STUDY ON INNOVATIVE DESIGN OF CHINESE SMART TOURISM PRODUCTS

Based on Cangzhou Urban Planning Project

ZHUANG CHAO 344766
ABSTRACT

Chinese urbanization has met a significant turning point which needs new industry pattern to boost up Chinese economy. Smartly and becoming more accurate. What’s more, in recent years, the acceleration of Chinese tourism industry development has slowed down, meaning while, research shows that the growth of middle class will grow in the future. Taken together, the need for transformation of the tourism industry is becoming more and more urgent. Under such circumstances, smart tourism is gradually developing as an emerging trends.

However, in the implantation of Chinese smart tourism design, the designers can rarely act as a leader to promote a concept by themselves. This is also the reason why many smart tourism development in Chinese Cities still stay in an infrastructure construction phase and why it's difficult to really meet the needs of tourists. Therefore, an innovation oriented design method for smart tourism products need to be developed under the Chinese smart industry context.

Based on these perspectives, with a developing foresight, I will summarize the current development situations of the smart city and smart tourism both in China and foreign regions, and developed a method to help innovative service designing of smart tourism by combining travelers’ demand, technology, innovation and business factors together. Ultimately, this study will end up with a design case which is based on Cangzhou planning project.

Key Words:
Smart tourism, Product design, Innovation, Design method
# TABLE OF CONTENT

**ABSTRACT 1**

**TABLE OF CONTENT** 2

1. **INTRODUCTION** 3
   1.1 Background 4
   1.2 Opportunity 6
   1.3 Objective 9
   1.4 Scope 10
   1.5 Structure 11

2. **Literature review** 13
   2.1 Smart City 14
   2.2 Smart Tourism 19
   2.3 Creative Innovation Design 28
   2.4 About service design 33
   2.5 Chapter conclusions 42

3. **Case Study** 43
   3.1 Cases around the world 44
   3.2 Cases in Mainland China 50
   3.3 Chapter Conclusions 57

4. **Discussions** 59
   4.1 About Smart tourism 60
   4.2 The method 61

5. **Case Analysis** 65
   5.1 Geographical characteristics analysis 66
   5.2 Regional characteristics summary 68
   5.4 Discussion 82

6. **Smart Tourism Products Design** 84
   6.1 Concept Development 85
   6.2 Functional Module 86

7. **Conclusions and Future Work** 100
   7.1 Conclusions 100

8. **Reference** 102

9. **Table & Figure Reference** 106
1. INTRODUCTION
1.1 Background

1.1.1 Chinese development meet the changing point

In recent years, the urbanization in China became more and more violent. While the city urban population is rising, the rural residents are still gathering in the urban area. According to a report of Chinese National Statistics Bureau, in 2013, the urbanization rate of China is 53.73%. This is the significant changing point compared with other counties experience (Wuzhiqiang, 2011).

![Figure 1.1. Middle-Income Trap](source: World Bank, 2010)

In the urban planning perspective, when the urbanization rate meet 50% means a key turning is happening. Urban construction contradictions and urban diseases will emerge from the water during this period. As a result, the society will have 2 different developing directions. One is transforming successfully and the economy increasing healthily and sustainably. And another is falling into the middle-income trap (Ohno, 2009), which means a situation that a middle-income country is failing to transition to a high-income economy due
to rising costs and declining competitiveness. Besides, the over urbanization and vain migration will also happen in the trap situation.

For example, the figure 1.1 shows gross domestic product (GDP) per capita for Korea, Brazil, Philippines, and the Syrian Arab Republic from 1950 to 2006 (World Bank, 2010). At first, all countries have a comparatively similar growth speed, but from 1970s, Korea continued to grow throughout the 1980s.

So, trying to avoid the middle-income trap in a strategic view is the urgent task that China is facing on the way of following development. Extensive development, such as utilizing demographic bonus and natural resources, will just give China fewer and fewer benefits. The types of industries need to be changed from the former ones.

1.1.2 Tourism industry is still at the early stage in China

Tourism has always been regarded as a significant industry for many countries and regions. It brings in large amounts of income into a local economy in the form of payment for goods and services needed by tourists, accounting for 30% of the world’s trade of services, and 6% of overall exports of goods and services (UNWTO, 2012).

When we take a close look at the status quo of Chinese tourism industry, we can find that the tourism industry is still at a very early stage. As the national survey summary mentioned (CNTA, 2014), after experiencing a long period of dynamic increasing, the revenues growth rate of the tourism industry showed a slightly decrease. This means the growth of tourism industry is shrinking now, which indicate that the industry will be possibly saturated in the near future. In order to get rid of the negative situation, new type of thinking and strategy need to be carried out.
A large number of tourism projects followed the typical old Chinese market model: cheap quality with high quantity. The human centered thinking is obviously lacking in the industry. Most of the smart tourism programs are more likely to be the performance that is not quite fit to the domestic market. During the research interview, I also found that these products and systems are somehow difficult for people to accept and use.

In summary, for designers, how to innovatively and systematically design a new generation of Chinese tourism products is an important issue that needs to be solved.

1.2 Opportunity

1.2.1 What kind of industry type is good for the transition?

In the report of 2010, the World Bank identified 2 main overarching ingredients for escaping from the middle-income trap. They are

1. High levels of investment that embody new technologies
2. Innovation – conducive policies.

In general, technologies and innovation are the two main methods to moving a middle-income economy into a high-income economy. Technologies provide the efficiency for living and producing while innovation enhance the society’s capability of adapting the dynamic environment.
1.2.2 China is searching answers for developing

In November 2013, the slogan, “Beautiful China—2014 Year of Smart Travel”, was officially presented by Chinese National Tourism Administration (CNTA, 2014). In official document, CNTA recommended each region studying from former successful experience and methods of smart travel and take use of the publicity of “year of smart travel”. Using advertising, products, exhibitions to enhance the using of advanced technology of smart tourism. Expanding Chinese tourism brand to the oversea market. Utilizing the mobile applications and internet provide smart service like information gathering and sharing, tickets booking, travel arrangement, travel recording and travel reviewing.

These suggestions reflect the Chinese government’s attitude and basic knowledge on smart tourism. It shows the industry and government are ready for the experience revolution. A breeding ground for smart tourism is gradually formed. What’s more, not only the government, but also the public are going through a transforming period. They are getting out of an adaptive process of using ICT technology in entertaining and becoming more dependent on it.

1.2.3 The rise of Chinese middle class

The transformation of industry and domestic stagey is important, but the transformation of populace is even more important. According to studies from Business Insider and All Emerging Markets, many economists believe that Chinese middle class will rise in the near future and this phenomenon would create opportunities the world has never seen before (David, 2015). The arguments mainly includes the increasing disposable income of Chinese household, the changing structure of holistic wealth distribution and the westward expansion of Chinese middle class (Michal, 2015).

In a research presented by ANZ greater China economists Li-Gang Liu and Louis Lam, they directly point to double-digit growth in re-
tail sales over the 2015 Lunar New Year, along with overseas tourism spending of $US164.8 billion in 2014, up a whopping 28% on 2013. Base on that fact and combine with other signals, we can believe the Chinese household wealth is actually keep running and it has already affect the tourism industry inch by inch. Besides, according to research, Chinese “tier two” and “tier three” cities are developing prosperously throughout the country and particularly in the West. Evidences indicate that, by 2022, it might be nearly two out of every five members of China’s middle class will live outside of coastal areas where the case in this study belongs to. All in all, Chinese consumption level will increase out across China in the foreseeable future. Reflecting on tourism industry, a large amount of high quality tourism service would be needed.

Figure 1.2. Projection of China’s Urban Households by income Groups
Source: David Scutt, 2015
1.3 Objective

1.3.1 Understand the status of smart tourism

At this stage, the Smart of tourism research and practice are still in an early stage. I hope that through this research, it would be much clearer about the smart tourism research status. This is only about preparing for the future analysis and forecasting, but also lay the foundation for the strategic positioning of designers.

1.3.2 Predict the future traits of smart tourism development

After understanding the current situation of the Smart of travel, then the analysis of future development need to be done. Study of the future trends will provide the content for designers and stockholders to use for reference.

1.3.3 Defining the innovation design method for smart tourism products

Through a combination of product design, a complete methods of smart tourism innovative design should be proposed. This method should be fit for applying to the different design projects. Furthermore, the entire design approach should take into account of the specificity of the smart tourism design and adapt the feature of smart industry and the technology. Different designers ought to be able to utilize this approach to boost design concepts generating and implementing from button to top.
1.3.4 Design a product for Cangzhou Project

Eventually, the whole study should settled in Changzhou Canal Smart tourism case. By combining the study conclusions and using this innovative design approach, a reasonable smart tourism products need to be designed. This design will become part of Cangzhou Canal urban planning projects submitted to the local government.

1.4 Scope

The goal of this paper is to identify innovative design approach for Chinese smart tourism products. With a developing foresight, I will summarize the current development situations of the smart city and smart tourism both in China and foreign regions, and developed a method to help innovative designing of smart tourism by combining travelers’ demand, technology, innovation and business factors together. Ultimately, this study will end up with a design case which is based on Cangzhou planning project.

The word “product” here refers to the concept of macro-level “product”. The product could have a lot of property. As long as the stuff has value for exchanging, it can be called a product. For example, the building is a product for residing and living; the city furniture is a product for people to use and experience. In the concept of marketing, the product concept refers to any kind of things that could meet the needs in the market (Kotler, 2006). Products has a certain degree of functionality and marketability. These two aspects interpret the designers’ designing direction for the Smart of tourism product: The good design should focus on the needs of the target group and product business model.

In this study, the smart for tourism products that we designed may have variety types such as apps, travel systems, tourist facilities,
tourist events and other design elements. The smart tourism research should not be limited to the product form, we should make more use of innovative ways to create new Smart travel experience.

1.5 Structure

Firstly, through the literature reviewing of smart city and smart tourism concepts, I would find the missing opportunity of design research. Then, after summarizing and analyzing the collection

Figure 1.3. The Structure of Thesis
Source: Drawn by author

Firstly, through the literature reviewing of smart city and smart tourism concepts, I would find the missing opportunity of design research. Then, after summarizing and analyzing the collection
of the existing domestic and international smart tourist cases, the absence apart of smart tourism need to be defined. Based on these solid foundations, I will hold an appropriate discussion about smart tourism product innovative design methods. The discussion contains the literature reviews of both creative innovation and service design. As a conclusion, a understanding of service innovative design principle and method would be released. According to that, combine the studies on the tourism needs, technological trends, innovation analysis and etc, the design opportunities would be discovered systematically. Eventually, opportunities would transform to concepts during the integration of the Canzhou case and design approaches,
2. Literature review
2.1 Smart City

2.1.1 The rise of smart city

Since the 20th century, along with the urbanization development and economic promotion, more and more cities began facing the problems including rapid population growth, unbearable traffic congestion, excessive consumption of resources, environmental pollution, social injustice and many other issues and other serious problems (Kim and Han, 2012). However, what a city’s need is a stable development. The urban problems need to be continually weakened until it is resolved. Facing the problems caused by these modern urban development, what method should be introduced to solve the dilemma?

After the concept of Information Communication Technology (ICT) was proposed, people realized that one of the most powerful force of social development in the 21st century seems was found (Okinawa Charter). Human development history indicates that every revolution of information transmission technology will bring profound changes for the society and the age. After language, print and telegraph, ICT would be this key player. In fact it did, it became the world most important driver of economic and society growth. On the other hand, the specialties of ICT such as mass data processing and transmission perfectly match the needs of urban issues dealing. So ICT was widely used in urban level since early. Urban digitization became the goal of many cities. This is the foundation and first step of smart city.

