Innovation Research on Service Design Collaboration Paths Oriented to Smart Cities - A Case Study in Living Lab

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Abstract. This paper takes "Living Lab" as research example, analysis the social role of urban residents from "passive acceptance" to "active participation", and product design trends are changing from "traditional closed" to cross-border "open collaboration", and discuss the constitutes value system for Living Lab. With particular emphasis in article, Service design takes an irreplaceable internal driving force for the sustainable development of smart city and systematic social innovation. Smart city design should adhere to the user-centered service design, and continuously explore collaborative public participatory innovation paradigm.

Keywords: Smart city · Service design · Prosumer · Living lab

1 Introduction

Smart City has become the trend of future urban development. Currently, in the smart cities' construction process exists three main crux: firstly, pure IT driven mainly features takes more obvious and failed to achieve deep integration of IT technology and urban functions. Secondly, overall planning relatively subjective, did not take deep research based on the actual situation of different cities of the geographical environment, industry structure, people and culture, etc. Thirdly, due to the construction of smart city often involves multiple collaborate city administration, likely to cause poor implementation and bad effect. Top design concept and significance has been recognized, but top design also has some limitations. Need to reflect on is whether top design can solve all the problems of smart city construction?

The arrival of the big data era for the development of Smart City provides a new opportunity. With the new information media, urban residents to participate more actively in social innovation. From the digital to the smart of the city development process, the importance of service design has become increasingly prominent. Service design seeks to integrate and collaborate social elements, try to build an open and transparent, collaborative and innovative application platform, is a User-centered design philosophy and approach. In the smart city construction, should base on the human needs of urban residents, establish "design human city" as the core. To achieve

sustainable development of smart city, not only from a strategic top design, but also need new ideas through service design to explore new ways to collaborate and innovation.

2 Smart City Design Requires Public Collaborative Innovation

"Co-working" is not entirely a new concept, but a human population instinct in human society. The productivity of the information society is Rapidly improving, making the social division of labor more specialization, people are more willing to share information through collaboration with ways to seek their own value. In order to complete some complex research tasks, many large companies in the industry used to setting global experts to work together around the branch. For example, Boeing-787 is researched by Shenyang, Montreal, Seattle and other areas of the branch network engineers through the exchange of video conferencing and data processing programs, work together to complete the Boeing-787 core components development.

Along with ICT tools become more representative of IT popularity, "crowd-sourcing" model is increasingly on the rise. Through the Internet as a basis for social work, and every Internet user can play individual talent, and ultimately to promote the progress of the project through a collaborative approach. In public collaborative process, user's role arises from "passive acceptance" to "active participation", the individual is given greater force. Taking Wikipedia (Fig. 1) as an example, Wikipedia now has 31,240,000 entries, is an online encyclopedia has 16 million volunteers edited worldwide. Wikipedia via the Internet as a platform for brainstorming, brought thousands of collective intelligence together. Wikipedia flourished even a direct threat to the traditional classic "Encyclopedia Britannica". Till now, no longer issue Britannica print paper version.

Fig. 1. Wikipedia information service

Currently, the Internet has expanded to vast amounts of information aggregation platform for human society interaction. Public will take more participation in all levels of politics, economy and culture, make their voices heard and contribute their efforts. Society is bound to the "Nowhere is the center" model. Although the city's future development prospects still not very clear, but the role and status of urban residents has been greatly improved is unquestionable fact.

Smart City is a harmonious development of the city as the goal. Construction of smart city should take urban residents as core elements, the full application of big data, cloud computing, mobile Internet and other information technology tools, Build collaborative community participatory platform, and thus the formation of human progress and development of the city's as a virtuous cycle. Service design-driven social innovation will profoundly affect every aspect of the city, Ultimately create a good experience for every urban city dwellers.

3   Living Lab: Service Design Collaborative Innovation Paths

Small as a product, to a large city, future-oriented design requires a new design thinking, the core of which should be to enhance the interaction between users. Service design from the perspective of system theory, combine many factors together, such as design objectives, design principles, business strategy, process management, technological innovation. Setting interaction processes between users, products, environment; thus providing a good service and experience for users. Service Design most emphasizes the importance of user needs. Design and build an "User-centric" open collaborative innovation platform, will be more apt to popular demands, and explore the possibilities of business rules, cultural patterns, academic research.

Living Lab (LL) is a service design typical paradigm of collaborative innovation. The concept of LL was introduced in 1995 by Prof William Mitchell from MIT Media Lab and School of Architecture and city planning (Eriksson et al., 2005).Olavi Luotonen (ENOLL chairman) thought that, LL is a system for future economic and social forms. In this system, based on real life, user-driven research and innovation will be jointly create new services, new products and new social structure. LL can provide service enables users to actively participate in the research and innovation process. The most important feature of LL is to emphasis on people-oriented, user-centered and co-innovation.

