

**Research and Application of Baby Carriage Design Based on  
Product Service System Design—Baby Carriage Rental  
Platform in Chinese market centered**

**By Wu Ting**

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**Research and Application of Baby Carriage Design Based on  
Product Service System Design—Baby Carriage Rental  
Platform in Chinese market centered**

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## **ABSTRACT**

Product service system is a creation process of combination between tangible and intangible assets. The nature is that users just enjoy the using process without possessing the production. It commits to save resources and power, reduce environment pollution, as well as meet the requirement from users, manufacturers and retailers. With the rapid development of current economic, the integration value between service and products has become increasingly acceptable in modern business. Product service system is more scientific and systemic to achieve the sustainable development in modern product design industry.

Baby carriage has a wild market with diversified product in China. However, it is expensive and has a short life cycle, thus providing a hug pressure to families, society and environment. The related production service system is weak. It could not meet the requirements of customers and limited the developing of baby carriages. This essay aims to interpret product service system through case studies, attempts to identify the characteristics of baby carriage products and grasp opportunities in each stages of life cycle through service life cycle analysis. According to evaluation and summarizing of such information, testing platform-sharing optimizing of baby carriages.

Innovation of this essay is to introduce the concept of product service systems in baby carriage industry, let custom enjoy the using process without possessing baby carriages. An optimized baby carriages' leasing website is a new view in this industry. Analyzing baby carriage industry through life cycle, it improves the integration of users, retailers and manufacturers. Thus manufacturers could reliably understand the needs of customers, it support the further design and development in baby carriage industry.

**Key Words:** product service system design, baby carriage, life cycle

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# CHAPTER ONE: INTRODUCTION

## 1.1 Research background

The extension of product service system within the global manufacturing industry has diversified modern business model. The correlation between manufacturing industry and service industry has become increasingly deep and significant. More and more manufacturing enterprises tend to outsource their service system to professional service institutions. Since the 90s America companies have focused on improve their competitive power. As one of the most successful strategies, global service outsourcing significantly contributed to the development of America manufacturing industry. Product service system theory has become a new topic to both academic sector and global industry. The manufacturing enterprises, such as motor, home appliance and computer industries, have paid more attentions to service system, which has been a primary competitive method to provide huge potential strengths to firms. For example, IBM has obtained nearly 33% revenues from their hardware service during recent years. With the rapid development of technology, imitation has been a serious challenge to every manufacturing enterprise. Thus, diversified services have become one of the essential differences and competitiveness to distinguish strengths of the firms.

Baby carriage market as an emerging product market has presented considerable commercial opportunities. Following the expansion of baby carriage market, produce service have been demanded by more and more customers. In many countries, such as Sweden, US and Canada, enterprises have supported diversified service system to meet the higher requirement from customers. For example, Darebin Baby Capsules rental PSSD, ENG second-hand stroller market, DISNEY stroller rental PSS and GOOD BOY EXPO product service system.



There is a great potential market in Chinese baby carriage business, which has released amazing consumption power. As the country has the most population in the world, the average consumption of each family to the newborns from 0-3 years old is more than 900 CNY per month in China. Traditionally, Chinese pay high attention to children's growing environment. Due to the one – child policy, children have the higher position in families. Parents tend to spend increasingly time and money to create better conditions for children. During the children's growing process, baby carriages can no doubt contribute to babies' healthy growth. As one of the essential children's product, baby carriages market presents great potential to release considerable consumption power. It shows that the global consumption level of baby carriages' production was 1068 CNY in 2009, therein 191 CNY in Chinese market (Jiang, 2011).

