Applied Mathematics and Nonlinear Sciences

<https://www.sciendo.com>

Research on space optimization of historic blocks on Jiangnan from the perspective of place construction

Youping Teng¹, Shuai Yang^{1†}, Yue Huang¹, Nathan Barker²

¹Zhejiang University City College, Hangzhou, 310015, Zhe Jiang, China

²University of Plymouth, Plymouth, PL4 8AA, Devon, UK

Submission Info

Communicated by Juan Luis García Guirao

Received November 26th 2020

Accepted January 31st 2021

Available online April 7th 2021

Abstract

In the process of rapid urbanization, gentrification and commercialization have inevitably appeared in the historical districts of Jiangnan. Although they optimize the space environment of the historic district and promote the development of economy and tourism, they have resulted in disadvantages such as insufficient vitality of the space group, rigid space interface, lack of space quality and lack of regional culture. Mathematical calculation can be used to analyse the data of 15 historical blocks, determine the key points of the protection of historical blocks in Jiangnan area and then put forward reasonable construction strategies. This paper starts from the four elements of space group, space structure, space quality and space vitality, identifies the key points and key point of the historical block protection in Jiangnan area, and then puts forward the reasonable place building strategy.

Keywords: historic block, place construction, Yangtze River Delta

1 Introduction

In view of the current lack of foresight and seriousness in China's urban planning, urban architecture has acquired the following aspects: greedy big, charming foreign, strange, lack of characteristics, ineffective cultural inheritance and other similar elements in the present-day situation. In February 2016, the State Council issued the first administrative document on urban planning. The document emphasizes the need to "carry out urban repair and organic renewal in an orderly manner, solve the degradation of the environmental quality of the old city, spatial disorder, historical and cultural heritage damage and other problems, restore the function and vitality of the old city, better continue the historical context, and show the city style". [1]. There is no doubt that the vitality of the city comes from the historical block. The historical block has "preserved the remains

[†]Corresponding author.

Email address: samyang@zju.edu.cn

of real historical information and vivid real life, and has a certain scale, which can fully reflect the distinctive characteristics of a certain historical period, a certain nation or a certain place”; it also becomes the carrier to continue the historical context of the city and show the city in style. Nowadays, although the physical space environment of the historic districts in the Yangtze River Delta has been improved after several rounds of protection, they are still trapped in the situation of insufficient vitality of the space group, lack of space quality and lack of regional culture. Under the urban renewal environment with “double urban repair” and “smart growth” as the “new normal”, how to find a regional, community-centred and non-universal renewal strategy for historic districts has become an urgent problem to be solved. Based on the field investigation of 20 historical blocks in Jiangnan area, this paper identifies the key points for the protection of historical blocks from the four aspects of space group, space interface, space texture and space activity, and then puts forward reasonable optimization approaches, to provide the correct bases for the local government to make decisions.

2 Current situation of historical street in the Yangtze River Delta

2.1 The need to preserve traditional culture

According to data from the National Bureau of Statistics, in the 10 years from 2007 to 2016, the area of urban construction land increased from 36,352 to 52,761 km², and the urban population density increased from 2,014 km² to 2,408 people/km². The rapid expansion of urban construction land and population has caused a series of problems such as the occupation of farmlands, shortage of energy and water resources, and loss of ecological resources [2]. Historic districts with good locations, low plot ratios and poor living conditions were among the first to be cleared. For example, the ancient granary gave way to “real estate” development in the Song Dynasty, the “modernization” reconstruction of Dinghai Old Street and the “demolishing and rebuilding” protection of Nanbu Hall all caused the loss of the traditional culture of the city. There is no doubt that a lot of traditional Chinese culture is preserved in the urban historical districts in living form, which constitute the important foundation and source of Chinese culture. Large-scale urban reconstruction has broken up and destroyed the various forms of cultural heritage built for thousands of years, blocked the long-standing context of Chinese culture, and lost the unique cultural spirit based on which the Chinese nation lives [3]. As President Xi pointed out in his report to the 19th National Congress, culture is the soul of a country and a nation. Without a high degree of cultural confidence and without cultural prosperity, there will be no great rejuvenation of the Chinese nation. He emphasized that cultural heritage should be protected as well as one’s own life. In the spirit of being responsible for history and for the people, we should carry forward the historical context, strike a balance between urban renewal and development and the protection and utilization of historical and cultural heritage, and ensure that development is done along with protection, and simultaneously protection is done along with development [4]. History has proved that Le Corbusier’s “Glorious City”, Ebenezer Howard’s “Garden City” and Daniel Burnham’s “Urban Beautification Campaign” all ignored the human scale and block diversity and led to the lack of urban characteristics, resulting in the loss of urban traditional culture and urban humanity. Therefore, the preservation of traditional blocks with complex functions and appropriate scales is not only necessary to maintain the diversity and vitality of the city [5], but also to preserve the traditional culture of the city.