With the user-centered innovation environment is increasingly complex, now LL has developed to 3.0 version. Experimental environment from a closed area expands to an open city, and become a main user-driven, future-oriented technological innovation
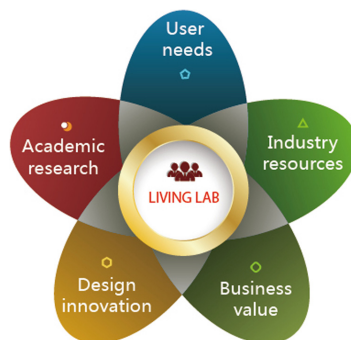

Fig. 2. LL consist elements

system, and innovative R & D new models. Living Lab brings design community, industry, business, academia, and other social groups and product users organically linked. By collaboration between users, designers and developers, Driving creativity, science and technology, culture in the form of better integration of product design (Fig. 2). LL can not only bridge the needs of society, user needs and product design activities, it is the epitome of an open society and a symbol of innovation.

4 Living Lab Value System Analysis

Relying on the city's residents as the main structure, as an open space in urban areas experiments, LL provides prototyping and testing platform for creation design and innovative applications. LL has distinctive SOLOMO attributes, to simulate a real environment for urban residents feel the design achievements in real-time.

LL integrates various types of users having chance to collaborate, combine the urban social needs and product innovation, technology research and development, advanced manufacturing and commercial operations, explore new design value, user value, business value and social value (Fig. 3).

4.1 Design Value

LL needs to capture the urban communities needs, predict usage scenarios, change user's participation process from the past test end, to the core research role into the design process. Today's product design philosophy has changed from the past to create a function to meet users, to based on the user to set the product features and other details. We can say that the rise of Living lab is brought to the traditional product design process of revolution.

4.2 User Value

LL capture real user groups attributes and build a participatory platform, build an information interaction space for different stakeholders, and takes as networking, distributed model. With the deepening applications of big data, mobile Internet tools, Diverse information media aggregation will help public more intelligent connection, product information interaction has great exploration space.

4.3 Business Value

LL is based on the localization of innovation. Every city has a unique charm of the city's character, there is a considerable mutual differences, which determines the static method should not be used to design for different cities. LL encourages users to share original ideas, research and creativity, which will inevitably lead to more regional style of products.

4.4   Social Value

Through the mass users participation innovation, LL help the city residents connected to each other. In the process of collaborative innovation, LL not only disseminate information technology concepts, improve information technology in the public's influence, While also help people further understand social innovation, and ultimately actively involved.
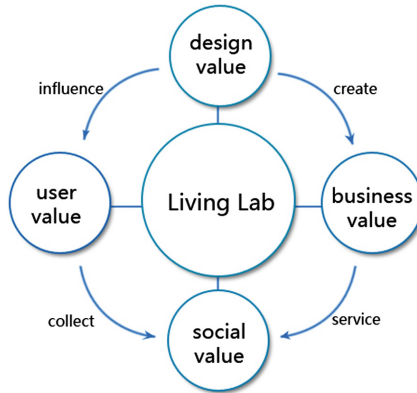

Fig. 3. Living lab value system analysis

5   Living Lab Case: Smart Living Lab Design

"Smart Living Lab" is founded in Tsinghua University (China), is an innovative environment for Living lab prototype of the smart city. Designers, engineers, brand experts, industry representatives, business professionals and design students and teachers participate in this professional collaboration platform, mainly for the future of urban life to create, experiment with different work tools and methods, and promote a specific type of product research, design and prototyping. "Smart Living Lab" seeks from the perspective of social humanities, focus on product design model can be implemented and potential business chances.

Via the internet help, "Smart Living Lab" across language, geography, culture intervals, convergence design global lab resources(including the United States, Australia, the Netherlands, etc.) for collaborative innovation, trying to create high-quality designs from the social, business, academic, and other perspectives. "Smart Living Lab" not only proved the feasibility of collaborative innovation from worldwide, but also reflects the young people trying to be creative, daring and innovative time spirits.

In the 2014 Beijing International Design Exhibition, "Smart Living Lab" constructed a communication participation platform for Beijing city residents, fully demonstrated the unique "Living lab" design concept :Not only smart city design works included ecology, transportation, living, education and entertainments, furthermore, take use of participatory co-design methodology, Expand knowledge sharing, research

needs to explore a range of design activities. Held several workshops and collected user groups needs and behavioral data, more accurately grasp the public group behavior patterns and mental attributes, ultimately for applying to future smart city design (Fig. 4).

Fig. 4. Smart living lab design platform

6   Conclusion

Development of the city experienced a digital, networked era, gradually towards smart and service-oriented. Smart City is not limited to traditional spatial planning, it is innovation and inspiration regional area. Explore the development of smart city, requires a combination of advanced information technology tools, more needs to adhere to the concept of service design thinking to guide and encourage public participatory collaborative innovation, In an environment such as Living lab, to create smart lifestyle continuously together.