Besides the evolution of ICT and database processing ability, another strongly support of smart city development should be the rise of personal technology products. First, it was the personal computer, then the smart phone. The terminals of information transmission for individuals were greatly increased, both the quantity and quality. All in all, with the continuous improvement in technology, the early form of digital city and smart city has emerged.
Back in 2007, the EU had announced a Smart City Concept systematically in a report named European Union Smart City Report. But it mainly talk about the development and planning mode medium-sized cities in Europe. There is no strong relationship between the Smart City Concept that we are widely known. This also showed that, at different time, the public opinions about the “smart” is changing all the time.

In November 2008, when global financial crisis is happening, IBM released a report named “Smarter Planet agenda for the next generation of leaders” in New York. In this report, the concept of “the Smart of the Earth” was proposed. IBM called for using large amount of the next generation of information technology in all kinds of industry (Wikipedia, 2014). In January 2009, US President Barack Obama publicly affirmed the “Smarter Planet” concept. At the same period, “Chinese IT product innovation and technology convention 2009” was held successfully. The global vice president of IBM Matt • Dr. Wang gave a speech named “Building a Smarter Planet”. (Sohu News) It officially kicked off IBM “Smarter Planet” strategy in China. (Li Yunpeng, 2013) From that point on, the concept of the Smart city gradually come under scrutiny. It was recognized by vast majority urban scholars as an effective solution for future urban problems.

In 2009, Professor Rosabeth Moss Kanter from Harvard Business School and the President of IBM International Foundation Stanley S. Litow published a article titled “Informed and Interconnected: A Manifesto for Smarter Cities”. At same year, for the first time, IBM defines a smart city in the paper named “smart city in China”. The smart city is the city that could make full use of information technology to sense, analyze, integrate the key information from the city’s core systems, so that it could smartly respond a variety of needs including people’s livelihood, environmental protection, public security, urban services, industrial and commercial activities to help human to create a wonderful urban life.

Since 2008, the smart city concept has been widely spread. During
this propagation, the definition was no longer the one word said by IBM. It was coming into a large variety of understanding. Scholars, enterprises and organizations from all over the world have their own opinions. Smart city concept development trend is not entirely consistent. However, the using of information technology is indeed recognized by everyone (Paolo Neirotti, et al., 2013).

At the latter half of 20th century, the explosion of PC equipment made the internet began to spread. Since the 21st century, with the birth of iPhone and app store, smart phone start a rapid developing. Meanwhile, the popularization and revolution of mobile networks triggered a boom of mobile internet. At present, the development are gradually moving towards the field of internet of things which is a necessary condition for the development of smart cities. For users of the Smart city, the distance of using tools is getting shorter by using the internet of things. It is because all devices are networked. For the smart city operators, the most precious resource of internet of things is the information which will be provided by “things”. Thus, in recent years, internet of things are in the trend of rapid growth.

From past experience, designers could hardly be the decision-maker. While the citizens’ living standards is rising, the demand of travel experience is gradually becoming more precise and delicate. The future market would be experience oriented, so the designers who know the experience design better would have the power to decide. Chinese designers should think this situation through and seize the opportunity.

2.1.2 The trend

Recently, the scholars from Italy summarized the development of smart city and discussed about the trend of the future (Neirotti, 2014).
The explode of Internet economy

Internet economy will change the traditional economic structure and industrial structure. Core stage, the intellectual property of the Internet industry. Downstream electronic information industry chain will focus on Internet applications for product upgrading and transformation, especially in traditional industries, will accelerate the formation of a new industry formats, such as internet banking, smart industries. In addition, cloud computing, big data, networking and other new formats taking shape, a new generation of information technology industry mainstream form.

The change of investment pattern

Smart city is the advanced form of city informatization. It is also a brand new elements and contents of the urbanization development pattern. If the government supervise the management and operation at the same time, it will easily lead to the financial insufficient, unsustainable development and management inefficiency, and many other problems (Dongjin Li, 2015).

But by using the power of private capital, the market mechanism and relatively advanced idea will be introduced to the city management. It will both expand urban management resources, and promote urban management ability and quality.

In 2014, several local governments in China have signed a series of strategic cooperation agreement with private enterprises. For instance, Hainan international tourism island and Alibaba Group have a strategic cooperation. They planning to use an investment of 5 billion yuan to build Chinese first digital Internet based and cloud based smart city. (Chinanews, 2014) This cooperation planted the seed of success. It has a great opportunity to create a win-win situation. With the help of Alibaba, government could use far less money and effort to earn a great city development and reputation.
The improvement of smart infrastructure

Even though smart city is not a new concept, there are not that many cities could be counted as a real smart one. It is most because of the shortage of smart infrastructure. (Dongjin Li, 2015) Among many of them, data center and public Wi-Fi are the two of the most important hardware. The Data center is the foundation of the smart city efficiency while the Public Wi-Fi is the basic way to deal with the information transition which is like the blood running in the system of smart city. Beside the two which has be mentioned, other infrastructure which could be used for information perception transmission and processing will also be needed. In china, plenty cities need to upgrade the “body” with these infrastructure, it is both a great problem as well as an opportunity for the stockholder.

The revival of people oriented

Liu Cixin, a famous Chinese science fiction writer said that, the boom of ICT may built an exciting but fake atmosphere of human progress. Sometimes, human seems to be over-depending on ICT technology and ignore the truth that technology need to service people. This point is also reflected on the smart industry product design which are lack of people-oriented thinking. But in the near future, the demanding of smart tourism products for the high level user experience will increased when most user are familiar with the service that provided with ICT.

Not only about the using experience, but also the concepts generation of smart products should be considered with end users’ opinions. Just like Neirotti wrote in the paper, the adjective ‘smart’ also refers to the city government appropriately give the capacity to the local residents to generate innovative services and.
2.2 Smart Tourism

2.2.1 The relationship between Smart City and Smart tourism

Generally speaking, the construction achievement of smart city is the foundation and support for smart tourism system building both on the conceptual and practical level.

“Smart city” gives people ways to find solutions against to urban problems. It makes a society that organically and harmoniously blend residents, city and life together. It also release a way of intelligent development for city. This thinking as well contributed to the changes of tourism information. By forcing people to break the original mechanical development model, the mutual exchange of “smart travel” is becoming outstanding. On the other hand, the smart city practice also provide smart tourism development path, model and infrastructure. What’s more, the components of Smart City which contains smart community, medical smart, the smart of the government, intelligent transportation, smart power, smart banking, smart logistics and Smart cultural and creative industry and other industries are associated with smart tourism. These components come together to build support platform for smart tourism.

Under some certain situations, such as the smart tourist in natural
destinations, this concept may more belongs to the extension of smart city which is a part of smart life.

All in all, there is a close relationship existed in smart city and smart tourism. This is why we discuss them together. Figuratively speaking, smart city is just like a delicate instrument, the elements it has could be the components, like gears. Then, the smart tourism should be a sort of gear cluster. It use the basic elements from smart city system and also make effort keep this system’s operation more smoothly and efficiently just like other significant blocks such as smart government, smart health care, smart education, smart transportation and smart electricity grid. Another point need to emphasize, those blocks may share same components while making different experience for various stockholder.

2.2.2 The origin and essential of smart city

The early form of smart tourism is the information construction of tourism. In foreign countries, the study of digital technology applications in the tourism is even earlier than the digital earth concept. With the rapid development of electronic information technology and mobile Internet, more and more technology combines with digital tourism according to different needs of different issues.

Back into 1956, American Airlines and IBM developed the world’s first computer automatic orientation system (Smart travel book). 1993 Williams pointed out that combination of IT and tourism is an inevitable trend in the development of the industry. These words has brought opportunities and challenges to tourism industry (Buhalis & O’Connor, 2005)

There were a definition of smart tourism in 2000. Gordon, Phillips form Tourism Industry Association of Canada defined it as “using simple, comprehensive, long-term, sustainable approach to plan, develop, manage the tourism products and business travel. (Smart
It doesn’t have much to do with the smart tourism we said. It is more likely about the precise requirements for the technical management and marketing skills.

All This Time, there is no unique definition for smart tourism in foreign countries. Besides smart tourism, intelligent tourism, tourism intelligence and e-tourism (Dimitrios Buhalis2002) are both the members of the names cluster. Around 2010, the articles talking about combination of ICT and tourism was becoming popular (Ulrike Gretzel 2011). Up to now, the hot topic are mainly about incorporation of social media or mobile internet with tourism with the tourism.

Influenced by the popular of Smart city around 2010 the word “smart” was inherited, it has been currently one of the most important issues in world travel and tourism industry since 2011. This phenomenon is especially obvious in china (zhu, 2014). From the holistic view, the foreign countries are lack of deep thinking studies on the field of smart tourism industry, therefore, designing and exploring the smart tourism whether in China or in foreign countries is positive and proactive.

British scholar Barry Brown (Barry Brown), who analyzed the relationship between tourism and mobile technologies, although they believed mobile technology has the large potential on tourism domain. However, they just know little about how the visitors arrange their trip itinerary and how to solve the problem they meet. So they provided 3 technology which are a system that help communication for each other, an electronic guide book with maps and an electronic guide to analysis the tourists. Alexander Almer discussed about the current situation of how the different target groups acquiring information in digital tourism, and they advised that different interactive multimedia need to be used for different various parts in tourism. Alireza Isfandyari-Moghaddam and others collected summarized the applications and management of digital technology in recent years in the tourism industry. They systematically analyzed the main forms and digital technologies what realize the digital
Domestic research on the smart tourism in China have varies opinions, there is no unified understanding of the definition about Smart tourism although they are similar. Through comparing, I found following two similarities: first, the demanding of a robust technology platform. In a way, intelligent tourism is living on the strong ICT technology. Second, the information flow –oriented system. The essential process of smart tourism is to provide a variety of tourist information for each stockholders of travel industry. The stockholders are tourists, government and enterprises. It also has its limitations, the Smart of the future are likely to travel out of the flow of information itself and provide more thoughtful travel experience.

The first problem of the definitions is that the core technology is not clear. In their studies, some scholars believe cloud computing, internet of things are the core technology while others prefer other technologies. Secondly, these scholars don’t have a unified opinion about the smart tourism property. At present, opinions on the property of smart tourism are: an integrated application platform, a new model of tourism information development, a revolution of management, new operation mode and travel patterns. There is no single definition for the properties. Thirdly, there is no obvious unified application scoping. The unclear scope of smart tourism application will affect the realization of the smart tourism value. I believe that the wisdom tourism is a huge system, there are many solutions in it. These solutions support the mutual interaction of the system. They use information technology as the core, variety other techniques which are highly efficient and accurate as the assist, offer visitors a convenient and valuable travel service and travel experience, and provide detailed evidence-based data and strategy recommendations for decision makers.

Smart tourism is the child proposition of smart city. However, it is an all-embracing concept. So far, this concept is still relatively abstract. A lot of things can be brought under this big label. The
book named “From informatization tourism to travel smart tourism” (P103) hold the opinion of that smart tourism concept include smart tour, smart tourism city, smart scenic, smart hotels and smart public services four areas. Such classification’s hierarchy and relationship are not quite clear, I have expressed reservations.

Smart tourism is a huge system with plenty smart solutions in it. And these solutions support the interaction of the system.

My opinion is that, at present, the idealized smart tourism should be the traveling system which is using information technology act as the core, variety other technologies could be used as supports to provide a highly efficient, highly precise and highly comfortable travel services and travel experience for visitors, provide detailed and accurate data for decision-makers, and even provide reliable suggestions through data analysis, self-learning and self-judgement.