2.2 The current situation of historic districts in the Yangtze River Delta

After investigation, it is found that the urban historical blocks in Jiangnan (Jiangsu, Zhejiang, Shanghai and Anhui) have gone through several rounds of protection and renovation, from the earliest Tunxi Old Street, Pingjiang Road to Xintiandi, Tianzifang, and then to Liyang Old Street, Chaohu Ears Street. Nowadays, some streets are filled with famous homes and gardens, commercial and cultural, and crowded with visitors. Yet, there are also streets that resemble built-up areas where commerce is depressed and culture is absent. In some districts, the main street is prosperous, with various shops mixed together. The sub-streets are preserved with

famous houses and gardens, fashion shops, cafes and private home stays, and the whole block is alive and kicking. Yet some streets are almost dead. In the real historical districts, there is still a phenomenon of “serious commercialization and real estate, weakened traditional culture, and lack of regional and local characteristics”. In the past 5 years, based on the in-depth investigation of 15 national and provincial historical and cultural blocks in Jiangnan area, the author started from the three aspects of spatial texture, spatial group and format characteristics of the blocks (Table 1), so as to provide the basis for proposing new solutions and measures.

Number	Block	Spatial texture	Characteristics of the formats	The space group
1	Tunxi old street	Fishbone pattern, 2–3 floors of emblems, Ancient Rome in the East	Huizhou characteristic study room with four treasures, mountain goods, catering mainly	There are few original residents, mainly businesses, and tourists are seasonal and temporal
2	Pingjiang road block	With chessboard pattern and Jiangnan architecture as the main part, famous houses and gardens gather in the block, which epitomizes Ancient Suzhou	Featured catering, boutique home stays, high-end hotels, former residences of celebrities and cultural and creative goods	There are few original residents, mainly businesses and tourists
3	Shantang old street	One canal, one street, Wu culture window	Suzhou special goods, catering and cultural and creative commodities	There are more original residents, moderate businesses and tourists with seasonal and time characteristics
4	History of Jishan in Shaoxing	Peninsula pattern, one canal and one district, Jiangnan residential area	Shaoxing characteristic snacks and commodities, commercial depression	There are mainly residents, a few businesses and few tourists
5	Tianfushan block, Lanxi	Fish head pattern, one canal and three districts, Hui style and Zhejiang style architecture mixed	Cixi featured goods, food and a few cultural and creative goods	There are mainly residents, a few businesses and few tourists
6	The Historic Bund District in Shanghai	The Wall Street of China is the gathering place of European architecture and Chinese and Western architecture	High-end products, cultural and creative products, banks, high-end hotels, former residences of celebrities and catering	There are few original residents, mainly businesses and tourists
7	The southern Song Dynasty YuJie	European architecture, Chinese and Western architecture, Jiangnan architecture mixed, Hangzhou city in miniature	High-grade goods, banks, hotels, home stays and catering	There are few original residents, mainly businesses and tourists
8	Meiyuan new countryside	Architecture gathering place of the Republic of China	The main residence, part of a hotel	Mainly residents, businesses and tourists are few
9	Tianzifang, Shanghai	Building gathering place of the Republic of China	All kinds of goods, cafes, cultural and creative rooms and restaurants	There are few original residents, mainly businesses and tourists

