



# Exploring Potential User Experience Design for Traditional Chinese Service Station: A Case Study in Guangzhou, China

Zhen Liu<sup>1</sup>, Yifan Meng<sup>1</sup>, Di Xu<sup>2</sup>, Jun-en He<sup>3(✉)</sup>, Xiusheng Gu<sup>3</sup>, Lijun Jiang<sup>1</sup>,  
Xiaohua Li<sup>1</sup>, Shaoxin Wu<sup>1</sup>, and Zhengquan Li<sup>1</sup>

<sup>1</sup> School of Design, South China University of Technology,  
Guangzhou 510060, People's Republic of China

<sup>2</sup> Total Sinochem Oil Co., Ltd., Shanghai 200122, People's Republic of China

<sup>3</sup> Sinochem Oil Guangdong Co., Ltd., Guangzhou 510627, People's Republic of China  
hejunen@sinochem.com

**Abstract.** At present, a number of countries including China announced the future will ban the sale of gasoline and diesel vehicles to achieve the full motorization of the car. Traditional Chinese service station is now facing a historical critical moment of 'business transformation'. The After Market (AM) is a key within the transformation, which refers to all kinds of markets after the sale of the whole vehicle, including oil. The elements of AM can be selling products of a service station. However, the satisfaction level of user experience is the key to the AM and company strategies to service station. The aim of this paper is to investigate potential recommendations for the potential best practices of service station based on user experience design. However, the potential best practice guide has the limitation that it examines what is already existing, rather than delving into the problem areas to identify new reference frames that can then provide information on the future of service station design. The case study methodology has been adopted to investigate the problem which included desktop secondary research and 5 site visits. The context then has been examined in which illustrate the factors, such as service station onsite factors (i.e. visual display, architectural layout and structure, onsite refueling service journey including service store shopping journey), and offsite factors (i.e. internet+ operation factors, and customer management factors), which contribute to the better user experience design. This leads into a potential framework that examines the measures that exist to improve user experience.

**Keywords:** Service station · User experience · Oil after market · Service journey  
Internet+ · Case study

## 1 Introduction

At present, the world economy is recovering moderately. China's economy is still maintaining a steady and favorable trend, with Gross Domestic Product (GDP) growing by 6.9% year-on-year [1]. There is an abundant supply and fierce competition in the

domestic oil-related product market. According to statistics, the apparent consumption of domestic refined oil products increased by 5.5% over the same period of last year [2], and the demand for gasoline and kerosene remained strong. Diesel oil reversed its declining trend and achieved a year-on-year increase. Domestic refined oil sales market, with companies such as PetroChina and Sinopec's large-scale petrochemical production and sales, are still dominant. With the gradual opening up of some domestic oil and petrochemical markets, foreign large petrochemical companies have gradually entered some regions and fields. As a result, competition in the domestic refined oil sales market has been aggravating.

On the other hand, a number of countries announced the future will ban the sale of gasoline and diesel vehicles to achieve the full motorization of the car. The Zero Emissions Coalition (ZEC) will stop selling fuel cars by 2050 at the UN Climate Conference in 2015 [3], and will only allow new-generation zero-emission vehicles to go public. The coalition is sponsored by California and is now rapidly expanding to 13 members, including several U.S. states, as well as Germany, the Netherlands, Norway and the United Kingdom. Recently, several major emission countries have already made specific deadlines. At present, many European countries have announced plans to ban the sale of fuel cars. At the media exchange meeting on 2015 Annual Report on the Development of Fuel Consumption in China's Passenger Vehicles [4], Jiang Kejun, a researcher at the Energy Research Institute of the National Development and Reform Commission, predicted that after 10 years, China will not have any internal combustion engine powered traditional cars among the incremental new cars it sells. Instead, pure electric-powered new energy vehicles. This means that by 2030 China will realize a comprehensive new energy vehicle.

Under above complicated and pressured situation, traditional Chinese service station is now facing a historical critical moment of "business transformation". The After Market (AM) is a key within the transformation, which refers to all kinds of markets after the sale of the whole vehicle, including oil, the expenses incurred in the course of using the automobile, maintenance, spare parts, beauty and modification, leasing, insurance, advertising, decoration and so on [5]. It also covers driving school, parking lot, car fan club, rescue system, traffic information service and used car in a broad sense. The elements of AM can be selling products of a service station. From the profit point of view, according to the '2013–2017 China Automotive Aftermarket Blue Book' [6] statistics, in the developed countries market, AM services accounted for about 60% of all types of services, while the market service margin is also higher than the gross profit margin of new car sales.

