



# Bridge the Physical and Virtual Design for Hutongs - Creative Design Supports Hutongs Community Participation

Huan Wang and Zhiyong Fu<sup>(✉)</sup>

Tsinghua University, Beijing 100084, China  
huanwangre@gmail.com, fuzhiyong@tsinghua.edu.cn

**Abstract.** In the context of the urban renovation process, hutong community has become the focus of creative design in Beijing, and there have been practical cases of hutongs that can improve public participation and accessibility for the city. By collecting the performance of hutong renovated instances in physical space, virtual network, and participating public reflection, this paper analyses the influence of creative design factors on public participation. The result shows that the combination of the physical and virtual design, primarily working on the facade of the street-facing buildings, and the integrated use of the community platform, are most conducive to incremental public participation. The research combed the mode of creative design support hutong involvement and updating, rising that bridge the innovative design in physical and virtual dimensions is a potential promotion to the sustainable renewal of hutong in the urban renovation.

**Keywords:** Creative design · Hutong · Community participation  
Physical space · Virtual network platform

## 1 Introduction

As a precious heritage of Beijing's traditional neighborhoods, hutong (or called alley) developed in the Yuan Dynasty of the early capital. At the end of the feudal period ended in the Qing Dynasty, Beijing had 2076 alleyways, of which 978 ones directly nominated as Hutongs. Hutong is the dispensable east-west direction street next to the main road, direct access to every household, as the end of the urban space practice, forming an integrated capital transportation system and be preserved so far [1]. Hutong brings together diversiform aspects of civic life and opens to the public in the city directly. It has been transformed into a community in the context of urban development to better adapt to urban life [2].

Hutong is the traditional urban space with such features as brief structure, flexible transformation, various design perspectives and the public participating in the characteristics. Based on having apparent advantages of culture demonstration, entirely a few renovated hutongs have been redesigned new appearance with the creative surfaces, which inspired multiple public activities (Fig. 1). At the same time, the general social networking platform supported by information technologies in recent years has

creatively enabled information transfer across boundaries of entities and has also played a significant role in stimulating more possibilities of hutongs. It is this creative design works of physical and virtual from two dimensions' perspective that transforms the hutong from the negative isolated space into an actively motivated area.



**Fig. 1.** Photos of physical design and virtual design for Yangmeizhu Xiejie (Hutong) in Beijing. (Public participating activities (left), renovated street appearance (middle), a street-facing building is being rebuilt (right).

“Creative City” has become one of the vital evaluation in current international metropolis development, so does creative design also have a better practice platform in a variety of cities [3]. During more than 20 years of innovative exploration, the original design of hutong in Beijing has developed from the space of physical dimension such as hutong streets and buildings to the complex integrating physical architecture space and virtual network community space under the residential community, carrying abundant, diverse public activities to support community development [4]. At this point, it is necessary to understand and explain interactions and supportive effectiveness, through these three dimensions, physical space, virtual network and community public participation, to provide a concrete guideline approach to creative design for hutong.

## 2 Background

*“I do not know who opened the first head; the street wall has dug a hole and used as a shop. Later, more and more people dig holes, or simply remove the entire gable.” [5]*

—Mr. Zhang, a deller in Nanluogu Xiang

The community renovation of Nanluogu Xiang (or Nanluogu Lane) is a well-known case of the Hutong street innovation and reuse practice. As one of the oldest hutongs in Beijing, Nanluogu Xiang was initially formed in the Yuan dynasty more than 700 years ago. Hutong extends from north to south about one-kilometer-long to both sides of the main street, symmetrically distributing eight hutongs and retaining the original structure [6]. Having been preserved entirely for hundreds of year, Nanluogu Xiang began to expose the signs of a commercial with the tendency of Shichahai Bars Street development. Due to its rich culture and distinctive geographical

advantages, Nanluogu Xiang quickly became a fashionable business district. Over commercial development led to confusion in the status of “pastel-style,” even though locals seldom stayed in hutongs, let alone participate in community activities. The shops form the new surface of hutongs, but they have lost the humanistic perspective of Beijing’s unique civic culture.

