UDC 711

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RESEARCH ON SUSTAINABLE DESIGN OF HISTORIC BLOCKS BASED ON INHABITANT SOCIAL INTEGRATION MEASUREMENT: A CASE STUDY OF HARBIN IN CHINA

Abstract: *The inhabitant behavior is the important part of the sustainable vitality for the historic blocks. In order to solve the conflict between inhabitant life and commercial tourism in the renewal of Chinese historic blocks, this paper proposes the sustainable design strategy for the vitality of historic blocks from a perspective of inhabitant social integration. Base on the theory of social integration and taking the DaoWai Historic Blocks in Harbin as an empirical case, the paper constructs the evaluation model of inhabitant social integration, uses the confirmatory factor analysis method to quantify the influence factor and its weight of inhabitant social integration by structural equation model (SEM). Empirical research proves that behavior and culture has a significant impact on the social integration. In the end, the paper discusses the sustainable design strategy of historic blocks from the five dimensions of behavior, culture, industry, space and management, and the emphasis of sustainable design should be put on the improvement of behavior and culture.*
Keywords: *sustainable design, social integration measurement, inhabitant, historic blocks.*

Introduction

The sustainable design of historic blocks is not only to renovate and upgrade the dilapidated physical environment, but also to redistribute and integrate the space resources under the condition of scarce and limited space, and to reconstruct the interests of various groups and community space. The dynamic urban form depends on the interaction between people and urban public space created by economic vitality, social vitality and cultural vitality (Jiang, 2007). The intertwined process of people's activities and living places makes urban life more diverse and more dynamic (Jacobs Jane, 2006). The Venice Charter advocates the original protection of the historical space environment. In order to promote the sustainable development of historic districts, we needed to focus on the inhabitant's ratio and the original living preservation degree (Ruan, 2011), and take a small scale and gradual transformation based on the needs of inhabitant's life that can be promoted (Xia, 2008).

At present, a large number of "hollow blocks" appear in many historic blocks in China, which lacks the residents' daily activities, can not maintain vitality and do not meet the increasing demand of tourism experience. The social inclusiveness of the historic district is not high, and the conflict between the inhabitant and the development interests is often submerged in the unjust interest choice.

In order to solve the problem of inhabitant social integration in historic blocks and to maintain the sustainable organic vitality of the district in essence, this paper constructs the evaluation theory model of inhabitant social integration, based on the survey data of the Daowai historic and cultural blocks in Harbin in China, uses the confirmatory factor analysis method of structural equation model (SEM) to quantify the social integration factors and their weights, and then suggests the sustainable design strategy for the vitality of historic blocks to meet the inhabitant social integration.

(1)Sustainable design

Sustainable design, which includes not only the sustainability of environment and resources, but also the social and cultural sustainability, is a strategic design activity to construct and develop sustainable solutions. Balanced consideration of economic, environmental, moral and social resources allows to maintain the continuous satisfaction of demand (Crosbie M. J., 1994). Sustainable design requires the harmonious development of human and environment. It can not only meet the needs of the present generation but also guarantee the sustainable development of future generations of products, services and systems (Szokolay S.V., 2004).

Sustainable design includes four attributes, that is, natural, social, economic, scientific and technological. It requires that the living environment of human being is sustainable and the quality of human life can be improved at the same time. While maintaining the quality of natural resources and services, the benefits of economic development should be maximized and consumption of energy and other natural resources should be minimized (Azhar S., et al., 2011).

The sustainable design of historic blocks reflects the integration of social, economic, cultural, spatial and management resources. The vitality of historic blocks needs the concept of sustainable development to plan and design to achieve the goal of sustainable district vitality by spatial planning.

(2)Social integration measurement

In 2003, the definition of social integration by the European Union can be summarized as: it is a process to ensure that vulnerable groups in society have access to opportunities and resources for development and participate in economic, cultural and social activities, access to social benefits and basic participation in decision-making (Berger-Schmitt, 2002). The early measurement of social integration were Park and Burgess, who proposed four aspects of social integration interaction: economic competition, political conflict, social cohesion and cultural integration (Park, Burgess, 1970). Landecker divides social integration into cultural integration, communication fusion, functional integration and normative integration (Landecker, 1951). The scope of social integration measurement in China is different from that in other countries. It mainly focuses on rural migrant workers, floating workers, new urban migrants and other groups (Cheng, 2015). Measurement dimension involves economic (Huang, 2011), psychological and cultural (Yue, 2012), identityand community (Lu, 2014). In the literature available, the inhabitant in the historic districts are seldom studied, and the research attention to this kind of groups is insufficient.