From a business perspective, the appearance of smart tourism gathering the tourism-related resources with information technology. It is a package which contains numerous services. This system which sells technology with travel packages has created an aggregation effect. It will intensively attract consumers and bring more adequate user experience so as to achieve the purpose of increasing Product Added Value.
2.2.3 Structure of smart tourism

According to the research of Wei Zhu in 2014, smart tourism system includes five elements which match the definition of smart tourism:

1. Information Exchange Center (IEC)
2. Tourists
3. Government
4. Scenic zones
5. Enterprise

Just like the figure above, tourists send requests such as searching information, buying tickets, booking hotel, social communication and etc. to IEC. IEC then will response with the demanded information or processed results. IEC also need to real-time monitor the resources of scenic zones while the zones is keeping reporting. The data is for analyzing and archiving management and also used to be returned to government officials as a basis to determine the next-step policy and move. For enterprises such as tourism companies,
hotels, restaurants and entertainments, they can request IEC to send advertisement or promotions which precisely match the needs to tourists. Meanwhile, the processing results of tourist requests are also returned to business for further arrangement. At the back stage, the IEC could be equipped up with AI, cloud computing and internet of things to meet the operation requirements.

In the structure, government and enterprise are acting as two significant stockholders (Zhu, 2014). In the traditional way, a mature smart tourism system needs a strong support of time and funding. Enterprises could possibly not be able to afford the cost of investment and resource mobilization, they need help of “Huge Hand” which seems hold more sway in Chinese cities. On the other hand, a smart tourism system would serve as a public facts to benefit tourists and promote urban brand. Conversely, if the tourist experience is not fluent, it would become a big barrier lay on the road of having an increase on fiscal revenue and urban brand.

In order to cooperate more nicely and efficiently, government should act as guider and leader but not a controller on the designing stage, encourage the construction of tourism informatisation in
the form of policies and regulations, lead the enterprises to fill the gap between technology, tourism and travel industry. When provide solutions for smart tourism, enterprises should not only consider the technical implementation, but also take actual factors of urban economic, transport, ecology and culture to into account to satisfy tourist requirements.

On the operating stage, government should mainly functions on dealing with data collection, monitor and adjust. It could substantially optimize the smart tourism system and help to improve the government current executive capability. IT enterprises need to maintain and improve the system by developing new functions according to the feedbacks from tourists.

### 2.2.4 Potential problems

**Misunderstandings of smart tourism system construction.**

Smart tourism system is not only about the tourism informatization or built an app. Another signification goal of Smart tourism is to use technology and data to consequently promote the travel and tourism industry both in economics, user experience and informatization level. It demands the government consider more of the future implementation and further upgrading.

**No unified standards to evaluate.**

Many cities use public tender to determine the relatively better project, but without a unified stander, it’s difficult to manage the evaluation. For different cities and regions, without a unified system is also hard to communication and exchanging the data.

**Government still act as the controller of the entire system.**

Especially in china, government take the charge of project is a com-
mon occurrence. This situation would easily lead to a low quality implementation in industry related to innovation. The funding limitation is one reason. Another more important reason should be the changing form market oriented to government oriented. This will cause the overlook of customer needs which is the key to success.

### 2.2.5 Conclusions

Generally speaking, in foreign countries, Smart Tourism is quite fragmented, there is no authoritative theoretical system, and the research scale is limited. Most scholar were focused on the individual projects and individual technologies. In china, the development of the smart tourism research just started for a short time, both quantity and quality are need to be cultivated. There is a very big space for developing, especially at the design aspect. Due to the implementation of China’s new tourism policy, and the establishment smart tourism year. The smart tourism research will have a breakthroughs and new outbreaks.

![Figure 2.4. High Line, looking west in 2009](source: Wikipedia)

![Figure 2.5. High Line Park looking west in 2011](source: Flickr)
2.3 Creative Innovation Design

Why we need Creative Innovation in smart tourism design? In the history of business management, among the vast number of cases, we can easily find out innovation was always acting as the key role to earn the triumph. It could be a product, system or even just slightly different of advertising. In fact, the essential reason why the victories happen is the winner satisfying the customers’ needs in a relatively optimal solution.

About the field of tourism industry, the logic is similar. Take the High Line Park in New York as an example. The High Line is a 1.45-mile-long park built in Manhattan based on a disused New York Central Railroad spur called the West Side Line. This is a project started construction from 2006. On the September, 2014, the final phase officially opened. Because of the wonderful innovative planning, elegant design, and the carefully execution, a dying line gradually changed to be a highly alive line. With the opening of the High Line Park, many films and television shows have set sequences there. As a result, the park gets nearly 5 million visitors annually. (Geiger, 2014)
2.3.1 What is creative innovation?

Innovation can be understood as a application of better solutions for new requirements or existing market needs (Maranville, 1992). More specifically, we could find the innovation are playing as the catalyst of growth on the field of business and economics. Entrepreneurs are willing to continuously look for better ways to satisfy their consumer by improving quality, durability, service, and price which come to fruition in innovation with advanced technologies and strategies (Heyne, 2010).

2.3.2 How could we ultimate this design methodology?

There are plenty ways of explanations of innovation design process in general.

In 2001, Koen and other scholars summerised three major activity domains in innovation projects in industry. In the front end part, the future products are defined and decided while in the new product
development part, the products are actually developed (Kristel, 2013). On the whole the ideas or concepts are selected and refined. This is somehow similar to the “Squiggle” model which was created by Damien Newman from Central Office of Design around 2004. The innovation start from chaos end with focus.

Then, what about the detail in innovation generation? Also In that study, Koen develop a model of innovative generation processes. They named it as fuzzy fontend of innovation (Koen, 2001). There are 3 different sections. The relatively uncontrollable influencing factors, the engine that drives the activities of the FEI, and the five activity elements. In the core of the FEI is the “engine” represents
the leadership, culture and business strategy of the organization that drives the five key elements. The 5 activity elements are opportunity identification, opportunity analysis, Idea genesis, Idea selection and concept and technology development. The relatively uncontrollable ‘Influencing Factors’ consist of organizational capabilities, the outside world (like law, government policy, customers, competitors, and political and economic climate) and the enabling sciences (like internal and external) that may be involved. The influencing factors affect the decisions of the two inner parts. This system perfectly explain the process for innovative activities, but did
not show the directions and facts that need to be considered with.

Design thinking seems the way to reveal the facts. It is a human-centered approach to innovation which are widely known all over the world. In the theory, on the process level, inspiration, ideation, and implementation are the 3 key to successful innovation. Inspiration is the problem or opportunity that motivates the search for solutions. Ideation is the process of generating, developing, and testing ideas. Implementation is the path that leads from the project stage into people’s lives. This idea and Koen’s model are include each other. Later, the 3 space has been expanded to phase of design process which are discover, interpretation, ideation, experimentation and evolution.

On the ideation level, it draws from the designer’s toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success (Tim, 2010). Just like IDEO’s working principle, the ideas should be created in consideration of the capabilities of stockholders and the needs of end users. The goal of innovation is to deliver appropriate, actionable, and tangible strategies while the result of innovation is new, innovative avenues for growth that are grounded in business viability and market desirability.
At 2011, IDEO had a project named a design thinking for educators’ toolkit (IDEO, 2011). It proposed the three lights of people-centered concept. They believe, a good user-centered design should consider the lights of needs, feasibility and sustainability. Needs light means the understanding of users demands, feasibility light is the consideration of the technology and implementation and the sustainability light refers to the business model that can be extended as well as the cost control.

2.4 About service design

2.4.1 Why we need service design in smart tourism design?

As mentioned before, many facts would lead to the increase of tourism consumption. This consumption contains not only the objects but also the services. That is because tourism itself is a complex integration of several services. The service could be accommodation, catering, sightseeing, museums visiting and many other entertainment etc. Basically, they are at everywhere in the entire tourism industry. In segments of these domains, experiences would be constructed by customers based on their interpretation of a series of encounters and interactions (Hume et al. 2006).

One negative happening in one segment could cause dissatisfaction, auguring, dissatisfaction and decrease of further consumption. On the opposite side, when most tourism products reach or even beyond the experience expectation from tourists, positive publicity and increase consumption would have more possibilities to happen.

Services is never a tangible or standardized goods that can be
stored. Instead, services are created through interaction between a service provider and a customer. Just like the book “This is service design thinking” written by Schneider and Jakob in 2011, when you have two coffee shops right next to each other, and each sells the exact same coffee at the exact same price, service design is what makes you walk into one and not the other. That’s the magic difference that service design would make.

### 2.4.2 Service design definition

Since 1991 Prof. Dr. Michael Erlhoff introduced service design as a design discipline, many scholars have defined service design in their own ways. This may be because service design is an interdisciplinary approach that combines different methods and tools from various disciplines (Zomerdijk, 2010).

Generally, the definitions come from options of 3 aspects which are characteristics purpose and method. About the characteristics, scholars mainly believe service design is, in contrast to service development, described as a human-centered approach and an outside-in perspective (Yen-Hao, 2012). It is an emerging field focused on the creation of well thought through experiences using a combination of intangible and tangible mediums (The Copenhagen Institute of Interaction Design, 2008). About the purpose, service design could help to innovate (create new) or improve (existing) services to make them more useful, usable, desirable for clients and efficient as well as effective for service providers (Stefan Moritz, 2005). Other scholars described service design in a practical way. Applying service design should develop the environments, tools, and processes that help employees deliver superior service in a way that is proprietary to the brand (CONTINUUM, 2010). Service designers should observe and interpret users’ needs and behaviors and transform them into possible futures service, then express and evaluate in the language of experiences.
2.4.3 Service design principles

Since there is no shared definition of service design, integrating the principles as a guidance seems more valuable and important. In my opinion, the five principles written by Marc Stickdorn in 2011 is relative Intact. The five aspect are user-centred, co-creative, sequencing, evidencing and holistic.

**User-centred**

There are many roles contained in service design. It would be highly possible to misunderstand one another simply because they all have individual backgrounds and experiences. So the one language is so important and this language should be the user-centred thinking. The ability to make use of this language during the development of services is crucial for its later success.
Co-creative

Putting the customer at the center is indeed important, but it would be much more complex than only just one customer. So during a service designing, customers as well as all other stakeholders need to be involved in exploring and defining the service proposition.

Through this co-creation, customers get the chance to add value to a service.

Sequencing

Sequencing is about the rhythm and the order. When the service approaches tourists, it will take a certain period of time. During the time, the rhythm of the service will influence the mood of customers. It cannot be too fast or too flow. In order to optimize that, just like this figure, service design thinking uses this analogy to deconstruct service processes into single touch points and interactions and then combined them and create service moments. Touch point is a quite significant concept at here. It means the interface of user and service related issues. The issue could be provided by service provider as well as the third parties just like the reviews of tourism. In a good service design, the well-designed sequence could achieve the climactic progress of customer’s mood.
Evidencing

This characteristic mainly refers to the visibility of the service that intentionally designed to be inconspicuous. The invisible service, such as housekeeping in hotel, frequently appeared in one service as a component. A tangible evidence like bills, mail, emails, brochures, signs or souvenirs could help user aware of that kind of service. But users are quiet sensitive to service than before, an evidence could be much noisy than before for the users. Service provider need to consider more with the first principle “user-centred” before implements the evidencing.

Holistic.

A reasonable service design is complex system that required the ho-
listic thinking all the time. Designers consider the context on many
levels such as individual touch point level, service sequence level
and service stockholder level. For the individual point level, the
conscious and sub conscious awareness are worth to be noticed.
For the service sequence level, alternative journey maps should to
be coded, analyzed and compared. For the service provider level,
understanding the identity and inherent culture of the provider will
help to promote service mindset.

Some other scholars also have some interesting opinions. Like Chris
Voss mentioned in “Service Design for Experience-Centric Services”,
there are 6 principles in service design:

1. Design from the perspective of the customer journey and its associated
touch points.
2. Conduct sensory design.
3. Require front-line employees to engage with customers.
4. Pay attention to the dramatic structure of events.
5. Manage the presence of fellow customers.
6. Closely couple backstage employees and front stage experiences

Figure 2.17. AT-ONE service design mode
Source: Jakob Schneider, 2014
The discretion may be different from Marc’s conclusion, but the concepts are linking with each other.