However, we see another scene from Yangmeizhu Xiejie:

*“Citizen-centered, organic renewal, multiple subjects, joint participation ..... Yangmeizhu Xiejie is gentle and rational explored, has been widely recognized by the world, as one of the landmark areas in Dashilar. So that Dashilar also was named the 18 promising designs community in the world.” [7]*

—[www.gov.cn](http://www.gov.cn)

Compared with Nanluogu Xiang, Yangmeizhu Xiejie represents a constructive reflection of the creative design supporting hutong renovation. Since 2013, Yangmeizhu Xiejie has been the earliest to start retreating in the Dashilar area, with 529 relocated out of 1700 residents. The remaining 1,171 residents are scattered in various large residential complexes to maintain the living atmosphere of local life. Following many creative designs for community life and activities, such as the transformation of the old courtyard house called “Courtyard House Plugin en Masse II”, the implantation of miniature gallery and library named “Micro-Yuan’er” experiment, and also the annual “International Design Week” to display the latest creative design. On the one hand, Yangmeizhu Xiejie Organic Renew project planned a transformation of the retreated space into public community activities area and encouraged the creative cultural industries to use and redesign the traditional street space. On the other hand, the project provides an online platform for innovative information dissemination and promotion of public recognition and participation in community activities. To date, Yangmeizhu Xiejie has practiced six creative courtyard designs, launched five online community platforms and regularly released various public participation activities such as films, hand-made works, and exhibitions. This exploration of organic renewal mode, linking the physical space and virtual space of hutong, promoting the communication of residents and visitors, demonstrating Beijing culture [8]. It has become a model for the participatory community, and as the leading event area of Beijing International Design Week for many years, has been regarded as Beijing’s trendiest hutong.

In fact, not only are Beijing’s hutongs such as Yangmeizhu Xiejie, Beiluogu Xiang, Yandai Xiejie, Qianliang Hutong and Fangjia Hutong etc, quite a few cases have creatively designed in communities based on street-based architecture and online platform under the premise of essential hutong remodeling to support community public participation, which could be sufficient experience for further design. It can reach an argument that creative design for hutong aims to not only the street-facing space, including buildings, streets, and facilities but also to extending the benefits from virtual network space under digital media technology because of its active unlimited communication of specific people, area, and activities [9]. Furthermore, it is suggested that the creative design for hutong rebuilding can practically improve the public participation, transform old communities into ongoing vitality units.

On this basis, this paper aims to analyze how creative design support hutongs community public participation through physical and virtual dimensions in the context of urban renovation. By capturing the data indicating the way of hutong creative design and reflection of public participating from practical cases investigation, this research explains the dominant design factors and design approach. Combined with the participating reflection to analyze the relationship between the design factors and influence, to derive the mode of creative design of the participatory community.

### 3 Challenges and Approaches

For the single pattern and flexible adjustment methods, hutong has formed a complex community synthesis through spontaneous or planned renovation process in response to the needs of contemporary open space [10]. The challenges of this paper come from reasonable quantification of design factors, as while the analysis the participation brought by the creative design of hutong and carry out the overlay analysis with the related factors as the link:

#### **How to Define Creative Design? How to Distinguish it from the Primary Renovation of Hutongs?**

Most hutongs have undergone rebuilding streets, facilities, and walls, no doubt presenting a neat appearance. From the view of creative design, it is common that design works focus on creating new functional possibilities and visual feelings to attract the public to enter or contact with each other and thereby stimulate the vitality of this space. Therefore, there is a general visual and functional breakthrough. In the face of urban renovation program of hutongs, which tends to be shabby and outdated, the creative design of this study mainly determined by three conditions: firstly, whether the original residential functions transformed into the tasks required by the new contemporary urban life or the introduction of the new format. Secondly, for the cases whether the original constructive form is expressed by using new materials and technologies, whether the space enclosed by the supposed courtyard is broken up and reorganized. Finally, whether we can find the combination of contemporary virtual online resources effectively enhances community engagement.

#### **How to Analysis Physical and Virtual Space Design Factors? How to Distinguish it from the Necessary Renovation of Hutongs?**

This paper capture, screen and sort the data from a human perspective and summarize it as a spatial-based data analysis system, including data on the physical construction, virtual network data and related participatory activities reflection.