By fully exerting the advantages of integration and marketing network, the service station companies actively cope with excess resources and the highly competitive market situation; co-ordinate the optimization of internal and external resources and fully expands the market; flexibly adjust marketing strategies, launch brand gasoline and raise the retail share of high-grade gasoline; optimize the layout of gas stations; speed up the optimization and reformation of refined oil storage and transportation facilities and further improve the marketing network; vigorously develop the automotive natural gas business and promote the construction and operation of gas station; and use information

technology to explore and establish the ‘Internet + Sales + Service’ new business model, to accelerate the development of new business.

However, the satisfaction level of user experience is the key to the abovementioned AM and company strategies to service station. Currently, inadequate effort has been made to explore potential user experience design for traditional Chinese service station to provide better service towards new future of service station, which is the focus of this paper.

## 2 Research Method

The aim of this paper is to investigate potential recommendations for the potential best practices of service station based on user experience design. However, the potential best practice guide has the limitation that it examines what is already existing, rather than delving into the problem areas to identify new reference frames that can then provide information on the future of service station design. The case study methodology has been adopted to investigate the problem which includes visiting five of service station sites and desktop secondary research. The context then has been examined in which illustrate the factors, such as service station onsite factors (i.e. visual display, architectural layout and structure, onsite refueling service journey including service store shopping journey), and offsite factors (i.e. internet+ operation factors, and customer management factors), which contribute to the better user experience design. This leads into a potential best practice guideline that examines the measures that exist to improve user experience.

## 3 Service Station Case Study

### 3.1 Service Station Site Survey

Five service station in Guangdong, China have been surveyed, which are owned by major refined oil companies such as Sinochem, Sinopec, Petrochina, Caltex, and Shell. Service station onsite factors to user experience design have been explored, which are visual display, architectural layout and structure, onsite refueling service journey, and service store shopping journey.

**Onsite Visual Display.** Visual display of the service station is acting as a key role to visual identity of the company, which assists the customer to identify the service station from long distance. The design of visual display can help with improving customer experience on site. Most of the surveyed service stations use main colors from their companies’ logo, which is a safe strategy for company visual identity purpose.

**Architectural Layout and Structure.** Architectural layout is designed to perform a function and meets most customers’ needs when they stop for service, can be exciting and unique. The approach taken in designing the architectural layout and structures is generally more about creating spatial facility for staff, pumping bays, repetitive metal

canopies and bathrooms that all comply with regulations, which can help with creating brand recognition for the service station and company, which is a key factor in business growth. Most of the surveyed service stations adopt the architectural structure of rectangular top and the four square pillars, where the onsite convenience stores are located behind the atrium of the pumping bays. One of the service stations is divided by the convenience store, where the store is in the middle of the station atrium with one refueling area on the left side, which is covered by rectangular steel structural roof and supported by six square pillars; and another refueling area on the right side, which is a white umbrella canopy roof and structure.

**Onsite Refueling Service Journey.** A customer/service journey map is a widely used tool to represent user experience with a service. Onsite refueling service journey map can help with identify opportunities for improving user experience. As shown in Fig. 1, the surveyed service stations currently employ mechanism among customer, store person, and service person, by which the refueling service journey end up with either the customer handing over a receipt copy or not for discharging.