10	Shanghai Xintiandi	Shikumen is the epitome of modern Shanghai	All kinds of goods, cafes, cultural and creative rooms and restaurants	There are few original residents, mainly businesses and tourists
11	Hangzhou Bridge West Block	Hui-style architecture and Jiangnan architecture mixed together, canal culture	Cultural museum, grain transport cultural features and catering	There are more original residents, moderate businesses and tourists with seasonal and time characteristics
12	Nanxia Tang Block, Wuxi	Two streets with one river, Wuxi style architecture, grain transport culture	All kinds of goods, cafes and restaurants	There are more original residents, moderate businesses and tourists with seasonal and time characteristics
13	Cangqiao Straight Street, Shaoxing	One river one street, Jiangnan architecture, Shaoxing culture window	All kinds of goods, hotels, home stays and catering	There are mainly residents, few businesses and few tourists
14	Chaohu ear street	Y-shaped pattern and Hui style commercial building of “shop down and live up”	All kinds of goods, food and beverage and children’s playground	There are mainly residents, few businesses and few tourists
15	Sincerely old street	Mesh format pattern, emblem architecture and modern architecture mix together	All kinds of goods, hotels, restaurants and various places	There are few original residents, mainly businesses, and tourists are seasonal and temporal

Table 1: The author investigated 15 national and provincial historical and cultural blocks in Jiangnan area.

3 The site building strategy of the historic district in the Yangtze River Delta

The historical block is a comprehensive place composed of physical space, spatial group and lifestyle. It is a physical space with a climate that allows for human activities. Due to the long-term residence and regular contact among human beings, various humanistic thoughts and emotions are imprinted on the habitat subtly, so as to produce various strong and lasting emotional attachments to it, which is the spirit of the place. It is not only the emotional support of human beings, but also the foothold of human memory. Therefore, the basic purpose of constructing sites of historical blocks is to attract people to relax and consume by creating reasons with conquer power, so that the blocks themselves have the function of being haematopoietic, generating vitality, so as to survive in the modern context and retain people’s memory roots. Therefore, by ensuring the integrity and continuity of the historical context of the block and activating the sustainable protection of the inner culture and spirit can only be the right way to protect the contemporary historical block.

3.1 Activation of spatial population

It is the requirement of sustainable development of urban culture to reshape the space vitality of historical blocks. The historical block is not a static, pure material space aggregation, but a four-dimensional space where people live and experience specific activities, recording their life tracks and living conditions. Throughout the development track of each city’s historical blocks, they are all mixed blocks integrating commerce, production, residence and entertainment. With the passage of time, the social function is transformed, and the functional

obsolescence of the block leads to the commercial depression, dilapidation of buildings, environmental degradation and population decline of the block, which becomes the “value depression” of the city. According to the “effective bid Curve”, low-income households are more dependent on the inner city than others. Historical districts are characterized by their superior geographical location, convenient transportation and complete living facilities, which can effectively reduce travel costs and living expenses, so as to meet people’s diversified living requirements. In the early stage, the protection measures focus on improving and renovating the physical environment of the block and integrating it into the transformation of the social and economic network, so as to provide residents with a certain degree of life welfare, which continues the policy of benefitting the people consistently, as implemented in China. However, the unavoidable problem is that most of the residents who remain in the historic district are vulnerable groups. They lack competitive survival skills and employment channels, which has become an obstacle for them to obtain a high income. To this end, “it is better to teach a man to fish than to give him fish”. The government, enterprises and social organizations should provide various development opportunities and ways, including employment, to enhance their social viability, so as to integrate them into the unified process of local urban and social and economic development [6]. Retaining the residents of the neighbourhood also retains the roots of the neighbourhood. According to the investigation, most of the groups in the historic districts are composed of original residents and external tenants, who are incompatible with each other and form close circle groups. It has been suggested that an appropriate mix of people of different ages, occupations, income levels and lifestyles in the neighbourhood would help to boost the vitality of the whole group. Therefore, the government should offer expropriation and compensation, transfer to credit support, tax breaks and incentives, special funds and series of measures, to transform old streets and old houses and repair them and make them function; provide diversified rents and convenience for renting to diverse groups to live, do business and run workshops, so as to form a wealth of exchangeable resources and thus improve the efficiency of the whole community. For example, the old buildings in Cangqiao Zhijie in Shaoxing, after being repaired and maintained by the government, are rented out to young people to run personalized b&BS, hotels, coffee shops, and cultural and creative shops. This approach promotes the transformation and enrichment of spatial types and the diversification of social network connections, thus stimulating dynamic interaction behaviours and building a healthy and vibrant neighbourhood foundation.

