Perceptions of the "New Urban Greenways" in the Pearl River Delta, China

Zheng Liu

KU Leuven, Department of Architecture
zheng.liu@student.kuleuven.be

Abstract

The Pearl River Delta (PRD) greenways are the first regional greenway network in China, which has been seen as the pilot greenway project to the other provinces and cities. The PRD greenways also resulted in continuous debates on their forms and functions. Some researchers argue that the PRD greenways show great value in promoting economic development and urban-rural integration, while some criticize that the PRD greenways have accomplished little ecological benefits that were planned in the early stages. However, most of the debates exist among key actors or researchers, while public perception of greenways is overlooked. Public perception could not only function as evaluation of greenway development, it also provides detailed information about what are the primary greenway forms and functions from a general view. In this article, the public perception is reviewed from three perspectives, which are greenway users, common citizens, and professionals that are working in design or planning institutions. The perception data of greenway users (n=393) is collected through on-site questionnaires in two greenways in Guangzhou. The perception data of common citizens (n=279) and professional planners or architects (n=185) is collected through Internet questionnaires that were distributed in targeted chatting groups on *WeChat*. The result of investigation shows that, the respondents recognized greenways as bikeways (28.66%), street greenery (22.63%), sidewalks (20.91%) and parkways (14.01%), while few see greenways as green open spaces (3.66%). Although researchers have doubts about greenways` ecological benefits, the users and citizens commonly recognized greenways as important recreational spaces in urban life. Moreover, most professional architects and planners see greenways as strategic spatial elements and prefer to incorporating them in future projects.

Introduction

Greenways are linear green corridors that are planned, designed and managed for multi-use purposes (Ahern, 1995; Fábos, 1995). Most of the early greenway literature was established on the experience of North America (Fábos, 2004), which became an important reference for other regions. In the international greenway movement that started in the 1990s, the diversity of greenway forms increases rapidly, which makes it difficult to develop a precise definition (Palardy, et.al., 2018). Among all forms of greenways, the intertwined development of greenways and urban built environment has attracted wide attention recently. In many cities, such as London, Seattle and Portland, transportation-led urban greenways are implemented as responses to urban residents` needs for non-motorized travel, the institutionalized arrangements of urban greening and street greenery, and insufficiency of green corridors in urban landscape context. These "landscaped and traffic-calmed pathways with a mix of bicycle facilities and other streetscape improvements" are named as "new urban greenways" (Ngo et al., 2018, p. 716). However, because there is insufficient green corridors and recreational resources, they also resulted in conflicts in public perceptions, especially to areas in which greenways are a new landscape concept. In this article, after the introduction of the conflicting planning goals and planning activities, we present an illustration

of the public perception of the Pearl River Delta greenways based on an investigation of online questionnaires.

Background and Literature Review

In greenway planning, the conflicts between public interests and private rights commonly exist (Little, 1990). Thus, public perception on greenways has been one central issue in greenway studies. On the one hand, to the users of greenway, their motivations, attitudes, use preference, and usage patterns have been heavily investigated (Akpinar, 2016; Gobster, 1995; Shafer, et.al., 2000). On the other hand, to the residents that are living in close proximity to greenways, their attitudes, concerns, and group differences are also receiving increasing attentions (Asakawa, et.al., 2004; Palardy, et.al., 2018; Weber, et.al, 2017). It should be recognized that most of the existing literature of public perception has been established under certain conditions: The areas, usage and stakeholders of greenways are distinguishable. For each project, the location and length of greenways are clear to both the researchers and the users. Consequently, the greenway users and their activities could be excluded from the others. However, to the "new urban greenways", both the greenway space and related activities could be intertwined with the urban landscape, which leads to conflicting perceptions of greenways. From this perspective, the Pearl River Delta greenways are a unique case.

Initiated in 2010, the PRD greenways have been the first regional greenway network in China. They were planned as strategies for supporting recreational activities, protecting ecological system and increasing the tourism economy, in which recreational and ecological greenways in other countries (e.g. the United States, Germany and Singapore) were adopted as ideal references. The PRD greenways achieved rapid development within a few years, reaching over 12,500 kilometre in 2015 (Liu, 2017). To this emerging greenway network in the largest metropolitan area, there is a growing number of studies on the PRD greenways, focusing on regional governance (Chung, Zhang, & Wu, 2018; Xu & Yeh, 2013), usage pattern (Chen, et al., 2017; Liu, et al., 2018), space quality (Liu, Lin, & Zhao, 2016), and activities supporting (Liu, et al., 2016). In these studies, Liu, Lin, & Zhao (2016) argue that a large proportion of greenways in the PRD cities are overlapped with the transportation corridors and therefore serve transportation purposes. Their findings could also be described by the definition that Ngo, et al. (2018) give about the rising "new urban greenways". In the PRD, the emergence of the "new urban greenways" is deeply affected by the institutional, environmental and social contexts. Because of limited resources and difficulty of institutional arrangements in multi-level governments, the planning activities were concentrated to the connection of greenway routes, rather than greenway landscape and recreational resources (Liu, 2017).