## **1.2 Research objectives and problems**

In this paper, we look at the three main challenges existing in baby carriages market. First factor is the high price. Simple baby carriage is likely to produce more inconvenience effect due to the poor quality and unable dismounting problems. In addition, tiny damage may sometimes cause the scrapping. Therefore, parents always prefer to high quality and strong practical baby carriages, which also have the higher price. The second challenge is the short usage period. Generally, applicable age to use baby carriage is around 0-2 years old. According to one – baby policy, each family can only has one child, thus the real usage period for a thousand CNY baby carriage may be only 1-2 years. Therefore the short usage time result in many families had a concern in buying baby carriage. Few dispose channels to deal with the unused baby carriages is the third challenge which perplex most Customers. It seems that the difficulty in loan recovery is the common problem in current Chinese baby carriage market, there are few recycling service system operating in domestic market. Families, which have already purchased baby carriages, have to discard or idle the existing baby carriages. It not only pressure the environment, but also wastes resources. Therefore,

product service system seems to play a significant role in current Chinese baby carriage market. Aiming at such problems, this paper will attempt to analyze the product service system in Chinese baby carriages market and highlight the applications used to deal with such problems.

Our analysis is based on a sample of 81 Chinese families, which include 27 families do not need baby carriages recently, 27 families intend to buy baby carriages and 27 families have already owned baby carriages. We adopt the questionnaires methodology to interpret the product service system applied in Chinese baby carriages market. Two types of questionnaires issued in October and November 2010 respectively. To the best of our knowledge, this paper focuses on the product service system involved with a country having the largest population. In addition product service system is still a new area for China as an emerging market.

### **1.3 Structure of study**

The outline of this paper is as follows, Chapter 2 shows an overview of the previous research on baby carriages market and product service system. Chapter 3 presents the sample selection procedure and methodology used to measure the effect of product service system in Chinese markets. Chapter 4 interprets the result of the surveys through questionnaires. Chapter 5 gives a conclusion of our research.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Baby carriage market in China**

#### ***2.1.1 Price challenge***

In Chinese baby carriage market, nearly all of the customers have faced the same challenges – Price. Chinese customers always prefer to purchase famous – brand products, such as “good kid”, “little angel”, and “Le Meida”. However, few parents may really understand the differences between the various baby carriages. Therefore, customers simply regard the price as qualities (Jiang, 2011). For some small and medium-sized enterprises, their brands do not have any competitive power in market. Thus, they have to reduce the price to attract some low-end customers. While such companies still need to consider the cost and benefits under lower prices. Thus, accidents are often appeared due to the lower safety and hygiene. Companies reduced the cost through purchasing inferior material, using simple design and assembling baby carriages irregularly. These actions not only injure customers’ economic benefits and babies’ health and safety, but also destroyed the brands of the companies. In order to ensure the qualities of the products, companies have to buy optimized design skills from developed countries. In addition, companies need to purchase expansive equipments and facilities to fit such design skills. Furthermore, components of baby carriages are often required specific materials, which are nontoxic, firm and light. Thereby, the high cost result in a high price of baby carriages (Industry trend and investment report in Chinese baby carriage business, 2011). For famous companies, high price also symbolizes their products’ qualities and reputation.

#### ***2.1.2 Life cycle challenge***

Customers face another challenge is the life cycle problem of baby carriages. First of all, few enterprises provide maintenance service when baby carriages are broken

(Industry trend and investment report in Chinese baby carriage business, 2011). Customers may also not understand how to prepare the products by themselves. If baby carriages are seriously damaged, customers have to purchase new baby carriages or barely use the damaged products. The new purchase produces an extra cost for families, which increase the financial burden and waste the resources. Barely using the damaged products may course the safety risk for babies. The second factor of life cycle challenge is components changing problems. A large number of styles of baby carriages fill with Chinese baby carriages market. The components of each type of baby carriages have different sizes and models. In addition, baby carriage components markets are still imperfect, customers seem to be difficult to purchase suitable components from normal components markets (Lin, 2007). Furthermore, many Chinese designers and manufacturers overlook the significance of components changing process in baby carriage life cycle. The models of components are irregular and substandard. It will bring the quality problem to products and also impede the replacement of components, thus to shorten the usage time of the products (Jiang, 2011).