Among them, the physical space data from the hutongs street surface and street-facing buildings covering hutong community's public space. Construction obtains the data for the street-facing buildings because of the variability between scale, function and aesthetic: Street-facing Facades, which are primarily enclosing, Front-yard, which is the front-facing semi-open part and Building Signboard, which is attached on the front surface [12] (Fig. 4). Virtual data includes hutong space-based network platform, such as Douban [18], WeChat [19] and Sina Weibo [20]. Subjects should consist of

both physical and virtual data, while the virtual community data situation is entirely out of understanding, shows the distinguished contribution of creative design.

### **How to Quantify the Influence of Creative Design to Participation from Community Physical and Virtual Dimension?**

Beijing Hutong renovation cases have a higher starting point for the renovation and have conducted creative design and increased community participation in the case of the work experience at various times, while they into activities have social effects vary considerably, the universality of the platform is also different. As varies social and environmental factors could become the resource, cultural conservation is a very complicated system, as well as cultural engagement [15]. Therefore, taking the total amount from the beginning of the creative design work until now, then quantified as the annual average, the number of reviewers and the number of participants as the community participation reflection data, besides researching community social platforms combined with the score. That can be the more realistic description of the overall vitality.

The trend of urban renewal construction has been unstoppable. The development is both an opportunity and a challenge [14]. This research tries to analyze the effect of creative design on the hutong renovation and reformation by investigation of practical project cases, to define and explain creative design factors of physical and virtual public space and how they work, to discuss the mode of the creative design supporting hutong community participation.

## **4 Data Characteristics**

According to the above description, the cases selection assessments are:

- (a) The projects should be hutong-centered creative design in the context of urban renovation for public space, involving multi-dimensional creative design work from the architectural space, street facilities, and digital media network platform.
- (b) The projects are located in the Dongcheng and Xicheng District of Beijing inner city, maintaining the traditional scale and spatial characteristics. Following the rules of the hutong when it first set up, which is the width of street is six steps (about 9.3 m), and named after three symbols including Hutong, Xiejie and Xiang.
- (c) The projects should be conducted in Douban Tongcheng [18], Sina Weibo [19], WeChat Official Accounts (app) [20], Dianping [21] and the internationally accepted TripAdvisor [17], where ratings and activity rankings and the number of independent entities are substantial.
- (d) These projects have undergone the creative design work. Those are accepted as examples of hutong practices that provide right space for innovative design, such as Ju'er hutong [11].

The cases researched in this paper include Yangmeizhu Xiejie, Ju'er Hutong, Nanluogu Xiang, Beiluogu Xiang, Yandai Xiejie, Wudaoying Hutong, Qianliang Hutong, Shijia Hutong, Fangjia Hutong, Dongmianhua Hutong (Fig. 2).

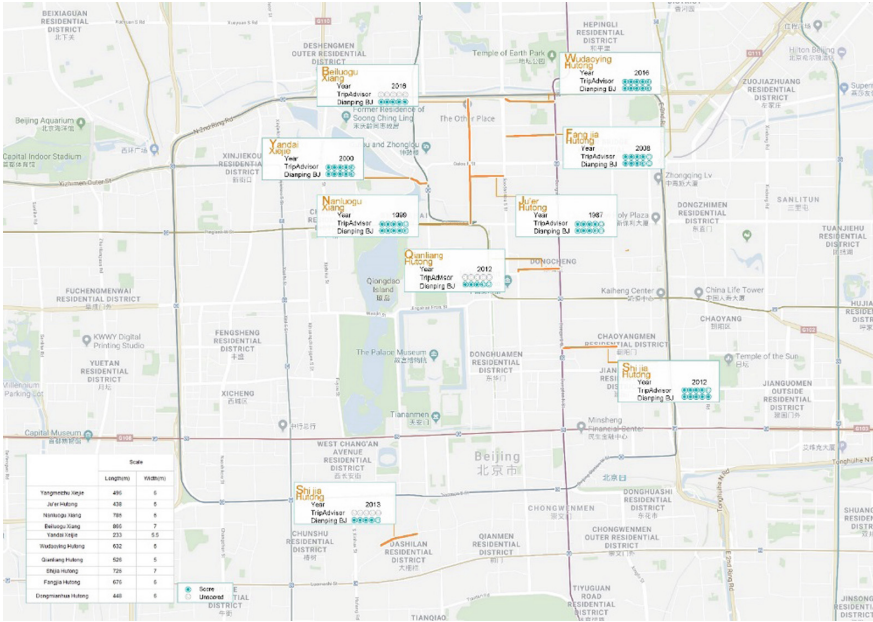


Fig. 2. The cases location and activity mapping.