### 2.4.4 The AT-ONE service design mode

After knowing the principles, in order to clarify the user-experience focus, an explaining mode is needed. In 2011, Simon Clatworthy proposed the AT-ONE theory.

Each of the letters of AT-ONE refers to a potential source of innovation within the service design process.

Among them, A is for Actors on the service design stage. Different cooperation between different actors will generate divergent value networks which is prevalent in services. It is a key to service success and it hides huge potency. T is what mentioned before, the touch point. Through carefully innovative considering, it could create more value. Service design itself is about choosing the most relevant touch points and designing a consistent customer experience via them. The next letter “o” is about the service offering under the branding. Experiences that produced by service somehow construct the brand. On the other side, understanding the brand DNA will also help to design emotional touch points as well. It will affect each other mutually and circulate accumulation gradually. The “N” refers to needs and desire come from the users. Just like any other types of design, you can never offering without needing. This part is the implementation of user-centred principle. Personas are used as a vehicle for introducing a user perspective. At last but not the least, E is short for Experience, which is the thing that for remembering and recalling. Although it sounds intangible, but experiences are now a valuable differentiator and the main force of experience economy.
2.4.5 Service Design Tool

Customer Journey Map

Customer journey map is a method for service design based on a graph which describes the journey of a user by representing the different touch points. This method details the service interactions and accompanying emotions in a highly accessible manner. CJM is an integration of the service design blueprint and storyboard method, but it more clearly illustrate customers’ processes, needs, and perceptions throughout their relationships with a company, or service (Pete Abilla, 2012).
The first step to construct a customer journey map is defining these touchpoints actors, and silos. After the touchpoints have been got, they can be linked together in a visual representation of the overall experience. Based on the insights, a personalizing map with users’ quotes about the process will be made. This figure is the journey map of Stackbucks. This visualization makes it more possible to compare several experiences in the same visual language.

**System Map**

The system map is a visual description of the service organization. There are different actors and aspects involved such as the flows of materials, energy, information and money through the system. The use of colors, the sizes of the objects and the way in which they are related inside the space of the visualization helps the “reading” of the graph and the understanding of the entire system. The figure is
about the system map Flickr.
In order to finish a system map, first, significant people and both the real and virtual places in service should be founded. Then, start to group them and make connections between each other. Next, move notes around to check if there is any better groupings or connections. At the end, the writer need to make sure the entire system of service is reasonable and explain itself very well.

2.5 Chapter conclusions

In this chapter, we went through the development of smart city and smart tourism. It is obvious that these two advanced concepts are not only planed on the blue prints but also influencing our life while we are not aware. Perhaps in the future, more and more people would get benefit from the smart system construction. However, the emerging industry also exist potential hidden problem such as polity issue, obsolete infrastructure and non-human-centered design.

In order to overcome the disadvantage, we took a view on the process and key elements of innovation and system design. Found out the structure of front end innovation and the facts designers should follow. What’s more, design thinking need to be blended together with the smart industry design.
3. Case Study
After we got a holistic view of smart industry from last chapter, let us take a close look at the smart tourism cases from all of the world.

As I mentioned before, my idealized definitions of smart tourism may include four feature which are:

1. Using information technology act as the core, variety other technologies could be used as supports.
2. Provide a highly efficient, highly precise and highly comfortable travel services and travel experience for visitors.
3. Provide detailed and accurate data for decision-makers.
4. Provide reliable suggestions through data analysis, self-learning and self-judgement.

According to the current development of Smart tourism, Factor 1, 2, 3 should be regard as the basic selection criteria, while the 4th one is counted as the optional standard.

### 3.1 Cases around the world

In currently smart tourism studies, the collection of cases are quite limited. In this paper, the author tries to collect numbers of smart tourism cases. In the table below, 16 projects has been placed.

#### 3.1.1 Smart Tourism Taiwan

Smart Tourism Taiwan (STT) project was started from 2013 operated by Institute for Information Industry (III) of Taiwan and Data Analytics Technology & Applications Research Institute (DATA) (vztaiwan, 2013). This project focus on developing innovation and thoughtful smart tourism services and creating high-quality tourism experience environment. They comprehensively support visitors from began to end. In Taiwan region, tourism resources are limited, so increasing how to enhance the quality of tourism is the key to allow Taiwan’s tourism industry to create higher value.
<table>
<thead>
<tr>
<th>YEAR</th>
<th>REGION</th>
<th>PROJECT</th>
<th>BRIEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2013</td>
<td>Tai Wan</td>
<td>Welcome Phone</td>
</tr>
<tr>
<td>2</td>
<td>2013</td>
<td>Tai Wan</td>
<td>Tai Wan Smart Tour</td>
</tr>
<tr>
<td>3</td>
<td>2013</td>
<td>Hong Kong</td>
<td>IBM Island Shangri-La Smart Hotel</td>
</tr>
<tr>
<td>4</td>
<td>2013</td>
<td>France</td>
<td>Nintendo 3DS Guide: Louvre</td>
</tr>
<tr>
<td>5</td>
<td>2012</td>
<td>India</td>
<td>iTraveller</td>
</tr>
<tr>
<td>6</td>
<td>2012</td>
<td>Brussels</td>
<td>Belgian i-nigma projects</td>
</tr>
<tr>
<td>7</td>
<td>2012</td>
<td>Tai Wan</td>
<td>Yinlan Smart Tourism</td>
</tr>
<tr>
<td>8</td>
<td>2010</td>
<td>Seoul</td>
<td>I Tour Seoul System</td>
</tr>
<tr>
<td>9</td>
<td>2010</td>
<td>Roman</td>
<td>Window of time</td>
</tr>
<tr>
<td>10</td>
<td>2010</td>
<td>Scotland</td>
<td>The Scottish administration of cultural heritage</td>
</tr>
<tr>
<td>11</td>
<td>2009</td>
<td>Anglo-German</td>
<td>Anglo-German smart guides</td>
</tr>
<tr>
<td>12</td>
<td>2008</td>
<td>America</td>
<td>Airbnb</td>
</tr>
<tr>
<td>13</td>
<td>2006</td>
<td>Pennsylvania</td>
<td>Po-cono RFID</td>
</tr>
<tr>
<td>14</td>
<td>2006</td>
<td>Singapore</td>
<td>Smart Country 2015</td>
</tr>
<tr>
<td>15</td>
<td>2006</td>
<td>America</td>
<td>Tripit</td>
</tr>
<tr>
<td>16</td>
<td>2004</td>
<td>America</td>
<td>HomeAway</td>
</tr>
<tr>
<td>17</td>
<td>1998</td>
<td>America</td>
<td>Priceline</td>
</tr>
<tr>
<td>18</td>
<td>2000</td>
<td>America</td>
<td>Tripadvisor</td>
</tr>
<tr>
<td>19</td>
<td>2009</td>
<td>America</td>
<td>Uber</td>
</tr>
<tr>
<td>20</td>
<td>2012</td>
<td>America</td>
<td>Lyft</td>
</tr>
</tbody>
</table>

Table 3.1. Smart tourism Cases around the world
Source: Drawn by author
STT project has mainly implemented three aspects of development.
- Integration of demands and offers
Tourists have demands like preferences and interests. Tourism business offer things with time, location, feature and social relationships. In STT, they try to bridge the information demands and offers to provide interesting, timely and location based service just for individual tourists.
- Optimization information in real time
STT project try to integrate structured and unstructured data both from internal and external in order to manage the passenger demands and popular trend.
- Journey planner
STT selects thousands of tourist attractions, restaurants and other activities in Taiwan and uses advanced analytical system to automatically generate travel plan. Allowing tourists easily get unprecedented personal tours.

3.1.2 IBM Island Shangri-La Smart Hotel

Among the cases above, Island Shangri-La Smart Hotel project is one of the most successful and outstanding one. By taking the use of system integration approach, relying on modern computer technology, integrating the ICT technology, modern control technology and modern architecture, IBM proposed four solutions for smart hotel. They are the concentrated monitor and management system, desktop cloud, wireless self-service check-in and check-out system, and convergence network. (IBM, 2011)

In addition, the hotel also offers a variety of intelligence services to match customers’ needs. These services include floor navigation, interactive television systems, smart phone, IP phone, electronic cat, interactive virtual hotel show, conference management and other advanced features. IBM smart hotel solution try to make a brand new customers experience by optimizing hotel management processes, improving productivity and reducing management costs of hotel operation.
The design of Smart Huanglong Hotel is quite exquisite. Due to the maturity of RFID (radio frequency identification devices), Huanglong Hotel is able to gain more customers’ perception and response. Rooms will automatically set several issues according to customer’s habits, such as adjusting the temperature. In this way it can immediately provide familiar and comfortable space for customers. Interactive TV system and IP phone system can automatically obtain information once the customers has checked-in. For instance, the system will select guests’ mother tongue as the default language, background picture and music can automatically choose the proper one according to the holiday, birthdays and other special occasions; even random services on the hallway, will kindly offers customers’ most familiar and favorite services because relative information has been already transmitted through smart systems to the nearest service’ s PDA; When the doorbell is rings, there is no need for the
guests went to the door, the picture of visitors will automatically jump to the TV screen. Little detail design like these seems bring maximum convenience to the guests’ experience.

An innovation in this “Smart Hotel” system is Smart Phone Solution. Usually, if the guest doesn’t have a local phone, because of the roaming and format limitations, communication problems is difficult and complex to solve. Nevertheless, in each room of Huanglong Hotel, the phone has the features of mobile phone. Guests can use the mobile terminal not only in the hotel but also in Hangzhou or near cities. At the same time of using it, telephone costs will be recorded directly to the guest’s bill which could be easily paid when check-out. Huanglong Hotel solved the worries of global traveler and made it smoother to communication with the outside world.

3.1.3 The emerging of sharing economy in tourism

During the collection of tourism related service, one common similarity was found among certain examples. These services are including Airbnb, Uber, Lyft and TripAdvisor. They are already widely used platforms at present.

Airbnb is one of the first company which carried out the sharing economy. Users could register and create a personal online profile for free and choose to be an owner or a guest. In addition, users could also use mobile app to chart with related persons rapidly. Airbnb also has functions like recommendations, reviews, and ratings to build credible online reputations within the platform. It is also keep developing new functions to help sharing such as wish list and neighborhood. Wish list is a function for friends sharing desire destination that will help to stimulate the travelling desire. Neighborhood is a filter function that helps travelers choose to the ideal neighborhood match their demanding.
Uber is a star application which allows consumers to submit a trip request to Uber drivers who use their own cars as the vehicles. The system is running like a metered taxi system but much smarter. Due to the helping of smart phone, the payment calculation is handled exclusively through Uber according to speed and distance selectively. What’s more, Uber uses algorithm to give “surge” price to driver and user to balance the real time market and enhance the efficiency. This is the point that cannot be reached in the old fashion taxi industry.

There is a proper nouns to desirable such economic type: Sharing Economy, also can be understand as peer to peer economy. In this system, sharing consumption as a phenomenon is a class of economic arrangements in which participants share access to products or services, rather than having individual ownership (Enrique Dans, 2014).

What are the issues that drive the sharing economy? In the discussions of scholars, there are various explanations. I think, the most important reason is the increasing volatility in cost of natural resources. The population of the internet found that setting up the mechanisms to coordinate supply and demand was beyond the reach of most people. So sharing economy will benefit the person who only have limited consumption ability. What’s more, for those people who have better economic condition, under some certain conditions, super premium experience will provided with affordable price. Such as renting castle on Air b&b and taking Tesla as a taxi through Uber. On the opposite side, social credit will significantly influence the status of sharing economy. In developing country like China, the security issue will affect most people’s choices.