(3)Inhabitant social integration measurement

Inhabitant social integration is to take the concept of social integration into the planning of the renewal of historic blocks that be mainly based on the understanding of social equity and harmonious integration justice. It emphasizes the fair logic of integration with cultural and economic resources, environment and behavior during the protection and development of historic blocks (Lu, 2017), and forms a planning idea which is superior to economic development. Referring to the dimension of social integration measurement of new urban immigrants and Sydney UFP report on a planning perspective on caring for vulnerable groups in urban areas (Li, 2004), this research constructs an inhabitant social integrated measurement system based on behavior, culture, industry, space (Liu, 2017) and management.

There are five dimensions of social integration: inhabitant behavior and tourist behavior, neighborhood culture and commercial culture, employment economy and industrial economy, living space and tourism space, public participation and public management.

Methodology
(1)Data

The data used in this paper was collected by the Research Group of the Humanities and Social Sciences Project Foundation of the Ministry of Education. From June to August 2017, the

research group carried out a social survey of the inhabitants of DaoWai Historical blocks in Harbin, China. The DaoWai historic blocks in Harbin is the largest "Chinese Baroque" building blocks with the largest reserved area in China. The whole protection area is 47.23 ha, the core protection area is 20.27 ha.

In order to obtain relatively high-quality primary data, the investigators included trained graduate students, who distributed 305 questionnaires, and the recovery rate was 92.46%. The number of available samples is 282, the demographic and social characteristics of the samples include gender, age, identity, residence time, monthly income, educational level, family structure, residence address, etc. In 282 samples (Table 1), 22.7% of all inhabitants have been living here for 20-30 years; 41.5% of the total sample demonstrated monthly income level of 1,000-3,000 yuan/month; the family structure is dominated by nuclear family. The main places of residence were in South 4th Street where buildings were multi-storied.

Table 1. Demographic and Social Characteristics of the Samples

Variable	Category	Freq	PCT	Variable	Category	Freq	PCT	Variable	Category	Freq	PCT
Gender	male	146	51.8	Identity	owner	260	92.2	Family Structure	Couple	52	18.4
	female	136	48.2		Tenant	22	7.8		Nuclear	140	49.6
Age	10-20	7	2.5	Residence Time	0-10	57	20.2		Trunk	68	24.1
	20-30	25	8.9		10-20	50	17.7		United	2	0.7
	30-40	52	18.4		20-30	64	22.7		Single-parent	7	2.5
	40-50	76	27.0		30-40	47	16.7		Single	13	4.6
	50-60	62	22.0		40-50	34	12.1	Address	Chun Hua	32	11.3
	60-70	57	20.2		50-60	19	6.7		South 2nd	35	12.4
	70-80	3	1.1		60-70	11	3.9		South 4th	49	17.4
Monthly Income	<1000	7	2.5	Educational Level	Junior school	119	42.2		South 5th	36	12.7
	1000-3000	117	41.5		Senior school	115	40.8		South 6th	31	11.0
	3000-5000	100	35.5		Junior College	42	14.9		South 9th	29	10.3
	5000-10000	48	17.0		Undergraduate	4	1.4		South 10th	37	13.1
	>10000	10	3.5		Postgraduate	2	0.7		North 4th	33	11.7

(2)Study measurements

The methods of investigation included a subjective questionnaire and a semi-structured interview. According to subjective feeling, each respondent was asked to fill the questionnaire that included 1-5 scale variables (1 =strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=total agree). The content of the questionnaire includes two parts: the first part is the basic information about residents, a total of 10 items; the second part is a survey of the reactivity index to inhabitant social integration, measuring a total of 19 items. The SPSS21.0 is used to preliminarily collate and check the survey data, and to deal with the missing data by the method of sample mean substitution. The reliability statistics analysis of 19 items resulted in the reliability coefficient (Cronbach's Alpha) of internal consistency of data samples equaling 0.927. The results of Bartlett spherical test and KMO value analysis showed that P value was 0.000 (P < 0.001), and Bartlett spherical test was adopted. The KMO value was 0.908, so the sample data was suitable for factor analysis, and the validity of the scale met the normal standard.

Measurement and analysis
(1)Measurement model

The hypothetical measurement model of inhabitant social integration is a structural equation model by confirmatory factor analysis, in which social integration, as a latent variable, is

measured by five measurement dimensions. Behavioral integration, cultural integration, industrial integration, spatial integration and management integration are used to reflect the corresponding indicators as the observation variables. The evaluation model of inhabitant social integration consists of 19 observational variables and 5 latent variables (Table 2).