## 5 Results

### 5.1 Description of Creative Design

According to the research approach, the two aspects of the physical and the virtual community space of hutongs are surveyed respectively. The dimensions and design of the streets included in the hutong street entity spatial data that is street-surface, facilities, and facing-street buildings enclosing street spaces. For the virtual public community space, the usage frequency of the open platform and the release of the participatory activities in the virtual community have been collected as primary data.

These cases of hutongs with creative designs have completed the infrastructural work of street-centered rectification and management before the creative design of public space quality. In the past, the dirty and messy areas were all improved to a certain degree. However, the design carried out from the perspective of creative design took into account both the physical and the virtual dimensions of public space, and the cases showed a particular gap. The characteristics are as follows: The creative design of hutong physical space is based on street-facing buildings as the leading carrier, all the hutong have been redesigned along the street. However, the design of facilities and street surfaces is unconsidered, which shows 70% and 40% relatively (Fig. 3).

The following is to analyze the creative design and research data of the street-facing buildings, trying to find out the distinct characteristic of design factors from the perspective of architectural design, that are street-facing facades, front-yard, and building signboard.



	Amount	Yangmeizhu Xiejie	Ju'er Hutong	Nanluogu Xiang	Beiluogu Xiang	Yandai Xiejie	Wudaoying Hutong	Qianliang Hutong	Shijia Hutong	Fangjia Hutong	Dongmianhua Hutong
Street Surface	4	0	0	0	0	0	0	0	0	0	0
Facilities	7	0	0	0	0	0	0	0	0	0	0
Facing-street Buildings	10	0	0	0	0	0	0	0	0	0	0

Fig. 3. The creative designs for physical space in hutongs.

The pie chart illustrates the preference of creative design for street-facing buildings (Fig. 4). Creative design is the most common in facades, while signboard and front-yard involve less. The buildings in Qianliang Hutong and Shijia Hutong all renovated facades and Yangmeizhu Xiejie, the least remodeled building, also maintained a 74%. In contrast, front-yard is the type of creative design with the least working, only in Beiluogu Xiang appears only a maximum of 45%, while Doufuchi Hutong does not involve the design of the front-yard space. Signboard design work has fluctuated from 8% to 33%, which is closely related to the hutong’s limited scale and complicated space tenure.



Fig. 4. The description and comparison of street-facing facades, building signboards and front-yards for the street-facing building.

Fundamental descriptive data also includes the posting of creative displays, sales, or other public activities by the virtual social networking platform. Overall, WeChat Official Accounts was the most widely used, Douban Group Accounts only dominated Beiluogu Xiang, and Weibo Verified Accounts performed modestly. On the individual, the number of subjects in the virtual network community obviously shows low, medium and high category. The low level of participation shows that there are no more than 15 principal bodies in the three platforms, such as Ju'er Hutong only 5 and Nnaluogu Xiang of 13. Of the moderate participation, Wudaoying Hutong appeared 90. Beiluogu Xiang showed unusually high engagement in social platforms, with more than ten significant accounts in a single platform and 37 in WeChat Official Accounts, bringing the total to 235 (Fig. 5).

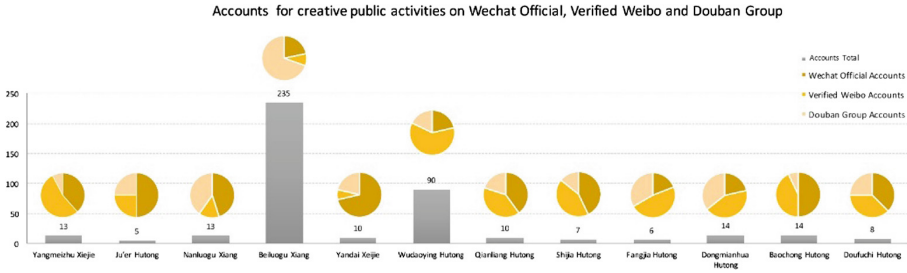


Fig. 5. Social network platform for community participating activities in hutongs.