In the practical protection of historic districts, many places still adopt the traditional protection mode of “government leaders, developers lead, experts lead and residents vote”, which leads to “the government is too tired and the public is too idle”. The block is still locked in a state of “bright surface and insufficient vitality”. There is no doubt that the residents are the owners of the historic district and have absolute say in the protection and development of the district. To this end, it is recommended to learn from Xiamen Tsan-Tshu-Uann’s “Co-build workshop” model. Through the public opinion consultation meeting, the public consultation meeting, the public report meeting and other communication activities, on the basis of jointly determining the theme of the plan, revising the plan and clarifying the results of the plan, the interactive communication between the government, planners and the public and other diverse subjects is promoted and the ideal effect is achieved [7]. In this model, experts and planners are transformed from “elites” to coordinators of diversified interests, governments from decision-makers to guarantors, developers from the main body to executor, and street residents as the main body, which increases the discourse power and cultivates the vitality of the community.

3.2 Diversified spatial structure

Lao Tze said, “Mix clay utensils, because the middle is empty, so we implement effect. Carved doors and windows cover into a house, because the middle is empty, have the function of the house”. What he meant was, “When you build a house, you have to leave holes in the walls for doors and Windows to get in and out, for the air to circulate and for the house to function as a dwelling”. People know that “empty space” is realized through the form of architecture and combination. Architecture is an art that transcends time and space. It is a living fossil recording history. All excellent buildings are filled with a kind of national or regional common value, and their “face” is the direct carrier of all external information. Just as Chang Qing said, “Without this face, architecture

will lose its charm”. Thus, to retain the real block, it is necessary to retain the face of the building. The Imperial Street in the Southern Song Dynasty is composed of Chinese and Western buildings, courtyard buildings in the South of Jiangnan and modern buildings, thus building a block with great architectural and humanistic charm. The team of China Academy of Fine Arts restored and renovated all kinds of buildings in the block. Strict control of architectural form, decorative symbols, scale and materials and other details is required to restore a pure Jiangnan old street. Therefore, when the face of the building is repaired or restored, it should be “restored to its original appearance”. Add back the building details after demolition, modify improper decorations, unify the planning and properly place the wires and pipes that are harmful to visual perception; the dirt, paint and mortar on the wall shall be removed by cleaning or removing, and the weathering and mildew spots of the external wall shall be treated with special curing technology. The original “second contour line” of the block, such as banners, billboards and other functions, should be retained. It is forbidden to make unified planning to the “first contour line” to form structural objects, so as to protect the original orderly beauty of the block; it is forbidden to whitewash or draw the outer wall of the street for the purpose of creating advertising effect or attracting eyeballs, which seems to be personalized or artistic, but its essence is to destroy the “authenticity” of the historic district.

The commercial layout of the historic district is a comprehensive, professional and systematic project closely related to the development of regional commerce. There is no doubt that a multifunctional space is more attractive than a single functional space. Diversified development can cater to more tourist groups and meet their various needs. Therefore, the establishment of reasonable and diversified commercial forms is an important factor for the successful development of historical districts. In view of the fact that most of the historical blocks in the Yangtze River Delta are closed, continuous and narrow streets, which are prone to be depressed and depressing, it is suggested to break them by shaping a flexible boundary. One is to emphasize the concave and convex of the building facade to form a grey space, which brings visual activity to the architectural form and makes the interface between the two become more layered, deeper and more human. The second is to open doors and windows on the outer walls of buildings or walls. The walls can be retreated from the roadside or treated as fences and greening them, so that the flow of internal and external spaces can permeate the atmosphere of life onto the street. This helps to create a sense of neighbourhood, and forms neighbourhood watch models such as “street eye” and “defensive space”. The streets with flexible boundaries not only increase the fun of the street space, but also easily attract people to wander out of the house, have a relaxing time and trigger the encounter scene, so as to achieve a warm atmosphere within the block.