### ***2.1.3 Recover challenge***

Recover challenge involved with lots of industries has been discussed for a long time, and also appeared in baby carriage industry. Used baby carriages be in idle at home, seem to waste resource and take up home space. In current Chinese baby carriage market, recovery system is seriously defective. There are few enterprises building up recovery departments to realize the product recycling. Thus customers are difficult to resell the used baby carriages. Few families are willing to dispose the used baby carriages as general refuses, due to the little refund and emotion reason. Therefore, a large number of used baby carriages are idled at home. Some damaged and unusable baby carriages may be thrown away by many parents. As we know components of baby carriages are specific materials. Discarding baby carriages not only pollute environment, but also waste the money for enterprises. However, China has a vast territory, how to collect the used and discarded baby carriages is a serious question. It

is difficult for firms to understand the disposal time, location and types of such products. Even though enterprises can gather these resources, how to assemble them together is another challenge.

## **2.2 Product service system**

### ***2.2.1 Concept of product service system***

In the present age, product service is playing increasingly important roles in our lives. Product service system design is a view, which just be stated for a few decades. Product Service System concept combined products and services that meet customers' requirements (Mont, 2002). They don't require the ownership of the products in a system and create value in use (Baines et al., 2007). Nowadays, PSS has consisted on social and environmental benefits (Baines et al., 2007) and many people assert that product service system design is a way of reducing the harmful impact of producing and consuming products in our environment (e.g. Roy, 2000). Product service system has transformed our lives. It fundamentally changed the economical focus from designing and selling physical products to a system which products and services jointly to meet general customers demands (Manzini and Vezzoli, 2002).

Some researchers have looked for new business models for Product Service System (e.g. Mont et al., 2006) when others began to examine how the product-service transition affects the means that products are designed (Morelli, 2002). Even so, there is no prescribed methodology for the design of PSS or a clear understanding of the role of design in product/service businesses.

### ***2.2.2 Product service system categories***

Researchers have studied the relationships between PSS and traditional products and services. The general image of a PSS can be broken down to three main categories (Tischner *et al.* 2002):

Product-, use- and result-oriented PSS. , as shown in Fig. 2-1,

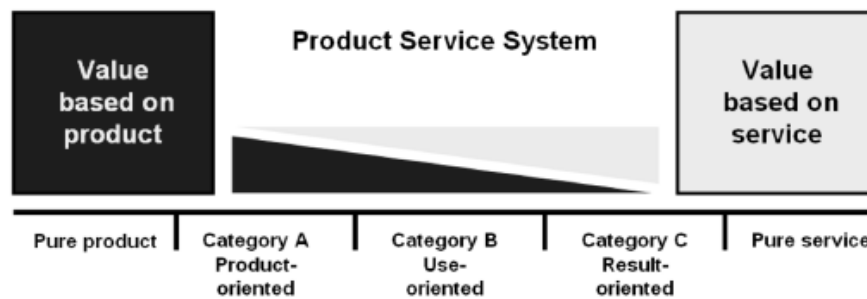


Fig. 2-1 Placing Product/Service Systems in a perspective to products and services (Tischner et al. 2002)

●Product-oriented (Ps PSS):

In this product service system, product is owned by the user/consumer. The service is added to an existing product. The value of product is increased through an additional service; such as upgrades, modifies, repairs and guarantees. For example, sharing, pooling and leasing. Product is the key point for a company in economical business and the service have another payment systems modified by companies.

●Use-oriented PSS (PS PSS)

In this product service system, product is owned by the service provider, who sells services and functions instead of products by all kinds of modified distribution and payment systems; In this category, the cost and quality of a product directly affect consumers' experience and price. But the product of this type is still a key element in the system for marketing competition. Eg. sharing, pooling and leasing.

●Result-oriented PSS (pS PSS)

In this category, product is also owned by the service provider, but products are substituted by new services. Customers don't purchase products directly, they use an optimized system provided by suppliers, thus to make their consumption more efficient. And PSS suppliers not only own products directly but also use products directly to serve customer. Eg. Customers buy the washing clothes service –clean

clothes but not use or rent washing machine.