### 5.2 Public Participating Reflection

Concerning public reflection, the user ratings of the two most trusted community life sites, TripAdvisor and Douban, were surveyed, in the light of the extent of public participation. TripAdvisor is an international public platform where Wudaoying Hutong and Nanluogu Xiang show very high annual average reviewers and maintain high scores of 4.5 and 4.0, followed by Shijia Hutong, Yandai Xiejie, and Ju'er Hutong. Douban, as a highly trusted online community in China, with the Tongcheng section devoted to urban activities, shows that Beiluogu Xiang's Activities and participants are at their highest level. Following is Yandai Xiejie, the number of community events posted on the community platform, and participants, there is a clear positive relationship between the number of the visible community platform for the promotion of participation has a significant role (Fig. 6).



Fig. 6. Reviewers, activities, and participants in TripAdvisor and Douban Tongcheng

This paper aims to figure out how the three dimensions of creative design, which are physical community space, network community space and public participatory activities, coordinated with each other to promote public participation in the community and activate the traditional hutong space. Bridge physical and virtual design for hutongs regarding a bright open public area [16]. Therefore, based on primary data, this paper further analyzes and deduce the practical mode that creative design supports community participation.



### 5.3 Creative Design for Physical Hutong Space

First, analyze the relationship between creative design and the spatial scale of the hutong physical space. The results show no significant relationship between design and length of the alley, but with a little bit of width. The most active objects appeared when the average width of the hutong was 5.5 m and 6 m in the context of building’s average width of 3 m, while most of the hutong with creative designs floated more in the design proportion of 2%–29%. The average trend of 5–7 m average interval is the most common trend is apparent, the prevalence of creative design has been 17.5%. It can be summarized that the hutong width of 5–7 m leading to the most conducive to the creative design work for the physical space (Fig. 7).

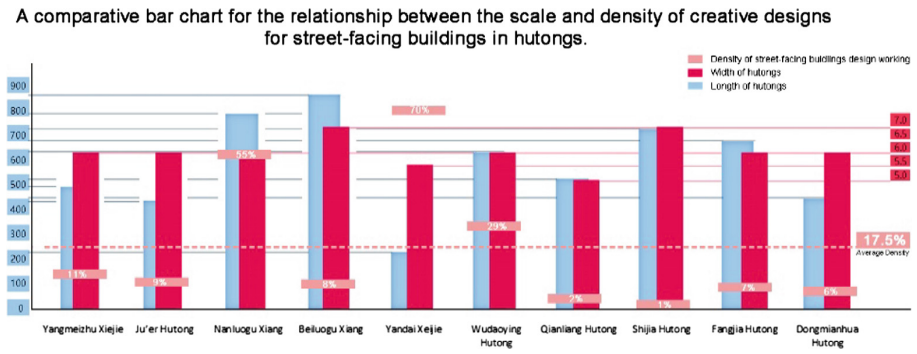


Fig. 7. A comparative bar chart for the relationship between the scale and density of creative designs for street-facing buildings in hutongs.

According to the actual situation, this result corresponds to the stellar reputation of the creative hutongs in Beijing. The two high-performing hutongs are Beijing’s prestigious commercial street, which is Nanluogu Xiang and Yandai Xiejie, mainly offers business activities instead of non-community participation activities. The rest of the cases are renovated design from 1% to 30%. Conclusions can also include that the hutong does not exceed 30% of the architectural design work, no matter how long the hutong is on a 5–7 m broad scale.

### 5.4 The Impact of Creative Design Factors on Participation Reflection

Next, whether these three dominating elements of creative designs street-facing buildings, facades, front-yard, and signboard, could have an impact on the public participation of the hutong? This paper aligns the participatory data from the virtual community platform across three design types for buildings. Then the correlation turns up:

Those hutongs involving physical designs in a large percentage shows a high level of reflection from network community platforms. Among them, the Douban Participants and TripAdvisor Reviewers, which are most relevant to actual participation in the community, show the highest similarities with the trends of Street-facing buildings’

facades and signboards, such as the highest amount in both Nanluogu Xiang and Wudaoying Hutong. Lower street hutong design work carried out a few, but also the case of small participation. It can be concluded that the design of the exterior design of the street-facing buildings is not only the foundational work but also efficiently indicates the involvement of the hutongs, especially street-facing facades and building signboards (Fig. 8).