In my opinion, sharing economy is an emerging type of service, but it could not replace the elder product-service systems. People indeed need collaborative consumption to decrease the cost of service, but private ownership is also one of the subconscious needs. Especially in China where people care lot about the security, the sharing economy type should be used wisely and flexibly.
3.2 Cases in Mainland China

The reason why I separate the cases in Mainland China from other regions is because of the particular domestic ideology. Compare to foreign countries, especially during last two years, Chinese government started more frequently mentioned smart tourism. Due to this political trending, the domestic smart tourism industry became gradually different from others. In this thesis, I picked several new smart tourist city which are announced in last one year to analysis the situation of current existing smart tourist industry.

Through this table we can find that, in the recent six months, the domestic smart tourism development are still mainly about constructing the basic infrastructures which include the network hardware and basic digital devices. The methods used for achieve smart tourism are mainly considered as mobile applications, websites, and radio frequency technology. According to these facts, we can know that, the developing level of smart tourism in mainland China are widely being in a quiet preliminary phase. Most of the areas even still in the stage of tourism informatization which is the status before smart tourism.

The reasons why this situation are formed are complex. It may be not only about the lack of technical personnel but also about the deviation of political assignment implementation and political achievements pursuit. In the smart tourism eco-system, Chinese politicians act as the dominant power. In this way, their interests and version would largely affect the result of project. In other words, vast smart tourism developments in china are chronically processed from top to button. This system unavoidable limited the generation and implementation of innovation. Even though there would be some prospective smart tourism projects, constraints are still over-load.
<table>
<thead>
<tr>
<th>YEAR</th>
<th>REGION</th>
<th>PROJECT</th>
<th>BRIEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2014</td>
<td>Huizhou, Guangdong</td>
<td>Accessible Travel card pilot cities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Travel credit card terminal with Cloud Computing Center</td>
</tr>
<tr>
<td>2</td>
<td>2014</td>
<td>Sichuang</td>
<td>G5 National Highway</td>
</tr>
<tr>
<td>3</td>
<td>2014</td>
<td>Mianyang, Sichuang</td>
<td>Mianyang Smart Tourism</td>
</tr>
<tr>
<td>4</td>
<td>2014</td>
<td>Nanchong, Sichuang</td>
<td>Yilong City, Linglang Region Platform</td>
</tr>
<tr>
<td>5</td>
<td>2014</td>
<td>Shandan, Gansu</td>
<td>Shan Dan Smart Tourism Platform</td>
</tr>
<tr>
<td>6</td>
<td>2014</td>
<td>Jinan, Shandong</td>
<td>Smart Tourism</td>
</tr>
<tr>
<td>7</td>
<td>2014</td>
<td>Guilin, Shanxi</td>
<td>Guilin Smart Tourism</td>
</tr>
<tr>
<td>8</td>
<td>2014</td>
<td>Zhengzhou, Henan</td>
<td>Zhengzhou Smart Tourism</td>
</tr>
<tr>
<td>9</td>
<td>2014</td>
<td>Qingdao, Shandong</td>
<td>Qingdao Economic and Technological Development Zone Construction start smart tourism</td>
</tr>
<tr>
<td>10</td>
<td>2014</td>
<td>Kaifeng, Henan</td>
<td>Kaifeng Smart Tourism</td>
</tr>
<tr>
<td>11</td>
<td>2014</td>
<td>Qinghuang Island, Hebei</td>
<td>Qinghuang Island, Smart Tourism</td>
</tr>
<tr>
<td>12</td>
<td>2014</td>
<td>Huangshan, Anhui</td>
<td>Smart Huangshan</td>
</tr>
<tr>
<td>13</td>
<td>2014</td>
<td>Shanghai</td>
<td>iTrolls</td>
</tr>
<tr>
<td>14</td>
<td>2014</td>
<td>Nanjing, Jiangsu</td>
<td>Nanjing Smart Tourism</td>
</tr>
<tr>
<td>15</td>
<td>2014</td>
<td>Suzhou, Jiangsu</td>
<td>&quot;one-cloud multi-screen&quot; tourism public information platform</td>
</tr>
</tbody>
</table>

Table 3.2. Smart tourism Cases in mainland China  
Source: Drawn by author
3.2.1 WeChat smart tourism port

In 2014, which is the smart tourism year in China. WeChat has launched the smart tourism technical port for scenic spots. WeChat is the Instant Messaging App developed by Tencent. As of August 2014, WeChat has 438 million active users with 70 million outside of China (Tencent, 2014). For most people from cities, the WeChat is one of their most necessary apps. By providing tickets, admissions, parks tour guidance and other tourism aspects for tourists with WeChat, it will enhance the entertainment experience for scenic, reduce operating costs and increase operational methods and help scenic industrial upgrade.

Let’s take smart tour guidance as an example.

### Smart tour plan providing

<table>
<thead>
<tr>
<th>Pain point in tourism industry</th>
<th>Solution by WeChat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ticket selling pressure of Popular attractions</td>
<td>WeChat online tickets booking, without waiting</td>
</tr>
<tr>
<td>High costs of tourists management</td>
<td>QR code with WeChat</td>
</tr>
<tr>
<td>High costs of traditional online ticketing promotion and management. Mainly based online travel agency channels</td>
<td>Complete self-operating channels, reduce operation costs and risk</td>
</tr>
<tr>
<td>Tourist information could not be collected</td>
<td>Knowing tourist information, holding tourists communication channels</td>
</tr>
</tbody>
</table>

Table 3.3. Wechat’s solutions to the pain points in tourism industry.
Source: weixin.qq.com

According to the type of tourists’ tickets and the amount of tourists, the cloud provide proper plans for the personal tour. For example, if people purchase two adult tickets, cloud will push route plan for lovers; if one ticket is adult and another is child, then the parent-child would be possibly advanced; if the tourist purchases the senior ticket, the leisure route could be introduced to them.
Map guidance and location based services system

The scenic spot map can be equipped lively on the mobile. The data about shops, bus stations, and other value-added services (the selections in the tab area) within the area can be rendered on the map. Through WeChat location API, tourists can gain their location information and get details about the services and distance which is the reference to navigate them.

Besides grabbing information with eyes, scenic spot could make self-help audio guidance for each attractions. After arriving the attractions, the tourist could tell WeChat the attraction’s name, then he could get the official phonetic explaining.

Other entertainment items.

With WeChat platform, basic travelling experience can be improved. What’s more, other entertainment items could be developed by scenic spots. This is a more exciting opportunity. For example, scenic spot could purchase a third-party WeChat photo printer and put it into some popular area to provide printing services tourist. These photos can record a sound, text, address and other information, it can be printed as a tourist souvenir or a gift to friends.
Smart tourism is far more than unilaterally provide convenience to tourists. In the smart tourism stagey of WeChat, they offer several suggestions for how to us WeChat plant form to help marketing and managing aspects.

**Suggestion I: Group Sharing Activity**

Steps:
1. Potential visitor initiate a convene plan
2. Send massage to friends or group to recruit partner
3. get discount once it has certain number of people

This proposal utilize the power of acquaintance sharing and the clustering peculiarity of tourism. It pulls the potential tourists and their friends together, encourages them to plan the trip on their own initiative and give some group discounts to them in return.

**Suggestion II: Group Sharing Activity**

Steps:
1. Visitor buy a ticket
2, Join a random lottery, get a restaurant or attraction coupons
3, Visitor consume coupons, achieve cross-marketing
This proposal utilize random lottery to encourage the purchasing of attraction tickets, and the prize could be coupons to increasing other service selling.

3.1.2 Alibaba Group

In 2014, Hainan international tourism island and Alibaba Group have signed a strategic cooperation. As a strategic partner, Alibaba Group will regard Hainan as a pilot implementation area of Smart City and built this future city as a prototype. (Fu Zekang, 2014) Ma believe that, within few years, the eating, lodging and travelling in Hainan could be covered just with one cellphone.

The measures include four major areas

1. Alibaba build cultural and creative center.

Alibaba digital entertainment and gaming industry headquarters will be located in the test area, providing domestic and foreign out-
standing cultural creativity, performing arts, exhibition and trade platform to create high-quality cultural and creative Ali gathering area.

2. **Smart Harbour**

Construction of China’s first Internet-based digital city equipe with cloud computing and big data service smart Harbour. Through the unified planning, construction and implementation of government, livelihood, business and other types of data services to improve the city’s operations and service levels, promote industrial upgrading, improve service quality.

3. **Chinese entrepreneurs’ smart warehouse**

Relying on the area’s natural regional advantages, constructing the entrepreneur winter studio to provide entrepreneurs’ smart warehouse.

4. **Taobao University Hainan Branch**

Constructing Taobao University Hainan branch to cultivate e-commerce-related innovative talents who could support the Internet economy.

Ma Yun suggested that in the next five years, human society will changed from the information technology (IT, Information Technology) age to the detection technology (DT, Detection Technology) age. In other words, information transmission is no longer the focus. How to get the right information and analyze it is more important. Alibaba cloud platform is the foreshadowing of this trend. *(Chinanews, 2014)*

Ma also said the purpose of selling goods is to obtain the data which can provide better macro and micro decisions for the country. Through the operation of the test area, consumers’ behavior data
will help to establish a strong platform which will support basic smart tourism, making cities “smart” up.

### 3.1.3 Conclusion

In China, the phenomenon of government craving for greatness and success is still prevalent. Sometimes, local governments wish to develop smart tourism beyond enhancing basic tourist experiences such as services, dietetic hygiene, and information display. On the other hand, some Chinese cities are still in the phase of constructing smart infrastructures, like Wi-Fi and big data clouds, while others are not at that stage. Therefore, governments should focus on these fields with the most available material and financial resources instead of pursuing ambitious projects. However, sometimes, smart solutions can be easier and cheaper as long as decision-makers understand tourists well. For example, if tickets can be paid through QR codes using Ali Pay or WeChat Pay, governments can save on human costs, and tourists will not need to join long queues. One thing to note is that tourists will hardly visit a scenic spot just because of the smart service system.

### 3.3 Chapter Conclusions

#### 3.3.1 The trend of smart tourism implementation

As I mentioned before, on this stage of smart tourism, the Chinese government is still used to the top-down working style. The power of companies is largely limited. On the other hand, the reflections from tourists hardly affect the smart tourism construction. Pessimistically speaking, this is not a smart status and the industry mod-
el is still in a junior level. However, with the increasing awareness and progressing technology of smart industry, this situation will be improved. They operation model would gradually change to the button-up model to stimulate industry innovation. In this process, the duty of designers is to find the balance between optimizing the traveling experience and maximizing the benefits of organic combination. Designers should always keep this in mind to clarify their position.

In foreign counties, large technology vendors and marketing agency are the institutions which mention smart tourism most frequently. In mainland China, smart tourism concept has been abused by low-tech enterprise. This is because of national industrial chronic cheapness: we have been accustomed to connecting industry with cheapness for a long time. On the Smart of tourism issues, the completeness and innovation determine its vitality. Therefore, cheap travel service providers are mean to fail in the vicious spiral. The higher quality of Smart tourism development is one of the future trends.

Smart tourism is still relatively IT-based industry. It may looks similar, but in fact, the development space of tourism is very broad and it can cover a lot of technology. On the other hand, the existing tourism products are often regarded as good concept with poor experience. It is because the lack of people-oriented awareness. In the future, the smart tourism is going to be equipped with diversified technology and humanized experience.
4. Discussions
4.1 About Smart tourism

4.1.1 The traits of future smart tourism

Before the emergence of smart phones, we cannot imagine current travel life. What’s more, online navigation makes free exercise much easier, mobile payments can allow the tourists purchasing any tourism products wherever they go and 4G networks decrease the distance between user and information to zero. Consequentially, mobile Internet subvert the traditional business model and using scenarios, Tourisms’ habits have undergone a fundamental change (Phoenix Tourism, 2015). That is the power when technology meet the general needs.