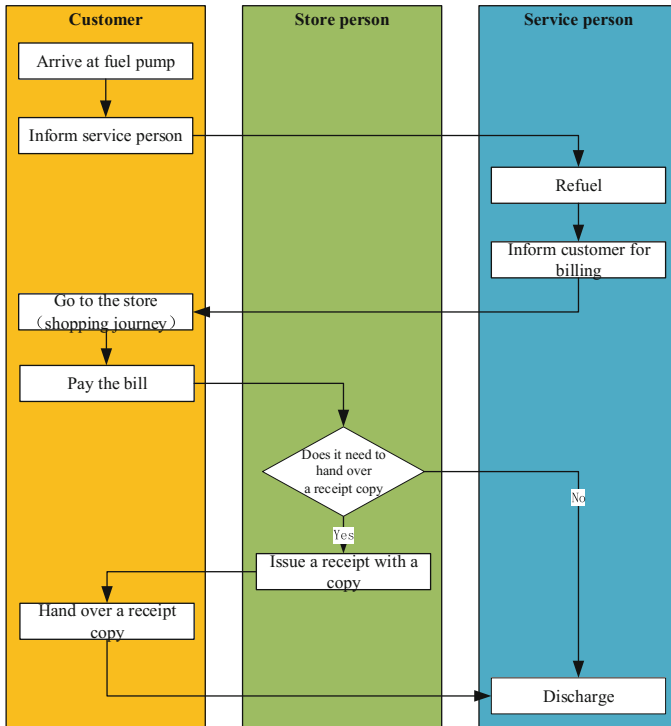


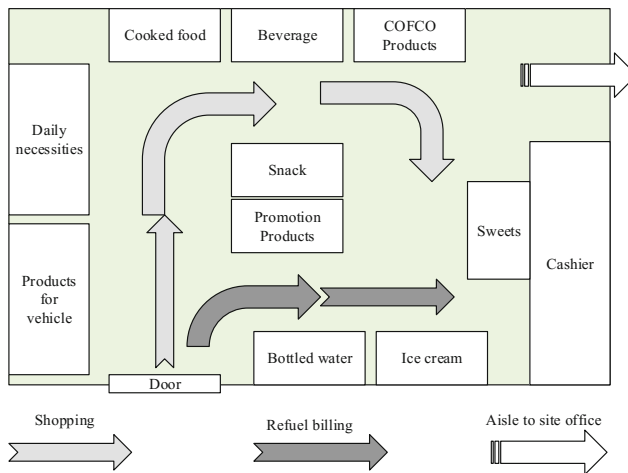
Fig. 1. Service station onsite refueling service journey map.

**Service Store Shopping Journey.** The service store shopping journey is a part of abovementioned service journey in terms of payment action of refueling, which helps with creating more on-shop selling opportunities, and plays a main role in onsite

customer experience. As such, the layout design for the stores is essential to attain above aims, which should consider methods for designing journey routes for refueling and shopping, whilst laying down certain products on the routes to increase and improve value and efficiency of the journey to the both of the customers and service station. For example, the customers can see the ‘promotion zone’ directly in the both of ‘shopping’ and ‘refueling payment’ routes.

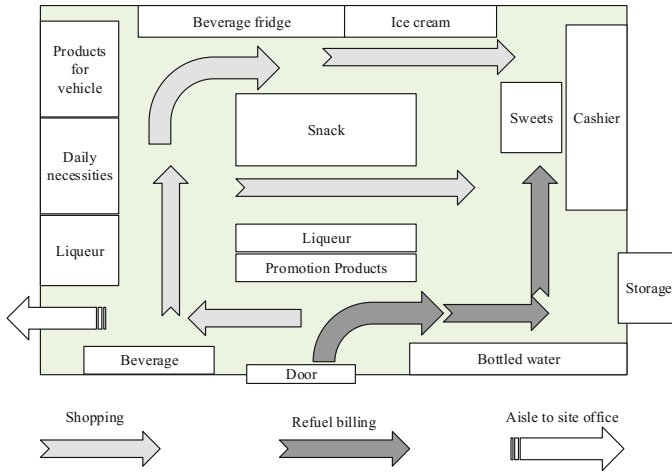
The shopping journey design is influenced by the architectural layout and structure of the service station, such as the location of pumping bays to the store, and the number of doors for entering the stores. Shopping journeys for the five cases of the surveyed stores are illustrated in following sections.

*Store Shopping Journey (Case A).* As shown in Fig. 2, the most profitable beverage and snacks are placed in conspicuous places. Convenience stores use the same checkout aisle as the supermarket, in line with the user’s general behavior. Cooked food area is relatively simple, only equipped with hot water bottle and instant noodles.