Therefore, among governmental officials and academic researchers, there have been continuous debates and critiques on greenway development ever since the beginning of greenway scheme. In this debate, the central argument is: Whether the bikeway-like greenways are implemented "correctly", in reference of greenways for recreational, historical heritage and especially ecological purposes in other countries. To this issue, Yang Wang, the governmental leader of the PRD greenway movements, argued that it is incorrect to equate greenways with bicycle routes (see Guangdong Provincial Department of Housing and Urban-rural Construction, 2013, p. 64), others argue that greenways are just bicycle routes with greenery (see Fang, 2011); yet others criticize the lack of ecological concerns in current greenway development (see Chen & Zhou, 2015; Sheng, 2015). In this debate, it has been unrecognized that it is difficult to find a "correct" form or a precise definition of greenways, because they are usually an adapting concept in

different contexts. Moreover, the public perception is also overlooked in this debate, while most of the arguments are established by professional experts. Therefore, this research develops a mixed method to investigation the public perception on greenways, comparing with architects and urban planners who have professional knowledge of greenways.

Methods and Data

In order to develop an overall understanding of the public perception of the PRD greenways, we conducted empirical investigation through both on-site and online questionnaires during 2014 and 2016. In the first phase, we chose on-site questionnaires to understand greenway users` perception of greenways, which helped us to establish basic knowledge of greenway users` activity pattern, preference and attitude of greenways. In August 2014 and January 2015, we distributed on-site questionnaires to greenway users in two different greenways in Guangzhou, including Donghaochong Greenway and Biological Island Greenway. The cases were selected due to different location and different surrounding landscape: Donghaochong Greenway is a waterfront revitalization project in the historical centre of Guangzhou; Biological Island Greenway is a belt park in the science park surrounded by the Pearl River. In the end, we collected over 383 copies of questionnaires.

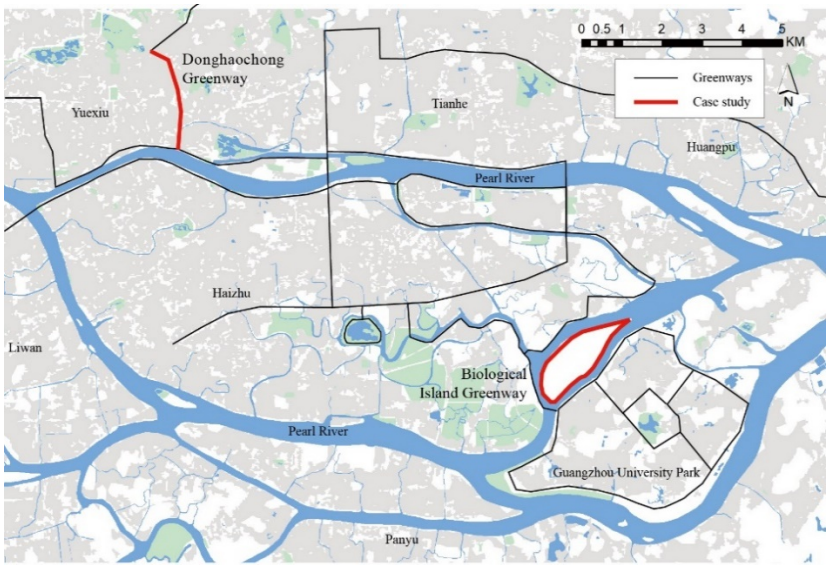

Figure 1. Location map of Donghaochong Greenway and Biological Island Greenway

In the second phase, we chose online questionnaires to understand different groups` perception of greenways, which not only increase the diversity of respondents, but also expanded the perception of greenways from certain routes to overall network. In July 2016, we distributed online questionnaires in targeted groups on *WeChat*. The targeted groups contain three parts: Architects and planners in major institutions (i.e. Guangzhou Urban Planning & Design Survey Research Institution, Guangdong Urban & Rural Planning and Design Institute, Urban Planning & Design Institute of Shenzhen); interested groups in the local organization (i.e. Green Bike-Transit*)*; Common local residents in groups of communities, schools, and friends. In the end, we collected 464 copies of online questionnaires, in which 279 copies were completed by common local residents, and 185 copies were completed by professional planners or architects.