What would lead the next appearance of subversion? The transition of using scenarios might be the shifting from using mobile phone to
any tiny pieces of smart device which can be easily carried with. It is called wearable device. A number of technology companies have launched smart watches and smart bracelet and Google’s exploration on smart glasses are widely knew. In this area, it would possibility be more abundant.

4.2 The method

4.1.2 Innovation model for smart tourism design

![Diagram of demands analysis process]

Figure 4.2. Demands analysis process
Source: Drawn by author

During the tourism designing, designers and related industries workers will often flightily design the project based on available re-
sources nearby. But in fact, life generates demands, demands guide the design, and design finally could change life. Therefore, a good design method is one of the essential factors for completing the design mission.

In this study, based on the current trend of Chinese Smart Tourism situation and characteristic, I will integrate various research concepts to redefine a new innovative design approach model for smart tourism product design. This model will contains four main elements.

Like the figure above, the elements are innovation, technology, business and needs. Needs means the demanding of the end user, it come from the research and analysis; Innovation is the degree of how creative is this design and how this innovation fit to the current situation; Technology refers to the techs which are being used in the design. Business aspect contains more than the surface meaning. It is the operation process which includes investors (entrepreneurs) and supporters (government). The design could be implement smoothly only if coordinated the benefits of stakeholders. These elements affect, interact and restrict with each other. By superimposing demand and technology domains, we can get a potential solution area. Among them, we can find the most valuable design range by considering the innovative level. On this basis, through the analysis of the business model, we can see the most feasible and most effective solution.

This design method contains different direction which decide the output style. They are conservative-radical, human-technical, practical-theoretical and radical-conservative. For instance, needs and innovation are quite emotional while the technology and business are relatively rational.

Designers, especially the majority of Chinese designers are lack of the technical and business thinking. Meanwhile, government and business decision-makers more focus on the business model or technology domain instead of needs and innovation. Great creative
design should balance these element. Through the organic combination of these directions, lively and valuable design will have the opportunity to be carried out.

Based on the above concept and model, the four steps in this thesis research are:

- **Demands analysis**

  The research about the needs will based on 3 analyses. First, through interviews with a certain amount, roughly sketch out the outline of travel process, then grab some impact factors. Based on these factors, using quantitative data analysis to determine the research focus. Finally, using locally based in-depth interviews to summarize the detail problems.

  The existing demands the subjective information based on the past data, therefore, it’s not enough to explain the future trends and opportunities. On the other hand, user demands could also be created which means a considerable number of design opportunities may hidden in the objective facts. So, digging the implicit demand is also one big part of designers’ concern. Based on existing information, build a persona to make reasonable speculation and anticipation is now a commonly used methods to draw implicit demand.

- **Innovation analysis**

  Comprehensive the discussions in the second chapter on innovation, I will evaluate the smart tourism product innovation on five domains which are model, technology, products category, experience and users.

  Mode means products’ macro vision and the system mode. Technology refers to the methods of designing and manufacturing. Product category refers to whether there is an established product types on
the market or not. It also includes aspects of product design and innovation. It’s the interpretation of the design oriented innovation. Another key aspect of tourism product design is the experience, that’s also the reason why we need smart products. User is the ultimate recipient of the product, a smart tourism product, whether attracted the new users or not, is also an important reference standard.

As time goes on, innovation presents as a slow dynamic form. So when considering the design, designers should take into account the change in the degree of innovation. Such considerations are meaning to promote the product performance in the future market and give a chance to make the product has a further developing opportunities.

This model, in fact, is fitter for designers and decision makers to compare and rethink innovations level of several current designs. This would have a positive impact on the project.

• **Technical analysis**

According to the design result, relative technology mature level need to be researched in order to be picked reasonably. On the other hand, smart tourism was born with ICT technology. Therefore, the technical analysis would base on that.

• **Time and economic costs analysis**

After a comprehensive comparison of the optimum product concept, next step is to consider further in their model. Using business model concept could have a holistic view on stakeholder analysis.
5. Case Analysis
5.1 Geographical characteristics analysis

Smart tourism design is a design field that have a very significant connections with the regions. This is also named place-oriented design. Different design base will have quite different features. This particularity will obviously and largely influence the demand studies, technical research and analysis on the business model. There are many facts included in geographical characteristics. It could be the area’s attractions resources, municipal resources, size of cities, population density, a local culture and customs.

To some extent this trait also have multi levels. It may be macro-territorial either partial territorial. For example, differences may be caused by different cities such as Shanghai and Beijing. It may also be also be caused by different of Shanghai Bund and Shanghai people’s Square.

This case involved Changzhou River area, east to Qingchi Avenue, west to Fuyang Avenue, north to Bohai Road, south to the Haihe Road. The total area of base is about 14.94 square kilometers (11642 acres). The base located in the center of Cangzhou old town area. Adequate urban traffic resources are equipped in this area. The location advantage is obvious.

I joined the group on the phase of overall program. Responsible for the conceptualization of smart tourism development and design and also part of urban design general concepts.

The overall planning of Canal District in Cangzhou is to build ultra-5A class tourist attractions, revive the culture of Cangzhou Canal and create charming urban culture, urban ecological Landscape and innovative industry cluster demonstration zone. By donging these, Canal district in Cangzhou would become the image and the creative engine of Canal old town.
Figure 5.1. Geographical Analysis of Cangzhou City
Source: Drawn by author

Figure 5.2. Site Information of Cangzhou canal
Source: Drawn by author
5.2 Regional characteristics summary

5.2.1 Ancient canal cultural resources

Cangzhou ancient Beijing-Hangzhou Grand Canal has been accompanied for two thousand years. Revealing canal cultural and activating canal intangible cultural heritage are the top 2 priority in Cangzhou new urbanization plan. Cangzhou ancient canal integrated Confucian cultural center, salt transport hub, grain transportation center, north canal remediation center, commercial center and logistics center in one. It has a very high utility value.

On today’s Canal, you cannot find the passing sail scull, bustling marina, bustling markets and towering towers anymore. Instead, crowded and mediocre buildings are surrounded by declining river. However, the general shape of ancient canal is still faintly discernible; the banks are still green and pleasant; the old lanes which are full of historical legends are still filled with rich ancient rhyme.

5.2.2 The resource of lion city

Figure 5.3. Cangzhou iron lion
Hebei has three treasures: Cangzhou Lion, Dingzhou Tower and Zhaozhou Bridge. Cangzhou Iron Lion, also knew as “Zhenghai roar”, has stand on the canal side for millennium years. It not only brought Cangzhou the “Lion City” reputation, but also give the seven million Cangzhou residences a spiritual sustenance.

### 5.2.3 Historical heritage zone

On the other hand, due to the man-made and natural destruction, Cangzhou canal are lack of outstanding existing historical and cultural attractions, heritage and relics. There are only few sporadic and historical sites and cultural points scattering in the planning area. They have relatively low relationships with the ancient canal city value. But as a historical and cultural plaques, could using

---

**Figure 5.4. Historical heritage zone around Cangzhou canal**

Source: Drawn by author
planning and design approaches such as cultural scene searching for underground the historical context to reproduce the history of Cangzhou in front of tourists and citizens. Because the distance of scattered locations are beyond the general scope of pedestrians, there is a need to utilize some means to Line them up.

5.2.4 Canal renovation: green corridor

Here would be a place for traveler to meet a “public happiness shore”. The bank of the green ecological should give the health and happiness and bring rich life experience to the residents. According to the present and planning road network, the canal greenbelt would be allowed to extend to the city with a green venation. Overall, Cangzhou Canal Zone has a rich cultural legacy. There would be many opportunities and sources can be developed. However, at present, there is no exiting system to attract tourists’ attractions that also lead to the lack of driving force. Settled smart tourism products should bring new fluent experience.

5.2.5 Demand Study

In 2012, there is a “Chinese leisure travel customer demand trends research report” mentioned that the current trends in leisure travel is mainly reflected in four aspects, which are significant economical characteristics economic, industry upgrading, city’s comprehensive network of support services and increasingly travel services.

Shao Qiwei who are from China Tourism Administration said, in 2013, Chinese domestic tourists reached 3.25 billion; Chinese Tourism Investment has a rapid growth. According to incomplete statistics, the country’s tourism direct investment reached 514.4 billion yuan with an increase of 26.6%. Leisure, cultural tourism, rural tourism, marine tourism, online travel has become a new bright spot of tourism investment.
Figure 5.5. Cangzhou Canal
Source: Drawn by author
<table>
<thead>
<tr>
<th>Main Process</th>
<th>Steps</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Desire rise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Get Info</td>
<td>TV, Internet, paper and other media; Referral</td>
</tr>
<tr>
<td></td>
<td>Touch Desire</td>
<td>Fits your preference, there are very attractive to own special event</td>
</tr>
<tr>
<td></td>
<td>Meticulous inquiry</td>
<td>For more information to determine the willingness to go</td>
</tr>
<tr>
<td></td>
<td>The possibility envisioned</td>
<td>Is there enough money and time to go</td>
</tr>
<tr>
<td></td>
<td>I decided to go</td>
<td>Travel willingness to reach</td>
</tr>
<tr>
<td></td>
<td>Planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plan Your Trip</td>
<td>Confirmation time can arrange to get through</td>
</tr>
<tr>
<td></td>
<td>Advisory opinion</td>
<td>Ask friends, or local people advice</td>
</tr>
<tr>
<td></td>
<td>Buy tickets</td>
<td>According to the length of time, departure and arrival location determination buy tickets or tickets</td>
</tr>
<tr>
<td></td>
<td>Book accommodation</td>
<td>Compare prices and area determination Accommodation</td>
</tr>
<tr>
<td></td>
<td>Looking for travel companions</td>
<td>Arrange in advance and no companion</td>
</tr>
<tr>
<td></td>
<td>Go to the destinations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To the station</td>
<td>Departure station, how to get, aside long time, the car place, departure time</td>
</tr>
<tr>
<td></td>
<td>Public transport</td>
<td>When traveling long ride experience, Time</td>
</tr>
<tr>
<td></td>
<td>Car to</td>
<td>Find routes, parking, gas stations, understand road conditions</td>
</tr>
<tr>
<td></td>
<td>Arrival</td>
<td>Service upon arrival</td>
</tr>
<tr>
<td></td>
<td>Moving in tourism</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The planned route</td>
<td>Plan to get there, look for travel sites</td>
</tr>
<tr>
<td></td>
<td>Understanding traffic information</td>
<td>Familiar city map, information on public transport trips and species</td>
</tr>
<tr>
<td></td>
<td>By public transport</td>
<td>Buy transport tickets, buses, taxis, boats</td>
</tr>
<tr>
<td></td>
<td>Rental Vehicle</td>
<td>Rent a car, rent a bike</td>
</tr>
<tr>
<td></td>
<td>Ask</td>
<td>Asking residents, businesses, police road how to go</td>
</tr>
<tr>
<td></td>
<td>Walk</td>
<td>Whether you have convenience</td>
</tr>
<tr>
<td></td>
<td>Instant Record</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Photograph</td>
<td>Shoot scenery, photo shoot, shoot food</td>
</tr>
<tr>
<td></td>
<td>Recording</td>
<td>Record travel segment</td>
</tr>
<tr>
<td></td>
<td>Spending record</td>
<td>Note Travel expenses</td>
</tr>
<tr>
<td></td>
<td>More ways</td>
<td>Such as micro-video</td>
</tr>
<tr>
<td></td>
<td>Instant Share</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mobile Share</td>
<td>Micro-channel, microblogging, social networking and sharing, and reply, interaction</td>
</tr>
<tr>
<td></td>
<td>Calling</td>
<td>And relatives phone calls, video calls</td>
</tr>
<tr>
<td></td>
<td>Other ways of sharing</td>
<td>Such as a postcard</td>
</tr>
<tr>
<td></td>
<td>Attractions play</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Into the area</td>
<td>Buy tickets, acceptance Tickets</td>
</tr>
<tr>
<td></td>
<td>Arrangement attractions play</td>
<td>How to play resort plan</td>
</tr>
<tr>
<td></td>
<td>Listen to explanations</td>
<td>Listen to commentary to explain, or explain Edition Description</td>
</tr>
<tr>
<td></td>
<td>Experience attractions</td>
<td>Different play items</td>
</tr>
<tr>
<td></td>
<td>Buy souvenirs</td>
<td>Shop for souvenirs in the spots</td>
</tr>
<tr>
<td></td>
<td>Catering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Understanding Features</td>
<td>What food is delicious investigation</td>
</tr>
<tr>
<td></td>
<td>Select a Hotel</td>
<td>Which hotel is better investigation, or by going to</td>
</tr>
<tr>
<td></td>
<td>Reserve a seat</td>
<td>Book in advance to avoid waiting</td>
</tr>
<tr>
<td></td>
<td>Order</td>
<td>Selection Process dishes</td>
</tr>
<tr>
<td></td>
<td>Eating experience</td>
<td>During the meeting of the whole process</td>
</tr>
<tr>
<td></td>
<td>Accommodation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Find a hotel</td>
<td>OK Location, select hotel</td>
</tr>
<tr>
<td></td>
<td>Check-in</td>
<td>Check-in process</td>
</tr>
</tbody>
</table>