	Street-facing facades	Building signboards	Front-yards	Network Accounts	Douban Public Activities	Douban Participants	Tripadvisor Reviewers	Tripadvisor Reviewers Scores
Yangmeizhu Xiejie	14	7	3	13	89	1238	3	0
Ju'er Hutong	13	11	4	5	1	6	156	4
Nanluogu Xiang	138	124	3	13	5	47	1122	4
Belluogu Xiang	17	19	0	235	13	34	0	0
Yandai Xiejie	53	47	8	10	235	4917	140	4.5
Wudaoying Hutong	60	62	11	90	10	41	69	4.5
Qianjiang Hutong	4	3	1	10	90	3321	0	0
Shijia Hutong	3	1	1	7	10	27	115	4
Fangjia Hutong	13	12	1	6	4	26	8	4
Dongmianhua Hutong	7	7	2	14	6	48	1	4.5

Fig. 8. A comparison of physical and virtual design factors for hutongs

Also, it is necessary to add that compared with the façade and signboards design, front-yard gives the minimal extent. That is due to the severe influence of the width of the hutong on the one hand, and the unfavorable use of the open space on the other side, which is driven by creativity activity content.

### 5.5 Physical and Virtual Creativity Design for Public Participation

Finally, based on the understanding of the influence of the material and virtual design factors on the engagement, this paper analyzes creative design enhances the public’s evaluation of the hutong. Associated with creative design and public participation and reflection, it is evident that quite a lot of hutongs with a high public participation score of 4–4.5 have done considerable design work on both physical construction and virtual networks (Fig. 8). At the same time, there are only a few hutongs that only achieve high participation in the online community construction, and relying on the physical space to reach individuals who enhance their cooperation and evaluation, such as Nanluogu Xiang and Fangjia Hutong.

Besides, the Hutong cases have the choices of which online social platform to go to launch out. These examples, which have done a lot of work on Douban and TripAdvisor, all show a significant amount of physical design work and gain more than 4 points of reflection. And even though there is a high number of reviewers, fewer public events, and fewer participants, the scores show only 4 points accordingly. Both Nanluogu Xiang and Ju’er Hutong demonstrate this feature, indicating that reviewers’ reflections are objective. So far no case can get better participation only by doing community network platform.

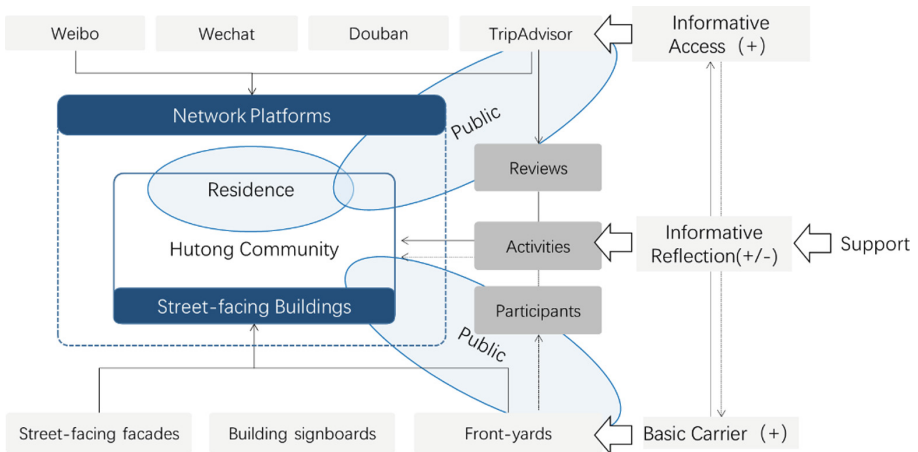
During the research process, a regularity reached unexpectedly. The hutong increased the exposure of the public after the creative renovated work, which provided the public access to the community space and the feasibility of participating in the activity and given not less than 4 points of reflection. A conclusion that the creative

design of hutong as a medium for increasing public participation in cities and perception in urban renewal is worthy of sustainable development, which could be a structure improve to open public space.

## 6 Conclusion

In this regard, this paper focuses on creative design to support hutong public participation in the context of urban renovation. The research found that joint design of physical construction and the virtual network can effectively increase the participation of the community, and the most feasible is to design facades of street-side buildings in the physical space. Hutong innovation can be constructively supported by the comprehensive redesign of creative design in three dimensions: street-facing building designs providing the basic space situation, virtual community networking platform convey timely information and informative reflection, which promotes information design.