Take pushchair as an example, PSS is when company provides the function of baby using baby carriage instead of the actual baby carriage performing the function .Here, customers pay for the function of baby carriage they require instead of buying carriage, as illustrated in Fig.2.2.



Fig 2-2 Example of a baby carriage function offered traditionally and as a.pss pay for using (Wu Ting,2011)

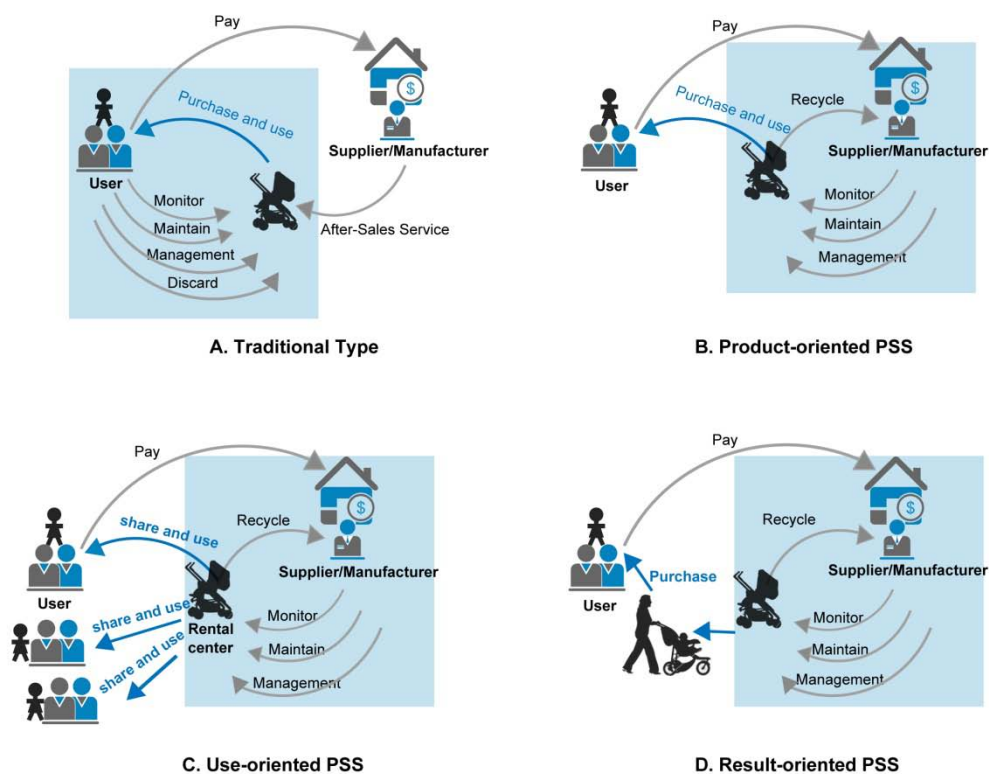


Fig 2-3 3 kinds of Baby carriages PSS and traditional type(Wu Ting,2011)

As shown in Fig 2-3 take baby carriage as example, in the traditional model, costumers buy a baby carriage for baby and in charge of the quality of using, maintenance. When babies do not fit carriage any more, costumers will abandon it. In Product- oriented PSS, costumers buy a baby carriage, when the supplier owns it and is responsible for maintenance. Costumers will be in charge of quality of using and purchase services to extend the time of using. The company takes charge of discarding or recycles it. In Use-oriented PSS, costumers rent a baby carriage for babies. Supplier own the carriages and in responsible for maintenance. Costumers just take responsibility for the quality of babies using. Customers need to pay a center amount of deposit first, and the consumption is involved with the usage times. Companies are responsible for discarding the used products or lengthening the service life through recovering these products

In summary, the quality of using baby carriage is the functional solution or result that costumers purchase. Obviously, interest is related to quantity of consuming not to the quantity of baby carriages. The whole system consumes less resource, reduce the cost, and increase the revenue, thus to realize the resource sharing by different owners.