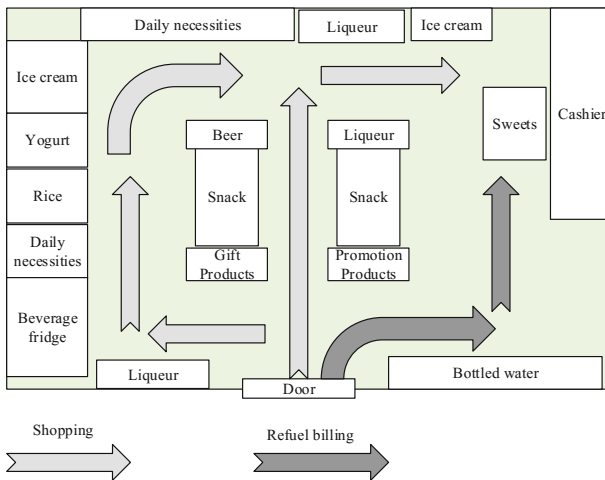
**Fig. 2.** Store layout for customer paying for refueling and shopping at Service Station A.

*Store Shopping Journey (Case B).* As shown in Fig. 3 of the floor plan, the promotional items are displayed opposite to the front door, where no matter on which route, the customers will notice the promotion products first. Shopping route is designed for the customer from the door to cashier, where the payment route needs to be set to go through the high-profit beverage and snacks areas. When the customers buy snacks, they can see the liquor cabinet behind the promotional items. The magazine rack is set up close to the ice cream area, where when the customers buys a magazine, children may take the ice cream straight out of the fridge.



**Fig. 3.** Store layout for customer paying for refueling and shopping at Service Station B.

*Store Shopping Journey (Case C).* As shown in Fig. 4, the store has three routes for refueling and shopping, of which the refueling route is designed directly and short to the cashier for saving time of the customers. Whether it is on the shopping or refueling payment route, the first thing that customers notice is the promotion and gift products. When the customers purchase necessities, they will be sure to pass through the high-profit beverage, snacks and gifts area.



**Fig. 4.** Store layout for customer paying for refueling and shopping at Service Station C.

*Store Shopping Journey (Case D).* The shopping space is large, and there are a number of products available for purchase, where there are several circular routes designed for shopping. As shown in Fig. 5, the layout is designed that after customers' purchase of

the beverage, they will pass through the cooked food area, which will help with stimulating the consumers to spend more and also they will pass through areas such as snack, wine and other products with higher profit margins. The stores also have counters selling souvenirs and coffee.

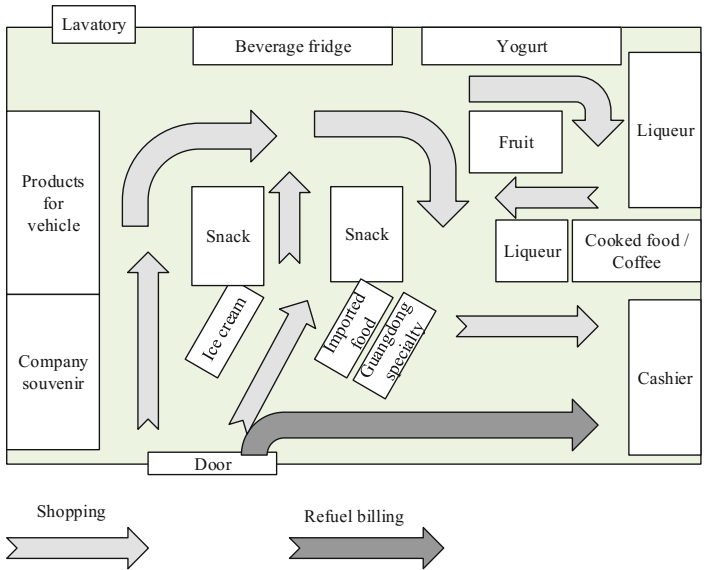


Fig. 5. Store layout for customer paying for refueling and shopping at Service Station D.

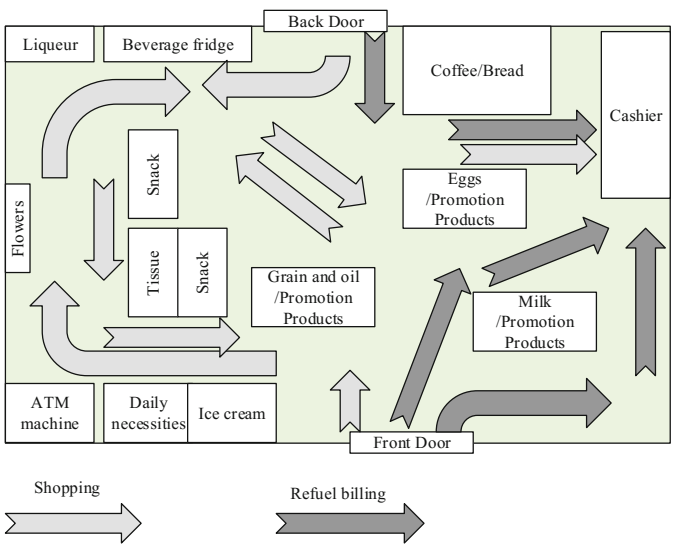


Fig. 6. Store layout for customer paying for refueling and shopping at Service Station E.