Table 2. Evaluation Model of Inhabitant Social Integration

Latent Variable	Latent Variable	Observational Variable	Code
Social Integration	Behavior	Neighborhood Communication	a1
		Social Community Network	a2
		External Disturbance	a3
	Cultural	Folk Cultural Activities	b1
		Community Cultural Atmosphere	b2
		Local Cultural Elements	b3
	Industry	Degree of Employment	c1
		Degree of Starting a Business	c2
		Traditional Store Management	c3
	Space	Living Infrastructure	d1
		Private Living Space	d2
		Living Environment Quality	d3
		Transportation Convenience	d4
		Public Space Sharing	d5
		Public Facilities Sharing	d6
	Management	Organization Group	e1
		Degree of Participation	e2
		Public Discourse Right	e3
		Management Evaluation	e4

(2)Statistical analysis

The second-order confirmatory factor analysis of the measurement model is analyzed in LISREL8.0. Weighted confirmatory factor analysis with a maximum likelihood estimator with robust standard errors (MLR) was used to test the measurement model. The parameter estimation results of the model and the normalized path coefficients are obtained (Fig.1). T-test method was used to test the significance of the path coefficient (Fig.2).
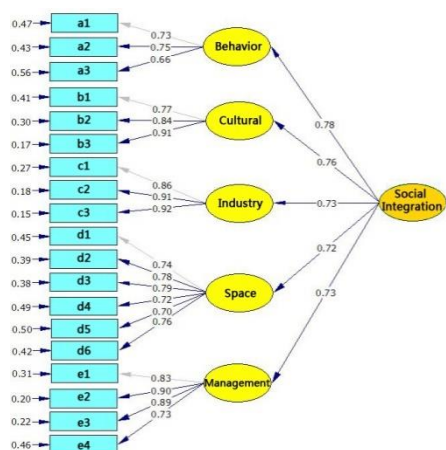

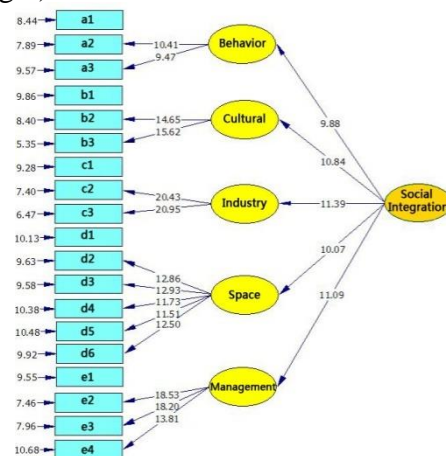Figure 1. Normalized Path Coefficient of the Model

Figure 2. T-test of the Model

The measurement model fit was decent: Chi-square value is 307.47, the degree of freedom is 203, the ratio of them is 1.51; P-value was 0.000 and RMSEA was 0.043; other fitting indexes showed that NFI =0.97, NNFI =0.99, CFI =0.99, IFI= 0.99, RFI= 0.97, AGFI= 0.89. All of them

are within acceptable standard range. The overall fit of the model is good, which indicates that the evaluation model of inhabitant social integration is supported by statistics.

(3)Results

In the model, behavioral integration and cultural integration are the two dimensions with the high path coefficient, the standardized path coefficient is 0.776 and 0.772 (Table 3). In the case of samples, the influence of behavioral and cultural integration on social integration is more obvious. In contrast, the improvement of industrial integration, spatial integration and management integration should be emphasized in order to promote the positive effect of social integration more effectively.

Table 3. Measurement Result of Structural Equation Model

Observational Variable to Latent Variable				Latent Variable to Latent Variable	
Outer loading (t-value)		Outer loading (t-value)		Path Coefficient (t-value)	
a1←Behavior	0.730(----)	d1←Space	0.737(----)	Social Integration →Behavior	0.776(9.89)
a2←Behavior	0.758(10.355)	d2←Space	0.784(13.224)	Social Integration →Cultural	0.772(10.94)
a3←Behavior	0.660(9.561)	d3←Space	0.788(13.285)	Social Integration →Industry	0.723(11.10)
b1←Cultural	0.771(----)	d4←Space	0.720(12.090)	Social Integration →Space	0.717(10.45)
b2←Cultural	0.839(14.983)	d5←Space	0.693(11.389)	Social Integration →Management	0.730(11.12)
b3←Cultural	0.909(16.048)	d6←Space	0.755(12.401)		
c1←Industry	0.858(----)	e1←Management	0.832(----)		
c2←Industry	0.906(20.290)	e2←Management	0.899(18.620)		
c3←Industry	0.921(21.148)	e3←Management	0.885(18.329)		
		e4←Management	0.733(13.834)		

To explain the practical reasons, it can be understood that in the process of DaoWai historic blocks renovation, multistory residential buildings in the reserve area have not been renewed, and some inhabitant still live in their original living conditions and social networks. The neighborhood relationship is good and the communication is more frequent. The period of investigation is the process period of the blocks renovation, only two blocks (South Second to South 4th Street) had completed renovation, the volume of commercial tourism belongs to the small scale level and the level of disturbance to the inhabitant is not high, so the effect of behavioral integration on social integration is higher. At the same time, because the original ecological culture of the block still exists, the original commercial and commercial culture of the blocks is still present, so the cultural integration performance is obvious. In addition, the industrial integration has not formed the situation that inhabitant's employment and entrepreneurship; the blocks have not completely realized the living space and the commerce space separation which because of the overall renewal has not completed; the district management is dominated by the government and has not yet formed the management mode of "self-living and self-control" of aboriginal people.