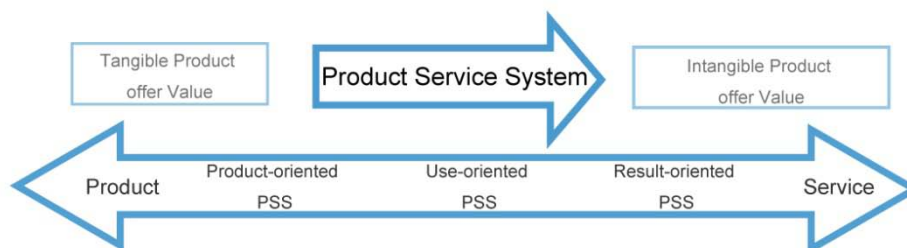


Fig.2-4 PSS categories transfer (Wu Ting,2011)

These three types of product service system are not static but are always changing as shown in Fig 2-4. According to different consumers, even for some kind of product, there may be existing product-oriented PSS, use-oriented PSS, result-oriented PSS at



the same time. Product-oriented service system is focusing on product at first, then shifting to service different degrees. In Use-oriented product system, products and services are both important as the same and promote each other. Results-oriented PSS gives first place to services. Even so, as the final satisfaction of consumers as the core in PSS, any form of Product service system has no difference.

### ***2.2.3 Effect of PSS***

Under product service and experience economy background, PSS has been a design strategy to guide the new development direction of designers and enterprises. PSS can effectively reduce the cost, and increase the reputation for companies. In addition, it has also attracted the attention of environmentalist. The revolution of consumption concept needs the effort and practice from the whole society. Coordination of the participants within the whole produce life cycle plays a significant role in product service system. Designers have to consider the whole life cycle of produces and improve the technical process. Baby carriage as an essential product in modern families, it can be also designed based on product service system. Thus baby carriage companies could increase the produce design efficient, shorten the design cycle, and reduce produce cost. It not only improves the design level of the products, but also promotes the competitive power of the companies in baby carriage markets. Product service system also integrates the economic and resource allocation. Customers can reduce the consumption and enjoy personalized service. Design is based on experience, the establishment of baby carriages system still demand more data and information from daily practice.

PSS is using innovative thinking to get the classic Win-Win-Win:

Win - you get the end result you need

Win - the provider of the service makes money

Win - the environment is not under any extra pressure.

PSS have potential to be environmentally benign because they assert that current levels of material consumption, looking for options that they may provide consumers

function/ service without lowering their level of welfare (Mont 2000). Prevailing environmental advantages for Product Service System are (Agri et al. 1999):

- declined use of original materials in production
- ascended lifetime of each part of a product
- Increased the frequency of using a product
- Minimized number of times materials pass through the production cycle
- minimized the risk of costumers purchasing new product and cost of supplier

#### 2.2.4 Life-Cycle Perspective PSS

The concept of life-cycle is the progress of a product from raw material, through production and use, to its final disposal as illustrated in Fig. 2-5.

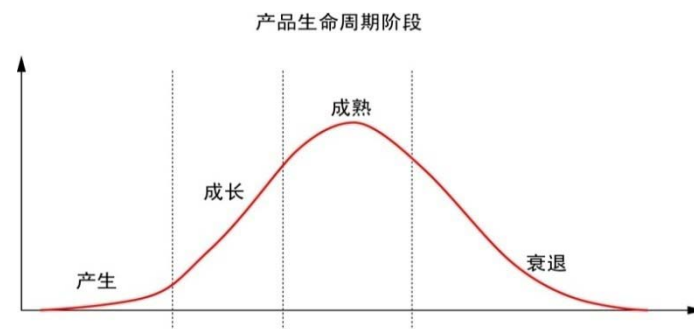


Fig.2-5 process of product life cycle (Life-Cycle Perspectives of Product/Service-Systems: In Design Theory ,Erik Sundin,2010)

In the present age, the issue of life-cycle is increasingly severe .it is possible to evaluate how the product has performed throughout its life-cycle in sustainable development. The knowledge of life-cycle allows the manufacturer to improve products accordingly and reduce need for service throughout the using phase, or to discover latent design errors more efficiently (Östlin et al. 2008).

