, \frac{n}{m}A - C$

Table 3. Payoff matrix of players after simplification

Managers Tourists	Open to the public completely	Lease part of space
Paid access	$0, 0$	$-\frac{1}{m}B, \frac{n}{m}B$
Free access	$B, -B$	$\frac{m-1}{m}B, \frac{n-m}{m}B$

Table 4. Payoff matrix of players

Management committee		Tourists	
		Open to the public completely	Lease part of space
Tourists	Paid access	0,0	$-\frac{1}{1316} 116000, \frac{n}{1316} 116000$
	Free access	116000,-116000	$\frac{1315}{1316} 116000, \frac{n}{1316} 116000 - 116000$