*Store Shopping Journey (Case E).* As shown in Fig. 6, if the customers enter the store from front door to the cashier without shopping, they need to go through the grain and oil, milk and eggs promotion area, whilst customers with the same purpose entered from the back door to the cashier also need to go through promotion of cooked food area. As such, these goods are easy to stimulate more spending. The cooked food (coffee and bread) area is very conspicuous, and distinguish from other areas with dark color.

When consumers enter from the front door and go shopping along the left hand side, they will initially see the grain, oil and milk for promotion and then the moon cake gift area. When they go for cold drinks, they will go through a promotion area for high-profit snacks and tissue, meanwhile, consumers enter from the back door for daily necessities, they will go through the same promotion area for high-profit snacks and tissue. The lay out setting for two entrances creates circular shopping routes to force the customers to meet certain products for potential purchasing.

### 3.2 Secondary Research

In the age of the new internet information technology and new ‘fan economy’, mother companies of the service stations have used the information technology for their daily operations, such as internet+ operation, and customer management, aiming for contributing to better onsite customer experience at service stations.

**Internet+ Operation.** Methods, such as China’s Baidu search results and Baidu Index, official website, social media official account, and mobile APP, have been used for the purpose of internet+ operation of the service stations.

*Search Engine Results and Index.* The China’s Baidu search results and Baidu Index can be treated as a mirror of the user experience in terms of user interest to the service.

For Sinopec, Baidu related results are about 18,800,000 at Sep 17, 2017, ranked first was a result of Sinopec gas filling card online business hall (<http://www.sinopec-sales.com>). For PetroChina, Baidu has found the relevant results about 16,100,000, at Sep 17, 2017, ranking the first result was the PetroChina Kunlun oil card online service platform (<http://www.card.petrochina.com.cn/>). For Caltex oil, Baidu related results were about 2,700,000 at Sep 17, 2017 (<https://chevron.cn.chi??>). For Sinochem, Baidu related results were about 1,050,000 at Sep 17, 2017, for example, ranking the first result was Sinochem’s website homepage (<http://www.sinochemoil.com/>).

The comparison among Sinopec, Petrochina and Caltex is shown Fig. 7, where the Sinochem has not yet included in the Baidu index. The search results and Index indicate the trend of the search from the customer during certain period of time, such as seven days, 30 days, 90 days, and a half year, which can assist to plan strategic actions for improving user experience.





Fig. 7. Comparison of Baidu index for service station companies (Sep 17, 2017).

**Official Website.** Official website of a company has the most authority for its products and services, which is crucial for user experience aligning products and services of the service stations. Sinochem petroleum oil retail business does not have own official sales site. But under the company’s official website of the oil sales department and station promotion section mention the product sales, and product promotion program information are found on a page that was last update time of December 5, 2014. In addition to its official website, Petrochina and Sinopec also set up special oil sales websites. Petrochina has set up an online service platform for Chinese petroleum Kunlun gas filling card, and Sinopec has set up a special online business hall. Their website built a complete online service system related to the oil retail business for the onsite service.

**Social Media Official Account.** WeChat index and WeChat official account can be used for operation to achieve better customer experience. The WeChat indexes for Sinochem, Petrochina, Sinopec and caltex are shown in Fig. 8, in which Petrochina gained the highest index at Sep 17, 2017 and the leading top index during the last 90-days period.








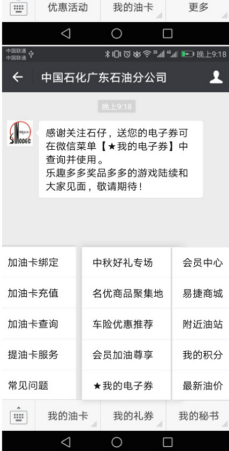
**Fig. 8.** Comparison of WeChat index for service station companies (Sep 17, 2017).