A vibrant historic district is one in which buildings of all ages should coexist and flourish. As Ieoh Ming PEI said, “The new building should be a good neighbor of the old building”. The suture between the old and new buildings should be ensured – that is, the original building height and contour line of the block should not be destroyed, and the formed building volume space should not be changed. The volume and scale of the new building are strictly controlled. Although its construction technology and architectural form are obviously different from those of the old building, there are echoes of symbols and forms. Only when there is a sense of time and space distance between the old and new buildings can they complement each other and let us truly understand the cultural background and meaning of the historical block [8]. Although the art centre at the entrance of Liyang Old Street and the D32 buildings along the river and west Qiaoqiao block have obvious modernity in terms of shape, technology and style, their huge size has formed a strong visual impact on the old buildings. Tao Xichuan uses dark glass, grey aluminium gusset plate and grey steel to repair the grey brick factory building, so that the restored part and the original part are obviously different in material and technology, but very coordinated in visual effect. Therefore, how to grow regional, modern and compatible new buildings in historical blocks is the key point of material restoration in the protection of historical blocks, and it is also an urgent problem to be solved.

3.3 Humanized public space

The purpose of the design is to create a public space that integrates into the urban fabric and is accessible to all. Hannah Arendt believes that one person does not create public space, the same people do not create public

Table 2 Evaluation of eight kinds of art quality of city block.

Number	Street name	Static model	Installation art	Landscape art	Water landscape	Interactive art	Video art	Digital art	Art activities
1	Pingjiang Road Old Street	✓	×	✓	×	×	×	×	✓
2	Shantang old street	✓	×	✓	✓	×	×	×	✓
3	Tunxi old street	✓	×	✓	×	×	×	×	✓
4	Liyang old street	✓	✓	✓	✓	✓	✓	✓	✓
5	Tianfushan block	✓	×	✓	×	×	×	×	✓
6	Nanxiatang old street	✓	×	✓	✓	×	×	×	✓
7	Yulie of the southern Song dynasty	✓	✓	✓	✓	✓	✓	×	✓
8	Hangzhou Hefang Street	✓	✓	×	×	×	×	×	×
9	Hangzhou West Bridge	✓	×	×	✓	×	×	×	×
10	Block Ji-shan block of Shaoxing	✓	×	✓	✓	×	×	×	✓
11	Dado Road Historic block	✓	×	×	✓	×	×	×	×
12	Shanghai Xintiandi	✓	✓	✓	✓	✓	✓	×	✓
13	Tianzi fang	✓	✓	×	×	✓	✓	×	✓
14	Nanjing 1912	✓	✓	✓	×	✓	✓	✓	✓
15	Lei street	✓	✓	✓	✓	×	×	×	×

space, only different people can create public space and the need for public space. The existence of public spaces in turn ensures their diversity. Publicity is by no means a collectivism product produced by some commonness or closure of human beings. Different from commonality, the essence of publicness is the complexity and pluralism based on respecting individual value, dynamics and conflict. Public space is a place where the self meets the strange “other”, which often occurs in various social activities such as transportation, performance, exhibition, trading, leisure, sports, games and interpersonal communication, in a transparent open, spontaneous disorder, compatible package. Once its function is reduced to a fixed phenomenon, a special set of social activities and experiences or a set of control principles, the complex human behaviour is rigidly separated into separate pieces, which ultimately leads to the disappearance of spatial vitality. The natural environment information, such as geographical environment, climatic conditions, light and temperature, traditional customs, festival activities and other cultural activities contained in the historical block space play an important role in optimizing the block space environment, improving the quality of the block, and forming brand benefits.

According to Bill Hillier, the basis of the vitality of a block lies in the combinatorial relationship among various parts of the block, that is, the permeability of the block [9]. The alleys within the block are accessible to each other, and one can easily cross or reach an area by choosing a route. The more permeable the block is, the richer the functional relationship of each local space will be, forming a network like capillaries. In a well-structured and well-ordered block, the functional layout between each local space is reasonable, the accessibility of each street is strong and the flow of people is reasonable. For example, the functional layout of local space in Pingjiang Road block is reasonable, the distribution of business travel space, home stay space, fashion space and leisure space is reasonable, the convenience and accessibility of each roadway is strong, so as to guide the flow of people to gather and distribute reasonably, and the whole block is full of vitality. However, the functional layout of each local space in Tunxi Old Street and Shantang Old Street is not reasonable. Commercial, catering, entertainment and cultural creative shops are mostly concentrated on one or two main streets. Moreover, the accessibility of each branch lane in the area is poor, resulting in many “dead corners” that force people to concentrate on the main street and reduce the vitality of other alleys.