Having a life-cycle perspective on PSS means that life cycle must be considered for both tangible products -physical products or intangible products - services , they go through the life cycle from creation, growth, maturity, decline process used in PSS during contract times. The physical products can be adapted in kinds of ways in a

product life-cycle. There are many methods that result in adaptation for manufacturing, delivery, usage, service, maintenance, disassembly, reassembly, testing, recycling and/or remanufacturing.

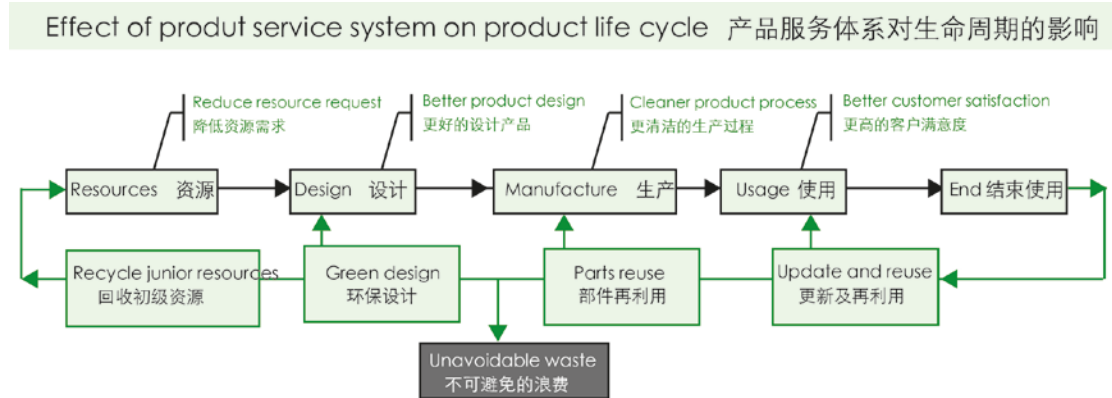


Figure2-6 Effect of product service system on product life cycle.(Wu Ting,2011)

Product service system has a positive impact to the product life-cycle. In every phases of life-cycle, PSS control the entire process systematically to make it more comprehensive, effective and green. PSS integrates all resources so that reduces the resource requirements greatly, while also reducing the waste greatly. In the design stage, Control products development direction effectively, design re-use or recyclable products to make the design more friendly; in the production stage, use the modular design to produce recyclable components. In the usage stage, focus on customer experience in order to get higher customer satisfaction.

## 2. 3 Existing baby carriages product service system

### 2.3.1 Darebin Baby Capsules rental PSSD



Fig. 2-7 Darebin Baby Capsules rental

A “baby capsule” is a baby seat for a car, which designed to restrain and protect an infant in the event of a car crash.

Each year in Darebin, children travelling in cars are needlessly injured or killed because they are not restrained or not restrained correctly. By law, the driver of any vehicle is responsible for ensuring all passengers who are under the age of 16 are restrained correctly. Appropriate child restraints must be used for every journey, no matter how short. Darebin City Council thinks that child restraints, such as the baby capsule, are the best way to prevent injury to an infant in the event of a car crash. As part of Council’s desire to improve safety within the community, Council offers affordable baby capsule hire product service system to all residents in the municipality. To ensure that the people install the baby capsule correctly and avoid unnecessary accidents happening, Dabin City Council arrange staff to educate the people how to use and install.

The baby capsules hired from Darebin City Council are suitable for use of a baby weighing up to 9kg and with a length of up to 700mm. The cost is \$ 290 to buy a baby capsule. The cost of \$66 is to hire the capsule for a period of 6 months. A reduced hire cost of \$40 is available to current Health Care card holders, Pensioner Concession and Department of Veteran’s Affairs eligible card holders. An additional bond of \$20 is taken at the time of hiring, to be refunded when the capsule is returned in good condition. The measure increased the reuse of the baby seat and improved the safety of children greatly in the meantime reduced parents’ financial problem and environmental pressure.