Sinochem, sinopec and PetroChina have established their own official WeChat accounts, as shown in Table 1, which contain an account interface for the main account information and interactive interface for service function areas, such as refueling cards, promotions, and customer experience.

The official account of the three companies are complicated, including the company’s account and the provincial companies account, such as official account ‘Sinochem oil sales’ and other accounts for different provincial companies. In addition, the provinces have their own internal account, and external account, such as ‘Sinochem Guangdong Oil’ and ‘Sinochem Guangdong Co., Ltd’, which are mainly used for corporate culture propaganda. In order to unify the sales entrances of refined oil products, PetroChina has set up a special official account, the ‘PetroChina e Station’, for the promotion of refined oil products and convenience stores. It also provides information on the site of service stations, and the inquiry of account of fuel card, card recharge and other products from customer service. Sinopec relies on the official account of each province to provide information for refueling services, refined oil market, and named ‘easyjoy’ convenience stores.

*Mobile APP.* Both of PetroChina and Sinopec have developed APP mobile clients, whereas Sinochem has not. PetroChina’s ‘PetroChina Hospitality e Station’ APP is a client software for all self-service customers. With mobile payment and refueling card services as its core, the APP focuses on ‘people, vehicles and life’ to provide customers

**Table 1.** Social media WeChat official accounts interfaces for service station companies (Sep 17, 2017).

Company	Account interface for main account information	Account interface for service functions
Sinochem		
PetroChina		
Sinopec		

with an efficient, convenient and smart service platform. Core functions include service station navigation, refueling mobile payment, refueling card online recharge, gas filling card query, and etc. Customers who use the mobile payment function, do not need get off to complete the refueling. The APP also integrates the ‘Points Mall’ of PetroChina, through which can complete the service of points for exchanging goods. Sinopec has developed a business office APP to provide customers with services for business, refueling and recharge.

**Customer Management.** Customer management directly affect user experience in terms of customer relationship with the products. In the Shell store, customers can join Shell members through the mobile client. Other services such as refueling card, point card, and stamp collection card can be integrated in this approach on the mobile.

There is a method to increase the user’s viscosity through voucher stamps for the customer in exchange for gifts. However, the current practice of using paper voucher and stamps is outdated and time-consuming to operate, and users may inadvertently lose the stamp card, so that such activities may also be considered integrated into the WeChat service or an APP mentioned above.

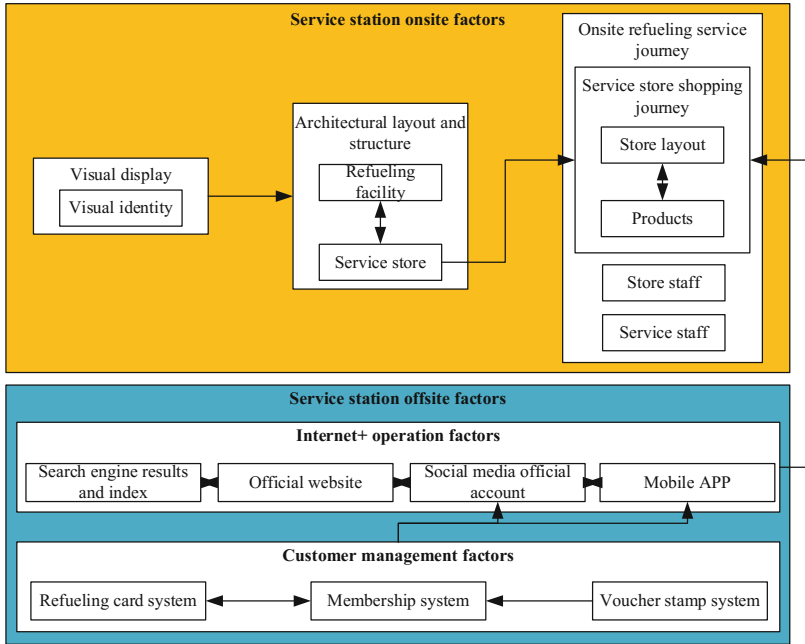
At present, Sinochem’s refueling card and point card are separated for use, of which the refueling card cannot be used across regions. For the users, the more cards is more troublesome. Hence, merging the point card with the refueling card, can be considered to develop a full and user friendly membership system, and to bind to client WeChat IDs or develop an APP for the purpose, which integrate the business to the mobile clients.