In this way, the practical mode of inducing the relationship between the various elements, combining the traditional hutong space and the urban development background, and combing out the creative design support based on Beijing’s Hutong pattern in the context of urban renovation to enhance community participation is as follows (Fig. 9):



**Fig. 9.** The general mode of supportive creative design for hutong

The research also found that urban spaces such as hutong have the high potential for function and style transformation. The creative design of street-facing buildings plays a more significant role in their openness to the public. The network community holds a supporting role in transmitting information and complements such alley Physical space is more closed space deficiencies.

## References

1. Hou, R.Z.: Beijing Historical Atlas. Beijing Publishing House, Beijing (1998)
2. Feng, J.G.: The Last Hutong. China Central Compilation and Translation Press, Beijing (2008)
3. Tang, Y., Klaus, R., Kunmann, K.R.: Culture, Creative Industries and Urban Regeneration. Tsinghua University Press, Beijing (2016)
4. Zhu, W.Y., Hou, X.Q.: Let's Talk About Community Revitalization I. Social Sciences Academic Press, Beijing (2015)
5. Liu, Z.H.: Neighborhood News. Beijing Daily (2016). [http://www.bjd.com.cn/zc/sbs/201605/11/t20160511\\_11021219.html](http://www.bjd.com.cn/zc/sbs/201605/11/t20160511_11021219.html)
6. Li, T.S., Zhang, E.D.: The History of Nanguogu Xiang. Beijing Press, Beijing (2010)
7. Li, B., Zhang, M.Z., Kong, X.X.: Inheritance and Innovation of 496m - Samples of Yangmeizhu Xiejie in the Protection and Renovation of Historic Cultural District. The State Council of People's Republic of China (2017) [http://www.gov.cn/xinwen/2017-03/28/content\\_5181376.htm](http://www.gov.cn/xinwen/2017-03/28/content_5181376.htm)
8. Yangmeizhu Xiejie Organic Renovation Program referenced in Beijing Design Week. <http://www.bjdw.org/>
9. Taner, O., Steve, T., Tim, H.: Revitalizing Historic Urban Quarters. China Architecture & Building Press, Beijing (2016)
10. Clare, C.M., Carolyn, F.: People Places: Design Guidelines for Urban Open Space. China Architecture & Building Press, Beijing (2010). Yu, K.J., Sun, P. (Translators)
11. Wu, L.Y.: The Old City of Beijing and its Ju'er Hutong Neighbourhood. China Architecture & Building Press, Beijing (1994)
12. Ching, F.D.K.: Architecture: Form, Space, and Order, 1st edn. Wiley, Hoboken (2014)
13. Wang, J., He, D.: Mitigation and adaptation strategies for global change, vol. 20, p. 665 (2015). <https://doi.org/10.1007/s11027-015-9644-1>
14. Wang, J.: "Urban regeneration" and urban design. Urbanism and Architecture (Urb Arch), no. 2. Heilongjiang Science and Technology Press (2009)
15. Tang, M., Chen, T.: Cultural landscape evolution under rapid urban development: a case study of Shichahai historical area in Beijing, China. In: Zhang, Z., Zhang, R., Zhang, J. (eds.) LISS 2012. Springer, Berlin, Heidelberg (2013). [https://doi.org/10.1007/978-3-642-32054-5\\_178](https://doi.org/10.1007/978-3-642-32054-5_178)
16. Ni, M.: Open your space: a design activism initiative in chinese urban community. In: Rau, P.L. (ed.) CCD 2017. LNCS, vol. 10281, pp. 412–431. Springer, Cham (2017). [https://doi.org/10.1007/978-3-319-57931-3\\_33](https://doi.org/10.1007/978-3-319-57931-3_33)
17. Beijing Hutongs referenced in TripAdvisor. <https://www.tripadvisor.com/Attractions-g294212-Activities-Beijing.html>
18. Beijing Hutongs referenced in Douban Tongcheng. <https://beijing.douban.com/>
19. Beijing Hutongs referenced in WeChat Official Accounts. <http://weixin.sogou.com/>
20. Beijing Hutongs referenced in Sina Weibo. <https://www.weibo.com/>
21. Beijing Hutongs referenced in Dianping. <http://www.dianping.com/beijing>