Therefore, those with higher correlation path coefficients between variables need to maintain their current status and improve reasonably in planning practice, while those with lower correlation path coefficients among variables are the key dimensions for planning and design in the future.

Discussion

The correlation between the dimensions of inhabitant social integration measurement in the above model is significant. By comparing the factor load coefficients of each dimension, we can quantify the overall level of social integration and factor weight, so as to guide the practice of historic blocks renewal planning.

(1)Behavior integration promotes communication to reduce conflict

The planning should first consider that the compensation scheme for moved- inhabitant in view of balance of the rights and interests of all parties which form the interactive decision-making of the game theory. Conflicts to retain residents should be minimized as much as possible, and the "retention rate" of inhabitants should be ensured. Based on the original shape of the historic blocks, the space should be more layout pocket green squares and other public spaces, then planning the point green space with 100m (radius) for service. Green squares should be distinguished between living space and tourism space in order to enhance the communication of community life and improve the quality of ecological environment of the block. The order of inhabitant and tourists should be established to avoid disturbing behavior, form the standard codes and proclamations with the aim to reduce the conflict.

(2)Regenerate cultural resources to create a traditional brand

We propose that traditional culture and belonging elements should be protected by improved sense of mind influence such as vision, hearing, etc. In order to plan a reasonable tourism capacity the historical elements of the reserve should be activated. Taking into account the needs of inhabitant's living in lower impact disturbance, we suggest control tourism capacity to promote the sustainable and stable tourism development in historic blocks. Planning of the tourist routes in the protected areas will systematize and classify the tourism resources, so that improve the participation of inhabitants, and focus on the historical building tourist products, traditional compound of tourist products, characteristic cultural tourist products, non-material cultural folksy products to highlight the Chinese Baroque "original blocks, original people" brand tourist image.

(3)Sharing industrial resources to advocate innovation projects

The original industry should be reserved appropriately, especially the old brands, old technology and other shops with a long history, take the creative tourism industry and the choice of industry should be complementary to the local characteristics of the district. So that the integration of industry will have unity and distinctive characteristics. The industry of supplementary life service should be improved, the renaissance should be suitable for living, buying, leisure and travel. Priority should be given to the local employment of inhabitants and the improvement of their residence, so that to implement their "living and working here" lifestyle. The internal dynamic cycle of historic blocks should be stimulated to promote the revitalization of old urban space. The emphasis should be on the protection of both material cultural heritage and immaterial cultural heritage, and layout reasonably with new function implantation, function replacement and function mixing.

(4) Human-oriented integration of spatial environment planning

Zone planning should perform the function of isolation resulting in low-impact on inhabitants' life. Respect for inhabitant travel mode, moderate adjustment of traffic network form and continue to maintain the space texture to optimize the traffic of blocks. The original living space must retain residential functions, which should be taken in to account when planning the first story of buildings for location of commercial objects and 2-3 stories of buildings for residence. The form of apartment as rental should be used to mix commercial and residential land to solve inhabitant housing problems. Private residential signs and other facilities should be established to minimize the contradiction between the subject and guest interference. The Planning area will be divided into five functional zones, tourist services area, business and entertainment area, local-cultural experience area and mixed business and residential area, as a "tour-industry-housing" pattern.

(5)Management integration with public participation of multiple subjects

A management committee should be established including inhabitants, business owners and management decision makers, in order to safeguard the interests of all parties during the planning and design. We propose to improve long-term tracking of planning implementation, take a long-term feedback mechanisms for planning public management, set up inhabitants' interest groups in historic blocks, and discuss the financing plan for sustainable renewal of historic blocks. In order

to improve the maneuverability of planning implementation, the land development and environmental landscape would be controlled, and plan the control management scheme. Planning requirements and management should be standardized in accordance with statutory plans, to ensure that inhabitants can obtain the best interests in the planning of space and public facilities arrangement.

Conclusion

With the change of historical heritage protection policy environment in China, the renewal of historic blocks will not only highlight the protection and preservation of the original historical material objects, and also will be more and more towards the transformation of the traditional cultural protection and community humanistic sustainable development. This paper proposed the evaluation model of inhabitant social integration, and quantified the influence factors and their weights by the confirmatory factor analysis method of structural equation model, which showed that the point of the sustainable design is the behavior integration and cultural integration according to the evaluation model measurement. Further, we suggest the sustainable design strategy, which provides a new perspective and approach to solve the conflict between trade tourism and inhabitants in the process of renewal and revival of historic districts. It provides new ideas and means for activating historic districts and realizing sustainable development.

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UDC 711