## 4 Discussion

By conducting case study and secondary research, this paper has investigated the potential factors to user experience design for traditional service station in Guangdong, China. The explored factors are service station onsite factors (i.e. visual display, architectural layout and structure, onsite refueling service journey including service store shop-ping journey), and offsite factors (i.e. internet+ operation factors, and customer management factors).

The design of visual display in line with company visual identity can help with improving onsite user experience, which enhances and merges with architectural layout and structure. Quality architectural design has the potential to add aesthetic and symbolic, and functional value to user experience for the customers who could even return to experimenting. The customer onsite experience with the service station’s architectural layout and structure are associated with refueling facilities and onsite convenient store, where the customer onsite behaviors [7] that interact with service staff and store staff, are mapped on the refueling service journey containing service store shopping journey that is influenced by on-store products on the store layout for purposes of refueling paying and shopping. The state-of-the-art information technology enhanced internet+ operation factors of the offsite factors contribute to the customer onsite store shopping journey, which include four integrated factors, such as search engine results, official website, social media official account, and mobile APP. Another set of offsite factors, i.e. customer management factors, can be improved through development and

the use of social media official account and mobile APP. The membership system is the core factor among the customer management factors, which associates with refueling card system and is enriched by voucher stamp system. Therefore, as shown in Fig. 9, the above discussed factors have been illustrated in a proposed framework of potential user experience design to China's service station.



**Fig. 9.** A framework of potential user experience design to China's service station based on the identified factors.

## 5 Conclusion

Service station is a symbolic facility of its mother fuel company. The user experience onsite the service station influences customer interest, royalty and long term relationship to the company, which includes following potential onsite factors: visual display (i.e. visual identity), architectural layout and structure (i.e. refueling facility, and service store), onsite refueling service journey including service store shopping journey (i.e. service staff, store staff, store layout, and products). Whilst, onsite service can be enhanced by potential offsite service methods provided by the fuel company, such as internet+ operation factors (i.e. search engine results, official website, social media official account, and mobile APP), and customer management factors (i.e. membership system, refueling card system, and voucher stamp system). This paper explored the above potential factors to user experience design for traditional service station in Guangdong, China, via case study and secondary research, which opens up a new way for

research on service station. Additionally, based on the identified factors, a framework of potential user experience design to service station has been proposed for the future use for improving services of service station in China in welcoming the incoming new era of internet+ information technology and sustainable energy. This paper provides methods and insights of the potential factors to user experience design for traditional service station in China, which could benefit to service stations across the world. The future research will be implementing and validating the proposed Framework with its factors.

**Acknowledgements.** The authors wish to thank all the people from Sinochem Oil Guangdong Co., Ltd, who provided their time and efforts for site investigation. This research is supported by Sinochem Oil Guangdong Co., Ltd and South China University of Technology (SCUT) project funding x2sj-D5170570, SCUT grant j2rs/K5172210, and Fundamental Research Funds for the Central Universities 2017ZX013.

## References

1. The State Council the People's Republic of China. [http://english.gov.cn/state\\_council/ministries/2017/10/19/content\\_281475913362978.htm](http://english.gov.cn/state_council/ministries/2017/10/19/content_281475913362978.htm). Accessed 30 Jan 2018
2. Hydrocarbon Engineering. <https://www.hydrocarbonengineering.com/petrochemicals/29082017/sinopec-shares-1h17-refining-and-chemicals-segment-update/>. Accessed 30 Jan 2018
3. UN Climate Change Conference Paris 2015. <http://www.un.org/sustainabledevelopment/cop21/>. Accessed 30 Jan 2018
4. Jiang, K.: China passenger vehicle fuel consumption. Development Annual Report 2015. The Innovation Center for Energy and Transportation, P.R. China (2015)
5. Ramesh, S., Donald, H., Ratna, B.C.: Remanufacturing for the automotive aftermarket-strategic factors: literature review and future research needs. *J. Clean. Prod.* **17**(13), 1163–1174 (2009)
6. 2013–2017 China Automotive Aftermarket Blue Book. [http://www.xinhuanet.com/auto/2017-05/11/c\\_1120953127.htm](http://www.xinhuanet.com/auto/2017-05/11/c_1120953127.htm). Accessed 30 Jan 2018
7. Kitamura, R., Sperling, D.: Refueling behavior of automobile drivers. *Transp. Res. Part A: Gen.* **21**(3), 235–245 (1987)