### ***2.3.2 ENG second-hand stroller market***

ENG is a Swedish manufacturing group which focuses on children's products with its two main brands BRIO and Simo2. Its character is high quality, full-featured and long lifetime. ENG Group don't compete with other brand in traditional quality to capture the market, but by providing customers with innovative products such as second-hand stroller ,to extend the lifetime of each baby carriage to seize the market.

According to statistics, second-hand baby stroller market account for 65% -75% in Sweden. ENG stroller has a very high quality and durability, as well as after the first user. The stroller has a good re-use value and perfect after-sales service. ENG products service system including reverse logistics system organization, different levels of carriage refurbishment and re-manufacturing. The advantage of such a system, companies no longer need to invest more money, or any complex development and manufacturing processes or new materials, but more effort in improving product service system.

Accordingly, ENG make a good use of high-quality products, reducing the environmental impact of production and waste of resources effectively.ENG will control the secondary market more and increase its market share, which retailers will play a more important role.



Fig. 2-8 ENG second-hand stroller

### 2.3.3 DISNEY stroller rental PSS

Disney set up a baby stroller rental service for family and children which is very convenient. Consumers can use strollers in the theme parks and Downtown Disney freely.

Disney stroller is made of hard plastic in one-piece moulding. It has a canopy blocked for the sun and no folding back. Consumers can buy the comfort kit between the child and stroller. Every stroller rental price is \$ 40.



Fig.2-9 DISNEY STROLLER RENTAL

### 2.3.4 GOOD BOY EXPO product service system



Fig.2-10 GOOD BOY EXPO product rental

Chinese baby carriage brand GOOD BOY design studio designed a new liner “EXPO STAR” specially for renting in Shanghai EXPO 2010. They offer 500 baby carriages for visitors. It supplied huge comfort for families with babies to visit EXPO. After Shanghai Expo research, GOOD BOY designed the rental stroller with fashion style and unique features--- EVA's one-piece molding design of the seat, sun resistance,

easy to clean, comfortable and durable. Especially, anodized aluminum frame with a modern style; bright colors on the stroller body is easy for parents to find children in the crowd Because the weather was hot during EXPO, the staff changed the blankets to mats for children to let them feel more cool and comfortable. The staff in EXPO took you through how to use & adjust the baby carriage. When the time draws near, there are telephones or SMS to remind parents to give it back. During EXPO, GOOD BOY “EXPO STAR”stroller rental service won a great acclaim and praise, More than 300,000 tourists enjoyed this service, has won acclaim and praise.

## CHAPTER THREE: DATE AND METHODOLOGY

### 3.1 Sample selection

During survey's process, we issued two types of questionnaires. The first questionnaires focus on some general questions to understand the current baby carriages market. After the following analysis and summary, we decided to issue another questionnaire which emphasized on the satisfaction of many recommendations based on the first questionnaires. The second questionnaires were issued to a smaller group within the same sample. We effectively realized the feedbacks of some solutions from such participants, thus to help us to design optimized product service system.



Fig 3-1 Baby carriage questionnaire sample

The first original sample consists of 81 Chinese families, which include 27 families do not need baby carriages recently, 27 families intend to buy baby carriages and 27 families have already owned baby carriages. 75 questionnaires were taken back, and 74 questionnaires were valid. No demand families submitted 23 feedbacks, intending purchase families submitted 25 feedbacks, and Purchased families submitted 26



feedbacks. These questionnaires were issued in Beijing, Shanghai, Qingdao, Wuxi and etc, totally 8 Chinese cities. The issuing time was around October 2010, and the result was obtained in 23th October 2010.