Empirical findings through on-site questionnaires

Donghaochong Greenway and Biological Island Greenway are two popular greenway spots in Guangzhou. Donghaochong (Donghao River) is a small river that goes through the central city and has been covered by an elevated highway since 1993. Before the 2010 Asian Olympic Games, Guangzhou municipal government initiated a project of linear park along the river, which aimed at improving the quality of water and landscape. Meanwhile, in a governmental planning, a green belt at the edge of the island for the constructing biological science park. In the greenway movement, these initiatives were incorporated into the greenway scheme and was seen as recommended practices for their social and environmental benefits. In fact, the increasing volume of greenway users became a serious burden to the management of Biological Island Greenway, as the local media reported "over 70,000 tourist per day on 10-kilometre greenway" (Li, 2016).

Through observation in field investigation, we found that both greenways are well received to public, considering the large number of users and dynamic social activities. The results of questionnaires further present the preference and attitudes of greenways. Generally, outdoor exercise and recreational activity are the primary purpose of greenways uses. Most of the respondents are not frequent users of selected greenways, which the frequency of using investigated greenways is lower than once a month. The environmental resources and recreational resources are seen as the primary values of selected greenways. Besides green open space, the respondents have diverse perception of selected greenways, including bikeway, non-motorized route, waterfront park and street park. In the end, to both greenways, respondents gave an average score of 7.34 and 7.64 from 0 to 10, which could be seen as satisfied comments to the greenway spaces.

The results of questionnaires also reveal issues in understanding public perceptions of the PRD greenways. The travel methods to the investigated greenways are different. Donghaochong Greenway is more accessible through walking, and more respondents chose to drive to Biological Island Greenway. The primary reason is that the different locations and populations of nearby residents, of which the Donghaochong Greenway is surrounded by high-density communities and Biological Island Greenway is in the new science park. Moreover, the large number of greenway users in Biological Island Greenway reflect one major issue of the PRD greenways: Although greenways have been implemented widely in the PRD, greenways with satisfied environmental and recreational resources are still accounting for the minority of the total greenways. Therefore, there is a need to further examine the finding of field investigation through widely distributed questionnaires.

Figure 2. Donghaochong Greenway and Biological Island Greenway
(Left: Internet Photo; Right: Photo by the author)

Table 1. Questionnaires of Donghaochong Greenway and Biological Island Greenway

	Donghaochong (n=99)	Biological Island (n=284)
1. The primary purpose of greenway use		
Outdoor exercise	12.12%	41.20%
Recreational activity	60.60%	47.89%
Cultural experience	3.03%	1.05%
Collective events	3.03%	9.86%
Travel through	21.21%	0.00%
2. Frequency of using this greenway		
Fist time	26.26%	33.10%
Less than 6 times per year	23.23%	24.65%
Between 6 times and 12 times per year	12.12%	22.18%
More than 12 times per year	38.38%	20.07%
3. The travel method to approach this greenway		
Subway	34.34%	32.86%
Bus	12.12%	4.24%
Private vehicle	2.02%	46.64%
Bike	2.02%	13.07%
Walking	49.49%	3.19%
4. The describing term of this greenway		
Bikeway	27.27%	18.66%
Non-motorized route	15.15%	11.27%
Waterfront park	7.07%	18.31%
Street park	10.10%	4.23%
Tourism route	6.06%	5.28%
Green open space	34.34%	42.25%
5. Frequency of using the PRD greenways		
Never heard	31.31%	28.52%
Occasional use	48.48%	38.03%
Frequent use	20.20%	33.45%
6. Preferred greenway form		
Urban greenways with green parks	18.19%	13.73%
Scenic trails in natural environment	81.81%	86.27%
7. Preferred greenway location		
Community parks	31.31%	15.49%
Everyday commute route	26.26%	19.73%
Inner-city large parks	17.17%	15.14%
Suburban parks	12.12%	19.01%
Rural villages	2.02%	13.38%
Natural reserved area	11.11%	17.25%
8. Average scores of the greenway		
(0-10: 0 for the worst; 10 for the best)	7.34	7.64

Empirical findings through online questionnaires

The results of online questionnaires show that the PRD greenways are commonly recognized to support outdoor recreation, daily commute, street amenity and tourism (Question 1 in Table 2). More specifically, the PRD greenways are found as bikeways, street greenery, sidewalks with greenway signs and parkways (Question 2). For the ecological benefits that are repeatedly argued in academic research, both groups of respondents rarely agree that ecological corridors are the common form of the PRD greenways (Question 2), or species habitat is the primary function of the PRD greenways (Question 1). However, the majority of respondents (81.72% of public respondents and 64.86% of professional group of respondents) recognized that the PRD greenways have positive effects on life quality (Question 3).