The public art of life aesthetics is involved in the historic district, and the unique charm of the historic district is interpreted from the artistic perspective again. This is supplemented by a variety of communication forms to arouse social resonance and identity, so as to attract the outside crowd to experience the passage of time and human warmth, promote the development of business and tourism block, and the prosperity of the vitality of the block. The brick Culture in the wide and narrow alleys of Chengdu, Sichuan, with its unique layout, display and juxtaposing images of past dynasties, bears the temporal and spatial temperament and information memory that has disappeared from Chengdu. The wall is embedded in the urban life art of the Chengdu people – “inside the high wall of the gate, in a corner courtyard, birdcage hanging, a few bamboo chairs and a small wooden table, three people make several circles of long brand” three-dimensional sculpture; round carving of “digging rice in the middle lane”; image of “fighting birds in the street”; “drinking tea at brick door”; “vegetable peddler in the Rain” [10] and so on. Chengdu’s scene of life has made it a modern street of food, fashion and art. The period of the southern Song Dynasty YuJie “four generations” and “YueJia Army”, “The Dockers” of the West End “The Lobster Bite” and “The Children’s Band” by Hefei Lei street, “Traveler”, and “Ramen” in Yinping Street, and other sculptures, all of which reproduce the historical situation and life scene of the area in a realistic way [11], fully arouse the nostalgic enthusiasm of contemporary people, and enrich the artistic quality of the block (Table 2) [12].

4 Conclusion

The Yangtze River Delta region has a long history and strong local characteristics. The visualization of the block image can not only improve the connotation and appearance of the city, but also cater to guests from all over the world and promote the development of the tourism market. A prosperous tourism market and a consumption environment enable historic and cultural cities to display their charm unprecedentedly and promote

tourism economy to a new level. Under the development condition that the urban development mode turns to “stock optimization”, the historical block that preserves the massive historical information and real life of the city is bound to become the “rich and refined inner space of the city”, which is repeatedly emphasized by Premier Li. The revitalized historic districts in the Yangtze River Delta continue the historical context of each city, maintain the spiritual world of urban people and shoulder the urban mission of “storing culture”, “spreading culture” and “creating culture”, just like “sowing new seeds of vitality on barren land”.

Acknowledgements: The authors acknowledge the National Social Science Foundation of China (Grant: 16BSH036).

References

- [1] Tiesdell S, Heath T, Oc T. Revitalizing historic urban quarters. M Y Zhang, W Dong (Trans.) Beijing: China Architecture & Building Press, 2006.
- [2] Wang G. Chinese cities: Review of 40 years' development and visions in the new era. Urban Planning Forum, 2018, (6), pp. 9-10.
- [3] Ning G. Cultural creativity: Connecting tradition to modernity: Protection of traditional culture in urbanization context. Hundred Schools In Arts, 2014, (1), pp. 70-71.
- [4] Xinhuanet. Xi Jinping: Protect cultural heritage like cherishing your own life. Accessed November 19 2020. http://www.xinhuanet.com//politics/2015-01/06/c_1113897353.htm.
- [5] Jacobs J. The death and life of great American cities. H S Jin (Trans.) Nanjing: Yili Press, 2008.
- [6] Yao Y, Su J, Na Z. The human-centered social transformation of historic districts and its integrated conservation: An empirical study on Fanjiajie in Pingyao Ancient City. Urban Planning Forum, 2018, (4), p. 118.
- [7] Li X, Liu M, Huang Y. A new model of community participation: A case study of "jointly development" workshop in Zengcuo'an, Xiamen. City Planning Review, 2048, 42(9), pp. 40-41.
- [8] Teng Y P, Guo W M. The protective design of "functional replacement" of historic districts. Art & Design, 2011, (10), pp. 84-85.
- [9] Hillier B, Yang T, Turner A. Advancing DepthMap to advance our understanding of cities: comparing streets and cities, and streets to cities. Proceedings of Eighth International Space Syntax Symposium. Santiago de Chile: PUC, 2012.
- [10] Ma Q Z. Public art and the revitalization of historical districts. Shanghai: Xuelin Press, 2010.
- [11] Sitte C. The art of building cities – city building according to its artistic. D K Zhong (Trans.) Nanjing: Southeast University Press, 1990.
- [12] Zhang Y Y, Yang C M. The enlightenment of “historical dynamics” to the space restoration of historical blocks, Architectural Journal, 2018, (S1), pp. 161-167.

This page is intentionally left blank