STUDY ON INNOVATIVE DESIGN OF CHINESE SMART TOURISM PRODUCTS
<table>
<thead>
<tr>
<th>Hotel Service</th>
<th>Including morning wake up, laundry, meals and other services called</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stay</td>
<td>Accommodation during the whole experience, including sleeping, bathing</td>
</tr>
<tr>
<td>Hotel Meals</td>
<td>Hotel provides meals</td>
</tr>
<tr>
<td>Registration Check out</td>
<td>Check out the process</td>
</tr>
<tr>
<td>Luggage transfer</td>
<td>Luggage transport and tourism during storage</td>
</tr>
</tbody>
</table>

| Shopping     | Daily necessities of life, phone cards, drinks                 |
| Local specialty | To some special places to buy goods                           |
| Shopping     | Commercial shopping center                                    |

| Special play | Event city specific time                                       |
| City Features | City Features lifestyle and life experience                    |
| Entertainment | Area entertainment relax.                                     |
| Find friends | Find friends to play                                           |
| Other        | Depending on the circumstances, there may be other tourism projects |

| Impromptu play | No arrangement to explore the streets                         |
| Explore business | Do not arrange to try different businesses                    |
| Other          | Other impromptu casual tourism                                |

| Record After Travelling | Classify and organize the photo |
| Travel log             | Write a travel record          |
| Spending record        | Travel expenses summary        |
| Other                  | Collating Tickets              |

| Sharing After Travelling | Upload Social Network          |
| The line sharing        | Talk with friends, being friends were asked to look at photographs friend |
| Memorial gifts          | The souvenirs to friends and relatives |

| Reviewing after travelling | Back to business advice, thanks, criticism |
| Feedback to the Government | Feedback to the government advice, thanks, criticism |
| Respondents Phone        | Government or business telephone call visits                |

| Others | Rain, cloudy |
| Emergency situations       | Crowd congestion                                       |
| Service Unavailable        | Rest day, venue decoration                              |
| Security Event             | Theft, robbery                                          |
| Physical condition         | Cold, fever, falls                                      |

Table 5.1. Domestic tourism steps general information
Source: Drawn by author
Based on that report, I also made a research based on Cangzhou City. Normally, 8 random in-depth interviews will cover 90% of users problems encountered in the field in particular. On this stage, I selected seven volunteers from tourists in Cangzhou. Half of them are men and others are women. Their occupations are also not the same. The main purpose of this visit is using the cluster analysis method to outline the general flow of domestic tourism, and then summarize the factors which may affect travel experience as raw material for further analysis.

According to the interview outline, I got answers and roughly summarize the general domestic tourism steps of Chinese tourists. Details are shown in the table. Elements it contains completely describe the tourist behavior. Finally, I select out the most important travel factors.

**Desire rise**

This refers to the process that a person changed from knowing nothing about tourist destination to having the ideas to go there. This person may get tourist information from different channels. Then realize himself is quite in to the destination. This step initiated the tourism behavior. It is a significant step.

**Planning**

After determining the idea that he wants to go travel there, there would be lots of things to do before really set foot. Including purchasing of airline tickets, booking accommodations and etc. The degree of difficulty of this process will directly affect the mood of tourists and travel experience.

**Go to the Destination**

This is the entire process from departure to arrival. It consists tourists experience on a vehicles.
Moving in tourism

Refers to the moving of tourists in destination area. Including taking bus, taking a cab, renting a bike, walking and etc. When tourists arrived in a new environment for the first time, they are totally unfamiliar with the surroundings and may not understand the local characteristics. Therefore, it has become a major problem.
Play in the attractions

It contains series of tourists’ behavior after reaching an attraction area. Ordinary tourists will consume a big part of their time in this step.

Catering

Food is the part that every traveler will be urgently needed. Also because of the unfamiliar with local Info. This process can be tricky, which means it is difficult choices a proper one in a short time.

Accommodation

Just like eating, it is an integral part in tourism. Also it is one of the aspects that tourists concerned most. During the trip, tourists are easily feel tried, so this kind people normally have a high requirements for accommodation.

Special projects play

During the interview, it is not difficult to find that travelling events are not just simply about attractions, catering and accommodation. There are many Featured Activity. Because of the significant differences between each activities, these special items need to have a

Impromptu play

Some tourists will not arrange the travelling very tight in advance. They would like to explore the destination rather than just following the plan. Improvised playing is an important part of their tourism.
Travel Trifles

When traveling, it is a temporary living experience in another city. So besides playing, there are many trifles such as a camera phone charging, remote communications, and emergency medical and etc.

Sharing in travelling

More and more tourists would like to share travel experiences during travelling. It has become an indispensable part of modern tourism.

Sharing after travelling

After the end of the tour, tourists will share tourism information to friends and net friends via writing travelling review or uploading photos. This is not only a process of recording but also stimulating intention from others to generate more tourism activities.

In these experience, there are controllable and uncontrollable experience. Controllable ones are like the attractions and other certain travelling events ore place. Whoever come to this area, the experience would be similar. Uncontrollable ones are much more than the former one. Such as weather, meal, accommodation and etc. could be different in a random environment. The designers and leaders of smart tourism project need to largely reduce the uncontrollable situations and replace them with nice designed controllable solutions.

During the interview, I also asked questions about tourism values. The values are mainly focused on the following points: preferring experience local things, expect to have more free travelling style, expecting having different travel experience with others and hope to be more close to nature.

In order to verify the results summarized from above interviews more accurately, evaluate the needs of tourists and prepare the
Figure 5.7. Domestic tourism journey map

Source: Drawn by author
groundwork for analyzing. I made a quantitative type of research again.

This investigation leads to several conclusions. 3 main reasons of travelling are famous attractions, seeing tourist information and looking for leisure holiday. The travel companions are more likely to be friends and family-member. Daily personal costs focus on 200 to
In the questionnaire, respondents were asked about which existing tourism factors they valued most, the results are as follows:

Through data analysis, we can find that, among the data, the problems more focus on the moving travel, accommodation, recording in travelling and emergency situations. These are the facts that more important element for the tourists.

The difference between the importance and convenience is just a reference to the designer. And it is also an evaluation of needs. I would like to express needs with the two parameters, importance and convenience. In very system calculation, I can find the coordinate of tourism moving, accommodations, emergencies and record-

Figure 5.10. Cangzhou arboretum, Cangzhou Wen Temple, Cangzhou Canal plaza
Source: Drawn by author
**Name: Wang Yan**
Location: Tianjin
Occupation: The civil servant, working for 3 years
Friends of the trip: boyfriend
Tourism Hobbies: like visiting some local unique things, like the natural scenery and cultural things with a sense of history, and sometimes would like to see the pear flowers and tulips. Taking photo near the canal
Tourism attitude: tourism is a relaxed, but also a learning; good travel experience is important
Tourism Day Average cost: 350 yuan / person / day

**Name: Zhao Cheng**
Location: Qingxian
Occupation: The fruit, 6 years
Friends of the trip: Family
Tourism Hobbies: like to play with my family in the city, shopping, take a walk in the park, like the city’s entertainment.
Tourism attitude: come to Cangzhou because it is convenience to reach and it has good urban resources; tourism price is very important
Tourism Day Average cost: 100 to 200 yuan / person / day

Figure 5.11. Tourists Personas
Source: Drawn by author
ing in travelling are respectively (8.89, 10) (9.44, 9.23) (6.67, 8.46) (10, 6.15). Among them, the travel moving and recording are close while accommodation and emergency situations are far away to each other. In the next study, I will choose the moving consideration as the main target.

5.4 Discussion

In this section, there is an in-depth interviews with the tourists in
Cangzhou. After that, I would summarize the personas based on different scenarios. Building the persona, is a method to detect the potential needs which they didn’t speak out. Donald Norman mentioned this in his book “The Design of Everyday Things”.

After I got the tourism factors analysis, I went to Cangzhou again to do the fieldwork. I visited the local attractions Botanical Garden, Cangzhou Confucian Temple Cangzhou Canal and Nanhu Park. In these places, I distributed the questionnaire to the tourists. After inquiring, I found that tourists form other cities are relatively less than the citizens. It means Cangzhou’s tourism recourses are not that attractive. The reason why tourists come to Cangzhou is mainly because of a good air condition and beautiful natural scenic such as the flower of pear. When talk about Cangzhou tourism problem, many tourists indicated that there is only little Wi-Fi hotspots in Cangzhou; and they do not know which scenic is good to go. When asked about witch projects on canal will you are most interested in, many people said that they are willing to see the green corridors and ride bike along the bank.

By using the interview materials, I established the persona. The character models will assist to find the potential pain points. As shown above, the personas are divided into two types, one has higher consumption ability and she come from bigger city such as Tianjin while another has consumption ability and comes from towns near Cangzhou.

I would like to summarize some significant pain points in the following table. With these pain points, combined with the personas, we can look for valuable opportunities in advance to prepare for the next design steps.
6. Smart Tourism Products Design
Like I mentioned in chapter 5, the main features of Canal District planning of Cangzhou are the ancient canal cultural resources, the Lion City cultural resources, historical sites and the new canal with green corridor. Based on that, more detail design need to be considered. The purpose of the design including following aspects.

1. Solve the problems about travel inconvenience which caused by unaware of local conditions. These problems contains issues such as understanding of traffic information, planning route, taking public transport;
2. Optimizing existing tourists travel experience;
3. Enhance the content of Cangzhou cultural heritage tourism concept;
4. Cangzhou attractions are scattered, the plan should lining them up;
5. Provide support for the new urban plan
6. Provide more practical and low cost project to fit the low-level tourism expenditure around Cangzhou;
7. Adapting to the situation that the city is lack of intelligent infrastructure;
8. Providing accurate travel data Cangzhou City

6.1 Concept Development

According to chapter 5, I choose the concept of mobile phones external devices to develop with. Stockholders could start this project with less cost and funding. It is more suitable for the early stage of smart tourism.

With the continuous development of mobile devices, more and more tourists are demanding a high quality of mobile internet. On the other hand, users are gradually tired of constantly slow speed of travel information downloading. The widely use mobile expose problem that the terminal infrastructure in the city is still not enough.
The external card is a combination of multiple functions for smart tourism. It will combine the Wi-Fi signal, transportation cards and scenic spots tickets together. Directly transmission the travel information to tourists’ terminal equipment and city cloud. It largely save the costs and enhance the dissemination of the design. It can also be a relatively cheap and helpful for tourists to solve a variety of small problems around the city tourism.