Figure 3. The conceptual scenes of the PRD greenways as reference to the respondents (source: Guangdong Provincial Department of Housing and Urban-rural Construction, 2010)

The investigation further reveals that there are still a series of design problems. First, the respondents argue that it is difficult to find greenways in many cases (46.77% of 464 respondents), especially for greenways that are indistinguishable from cycle tracks or sidewalks (52.59%). Second, for recreational uses, the respondents criticize accessibility as a key issue because of remote location (46.98%) and insufficient public transport condition (49.57%). Third, there is a lack of detailed greenway design in bikeway design (48.06%) and service facilities (49.57%).

In addition, the results show that among different groups, the professional group of respondents have less participation in greenway activities (Question 4). They are less satisfied in implemented greenways, by seeing greenways as sidewalks with greenway signs and bikeways, and arguing that greenways have not achieve any effects on life of quality (Question 3). However, they also show great confidence by arguing that greenways are now a common element in planning and design (93.51% of total professional group), and they would incorporate greenways as planning strategies in future career (97.30% of total professional group).

Table 2. Questionnaires of perceptions of the PRD greenways (n=464)

	Public (n=279)	Professionals (n=185)
1.Primary function of the PRD greenways:		
Daily commute	59.86%	55.14%
Outdoor recreation	76.34%	69.73%
Tourism	39.07%	42.16%
Access to the natural environment	37.28%	36.76%
Education	4.30%	8.65%
Street amenity	55.91%	43.78%
Species habitat	3.58%	2.70%
Pollution control	10.04%	5.41%
Disaster protection	4.30%	5.95%
Economic growth	4.66%	5.41%
2.Primary form of the PRD greenways:		
Motorized ways with greenway signs	6.10%	3.78%
Sidewalks with greenway signs	19.00%	23.78%
Bikeways	25.45%	33.53%
Street greenery	24.71%	19.46%
Ecological corridors	0.00%	0.00%
Parkways	16.49%	10.27%
Tourism routes	2.87%	2.16%
Linear parks	2.15%	2.70%
Green open spaces	3.23%	4.32%
3.Primary effect of greenways:		
Positive effects on life quality	81.72%	64.86%
No effect	17.92%	34.59%
Negative effects	0.36%	0.55%
4.The frequency of greenway uses is:		
Never	18.28%	19.46%
Less than 10 times per year	37.28%	52.43%
Between 10 times and 30 times per year	19.00%	16.76%
Between 30 times and 50 times per year	7.53%	4.32%
More than 50 times per year	17.91%	7.03%
5.Primary activities of greenways uses:		
Walking	48.03%	47.03%
Cycling	30.47%	29.73%
Driving	2.15%	2.70%
Jogging	1.08%	1.08%
6.Exsisting issues of greenway uses:		
Unable to tell greenways from bikeways	53.41%	51.53%
Lack concerns of cycling	48.03%	48.11%
Lacking servicing facilities	46.95%	53.51%
Hard to find greenways	44.80%	49.73%
Crowded and noisy	34.77%	31.89%
Poor accessibility	43.37%	51.89%
Amenity and pollution	22.58%	16.22%
Lacking interesting views and resources	15.41%	18.38%
No issue	3.94%	3.24%

Conclusion and Discussion

As new evidence for the research of the PRD greenways, this research uses on-site questionniaries and online questionniaries to devleop an overall understanding of the public perception. The results of on-site questionniaries show that urban greenway spots with sufficient environmental and recreational resources are dynamic in supporting recreational activities. The results of online questionnaires further proves that recreational resources and alternative transportation are the primary perceived function of the PRD greenways, while the assumed ecological function of greenways are hardly recognized. While professional groups are less satisfied about the ecological benefits, the public group shows supportive attitudes to the recreational opportunities and access to green spaces in the PRD greenways. From this perspective, the PRD greenways managed to increase the quality of life for local residents, with a part of the planned goals realized.

To the emerging "new urban greenways" in the world, the PRD greenways provide valuable experience and lessons. The high dependency of urban road system and street greenery, is the primary reason of rapid greenway devleopment, but also the major challenge of futre greenway development in the PRD. Like greenways in many other regions, the PRD greenways see greenways in the North America and West Europe as ideal models, which are challenged by the limited land recoures and fragmented natural landscape. In the end, a large proportion of the PRD greenways are transportation-led greenways in urban areas (Liu, Lin, & Zhao, 2016), which fit the discribtion of the "new urban greenways" that Ngo, et al. (2018) conclude. However, the PRD greenways also reveals more issues of the development of "new urban greenways". It should be recognized that unclear planning goals and unmatched planning activities could lead to conflicting perception of the greenway concept, not to mention the cost of over constructing in built environment.

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