In selling point like kiosks, train station or post office, the app of the product can be installed directly on the device. And the city tourism cloud which the account connect to will save the user’s travel records, eventually allowed to become a tourist in a collection instead of a tool.

6.2 Functional Module

6.2.1 General System issues

a) Solution of mobile internet

At present, tourists has relatedly high demand on mobile internet. And what tourists do with the internet are mainly about searching the tourism and consumer information or sharing the travel moments to friends. Either of them will bring benefit and more opportunities to stockholders such as enterprise and government. One of the idea of this design is to provide 4G network or mobile internet discount supported by local mobile operators. Besides, government need to collect the account and password of public Wi-Fi hot pot in the city and put the data into city cloud. On the back card device, there would be a QR code which could lead to the connection of the discount and hot-pot. Thus, tourists will get biggest convenience about mobile internet during the city tour.
Figure 6.1. System design of the Concepts
Source: Drawn by author
b) Solution of cell phone calling

The high price of long distance calling is one of the problems for tourism in Cangzhou. Some tourists do not want to use the long distance call neither buy phone cards. Like mentioned in the last part, a discount deal from local mobile operator would be contained in the service. This service could also include the long distance calling discount package or coupon. It may not counted as a strong demanding, but it would encourage the user to use this device.

c) E-wallet

This is a preloaded E-wallet and the money can be refunded through sailing store or the internet. In the E-wallet system, it can act as the transportation card, the attraction Tickets or even shopping card. For a new visitor, it would be harder to figure out how to buy the
ticket and buy them separately especially for a rapid travelling. It would be much easier for tourist to keep using one thing for paying basic and tiny consumption. Furthermore, the record of purchase could export a report about the entire travelling payments to help tourists manage and review the costs. To encourage the tourists to use the card, some special discount and special gift can only be purchased through the card.

d) City Tourism Cloud

The City Tourism Cloud stores large amount relevant information about Cangzhou. These data include information on attractions, maps, events and etc. It will smartly updated when it is needed. When tourists arrive somewhere, the information of this interests could be queried. Built-in map could also be used even though there is no internet.

Figure 6.3. The rendering of the card 2
Source: Drawn by author
e) Trip recording

One significant point is that this system also collects and learns user’s behavior, with the permission of the user. During the trip, by using the card for paying and entering attractions or any other equipped places, travel data such as time, location, consumer expense and etc. are collected. By gathering these information, it can provide local tourist information and real time feedback to tourism managers with almost no cost. Second, it can help the user collect data for travelling review. When the tourist leveling Cang Zhou, he can print out the tourism review sheet at certain points like bus, train terminal as a souvenir. Of course, he can also check the information on the web.

f) Smart adjusting system

Gathering data is just a very early step in smart tourism system. The data of tourism gathered by city cloud provides a base for smart analysis which is the next step of smart tourism. But it’s not the purpose. In the end, the system need to adjust the behavior of tourists and city itself. For instance, there would be a flexible bonus system. In order to lead the stream of tourism to the place which is less noticed, certain discount coupons will appear at the exact place in the app. Or in other way, the push notification on the App will recommend tourist go to an appropriate destination. At city level, the cities publicity material on the public screen could be adjusted automatically based on the smart analysis result.

g) Sharing economy in tourism

Sharing economy is an emerging market, the function can be regarded as an optional concepts in the system. The key to sharing economy is owners share stuff that more than needed to the people that just need the stuff. In the city, the citizens know far more of the city than the tourism. This potential difference would create lots of opportunities. A tourist could ask route to a citizen or a citizen could prepare
a local meal for several different tourist. One step further, not only the citizen, even the government could be involved in this sharing economy. For instance, tourists can collaborative renting the government boat on the canal to hold a night tour.

6.2.2 The card

a) Inclusive

I always believe that a smart system doesn’t have to put the users into a scenario which is crowded with digital screens or other media. The smart spirit is all about how to efficiently helping human touching the world and understanding themselves. Not all of people are fond of shining digital things especially for some group of people in China. They are more care about naturally utilize things around themselves. So in this design, for different level users, there are different experience could be chosen without understanding others. For example, the tourists who are not good at using smart phones or even hate to read the tiny words on the screen, could just buy the card as a tool to experience the city tour. He is able to enjoy all the discount, and his journey will be recorded and printed out for him without touch the phone. Server in different places might also provide tourism information which is based on city tourism cloud

Figure 6.4. Technology integration
Source: Drawn by author
for him. In this way, tourists will enjoy the trip in their own way. This smart system will embrace every one need help no matter he care “smart” or not.

b) Technology integration

Because of the design need to be based on the current technology using facts and the trend in near future in mainland China. And also, the cost of the first enablement should be in a relatively low rage. So the technologies used in this design are relatively mature. It mainly includes radio frequency technology (RF), and QR code technology. The essential meaning of the card is a product that has a certain ID which link to an individual tourist information can be recognized and recorded by both the city and user itself. These functions can be assembled into the small card very easily to achieve the goal.

c) Souvenir card

This card is beautifully designed or printed with Cangzhou related context such as lion or canal. The travel unit could also provide stamping experience, design the card with more personalized experience. Furthermore, there would be some premium card which could be used in certain place with more functions. It is an expanding of this design implementation.

6.2.3 The APP

At the first time that user connect the card, the app would ask to be installed on the cellphone. If the tourist do not want to install the app, he can also use 4g and RF functions.

And if tourist decide to use the application, he will be able to easily
Figure 6.5. Information architecture of the App
Source: Drawn by author
Figure 6.6. Function wireframe of the App
Source: Drawn by author
access information about attractions, capture data and results of real-time analyze, arrange their own travelling route. The figure is about the information framework of the app. On the other hand, while this app meeting the needs of tourists, the government are gathering the information with great reference value. This system is not exist in the current Cangzhou city.

As chart shows, by analyzing the demand, I classify the APP into five categories, named, theme routes, urban exploration, transportation, city card and my travel. These five categories has covered the functions that tourists needs and integrate tourism resources, greatly improve travel efficiency.

**6.2.4 Possibilities of Development**

The design is able to be used in other cities. Just with a slight improvements, it can be put into other cities’ tourism market. Once such cards are used by a large number of people. Increasing transverse features need to be considered, such as analyzing of the tourist’s travelling behavior on many of his travel history. In that way, the cloud push more precise information. This would be counted as a meaningful method for enterprise and also the users themselves. Also, user can save the money which was left from the last travelling.
6.3 Using Scenarios

Based on personas and the design concepts, I made 2 assumption of different using scenarios, as the following figures show.

6.3.1 Scenario 1

1. There is couple come from Tanging. They are willing to have a nature tour.

2. They find the “Cangzhou Bao” could be used for paying bus, attractions and other functions. They are interested in that.

3. It also provide public wifi networks and mobine internet discount without extra fee. So they decide to buy it.

4. At the selling point, they also down load the apps.
5. It can be used as the bus wallet.

6. By using the app, they could know where to go based on the information of people and events.

7. Cangzhou Bao helps them easily rent a bike.

8. They can also get information about the cab and bike rentals.

9. After visiting the canal, they don’t know where to go next. So they use the app to find the nearest travel route.

10. After they get tired of attractions, they use the detective mode to seek for the interesting corners in the city.
6.3.1 Scenario 2

1. The family from Qing town come to Cangzhou to go for shopping and visiting the old temple.

2. They find out it is so cheap for family to take the public transport by using “Cangzhou Bao”, they plan to rent one.

3. When they come to the old temple park, they use the “Cangzhou Bao” as the tickets.

4. All the stores could be used for charging, and of course, they also charge the device through online bank.

5. Besides, the can print the bill or the map at the store. It is based on the cloud data that the card generate. This family know clearly about their costs.

6. By the guide of the paper, the family go to the canal to enjoy the afternoon.
7. And it could be also used as tickets for the boat on the canal.

8. They can get free audio guide about the canal from "Cangzhou bao"

9. The family could return the ‘Cangzhou Tong” at the station or through internet. They are also allowed to keep it for next time.
7. Conclusions and Future Work

7.1 Conclusions

All in all, this study started from smart city concept and settled in smart tourism design. It concentrated on a small part of general smart industry and try to support and supplement the smart city theory which is one of the my Chinese mentor’s studies. In this thesis, I have logically propel every step and combined the concepts of urban planning from microscopic thinking to macroscopic one. At the end I organized a design process which is fit for smart industry designing.

However, because of limited time and energy, I did not have enough study on the government and enterprise aspects in smart tourism system while these two parts have significant impacts on the implementations. Idea is valuable. But without excellent actions, they will come to nothing. I should dig that further.

About the smart tourism itself, after the project, I believe the development phase of smart tourism industry in China should be divided into different levels. In a city like Cangzhou, the awareness of smart industry is still at an early stage. Advanced design would confuse them instead of proving convenience. I would like to establish smarter system in tourism industry rather than smart products which are full the technology. This “smarter system” should be should be simple, fast, easy to upgrade and friendly.
7.2 Future Work

This study has many deficiencies. Generally speaking, it is still in a preliminary stage on the subject. The future researches could be studied further on the following areas:

7.2.1, increasing the range of research

Because of limited length of this thesis and insufficient experience, this study is mainly focused on the needs of part tourists. However, in fact, truly comprehensive analysis is needed far more discussions and investigate. Therefore, subsequent research should continue to add more effective samples.

7.2.1, complete the design and carry it out.

Implementing the design to acquire more complete analysis and discussions. In that way, I could improve the design method and make the entire methods more persuasive. Currently, the approach and design are hanging in the air.

7.2.1, Comprehensive information collection

This article haven’t collected large amount of smart tourism. In the next step of the study, I would collected and analyzed more material to largely enrich the research analysis. What’ more, I could build online open innovation platform for continuously data collection.
8. Reference


10. Neirotti, P., De Marco, A., Cagliano, A. C., Mangano, G., &
vice interaction design: A Hawk-Dove game based approach to managing customer expectations for oligopoly service providers. Information Systems Frontiers. 16 (4), 697-713.


Table & Figure Reference

1. Figure 1.3, Figure 2.1, Figure 2.9, Table 3.1, Table 3.2, Figure 4.1 Figure 4.2, Figure 5.1 to figure 5.7, figure 5.9, table 5.1 to 5.2, figure 6.1 to 6.8: Drawn by author.
2. Figure 5.8: Photograph of author.
5. Figure 2.2, Figure 2.3: Zhu, W., Zhang, L., & Li, N. (2014). Challenges, function changing of government and enterprises in Chinese smart tourism. Information and Communication Technologies in Tourism.
7. Figure 2.5: Photograph of La Citta Vita Available from: http://www.flickr.com/photos/la-citta-vita/4546199798/in/set-72157623789325157/ [Accessed on 7th Aug 2015].
8. Figure 2.6, Figure 2.12 to Figure 2.17: Marc Stickdorn, Jakob Schneider. (2012). This is Service Design Thinking: Basics, Tools, Cases. New York: Wiley.
importance-of-the-front-end-stage-in-the-innovation-process


11. Figure 2.10, Figure 2.11: IDEO. (2010). About IDEO. Available: http://www.ideo.com/about/. Last accessed 23th Oct 2014.

12. Figure 2.18, Figure 2.19: Available from: www.servicedesign-tools.org [Accessed on 10th Aug 2015]


14. Figure 3.2 to 3.5, Table 3.3: Available from: http://action.weixin.qq.com/payact/readtemplate?t=mobile/merchant/project_offline_scenic_spot_tmpl [Accessed on 10th Aug 2015]