The second questionnaire consists of 30 families within the first sample, which includes 10 no demand families, 10 intending purchase families and 10 purchased families. 29 questionnaires were taken back, and 29 questionnaires were valid. All of the No demand families and intending purchase families submitted the feedbacks, and one of Purchased families did not submit the feedback. The second issuing time was around November 2010, and the result was obtained in 20th November 2010.

### 3.2 Questionnaires

Table 3-1 Baby carriage market questionnaire (Wu Ting,2011)

<b>Questionnaire</b>	<b>A</b>
NO. _____	
<b>Baby Carriages Market</b>	
This questionnaire commits to understand some basic information about current baby carriages market, thus to assist us to improve the product design and service. Thanks for your help. Best regards.	
_____dd_____mm_____2010	
Name: _____	
Address: _____	
Telephone: _____	
work : _____	
Sex: <input type="checkbox"/> Female <input type="checkbox"/> Male	
1、 In what age group are your children?	

0—1     2—3     3—4     5-8

**2、 How many children carriages do you think is acceptable during your children are growing?**

1     2     3     4     over 5

**3、 In what salary group are you?**

3000-5000RMB/M     5000-7000RMB/M     7000-9000RMB/M  
 9000-11000RMB/M

**4、 What is the percentage of your baby carriage consumption in a family's total expense per year?**

less than3%     3%-5%     over 5%

**5、 how often do you think you would buy it?**

frequently     occasionally     rarely     never     hard to say

**6、 What's your origin of baby carriage?**

Purchase by yourself     Given by your freinds     second-hand purchase  
 Rental

**7、 What's your purchase channel of baby carriage?**

Shopping mall     Professional infant & mom sites     BtoC website  
(eg.TAOBAO)     Abroad buy

**8、 In what price group of baby carriage is acceptable for you?**

200-300 RMB     300 — 500 RMB     500 — 1000 RMB     over 1000 RMB

**9、 What's your opinion of the baby carriage's price in the market?**

Expensive     Acceptable     Cheap

**10、 What do you think of baby carriage assemble?**

Too complex     Complex     Easy     Too easy

**11、 what is you pay close attention to baby carriage during purchase?**

Cost performance     Safety     Flexibility     Functionality      
Comfort     hygiene     personalization

**12、 How do you deal with your used baby carriage?**

give others     unused     as a storage     sell to others

other\_\_\_\_\_

**Thank you for your help!**

Table 3-2 Baby carriage rental questionnaire (Wu Ting,2011)

**Questionnaire**

**B.**

**NO.**\_\_\_\_\_

### **Baby Carriages Rental**

The purpose of this questionnaire is to find out what is your opinion about baby carriage rental, thus to assist us to improve baby carriage product service system design. Thanks for your help. Best regards.

\_\_\_\_dd\_\_\_\_mm\_\_\_\_2010

**Name:**\_\_\_\_\_

**Address:**\_\_\_\_\_

**Telephone:**\_\_\_\_\_

**work :**\_\_\_\_\_

**Sex:**     Female     Male

**1. What is your opinion of baby carriage rental?**

agree     neutral     disagree     no opinions

**2. In what price group of baby carriage rental is acceptable for you?**

Less than 50RMB     50-100RMB     over 100

**3. How often do you think you use online shopping?**

frequently    occasionally    rarely    never    hard to say

**4. What is your opinion of baby carriage personalization ?**

agree    neutral    disagree    no opinions

**5. What is you pay close attention to baby carriage changeable accessories which need to be changed?**

Cost performance    Safety    Comfort    Practicability  
 Hygiene

**6. What is your opinion of using second-hand baby carriage?**

agree    neutral    disagree    no opinions

**7. What is your opinion of baby carriage recovery ?**

agree    neutral    disagree    no opinions

**8. Do you think you need special instruction about how to use rental baby carriage?**

agree    neutral    disagree    no opinions

**9. How often do you think you share experience with other parents?**

frequently    occasionally    rarely    never    hard to say

**Mr / Miss, thank you. The interview is now completed. Good Bye.**

### **3.3 Sample description**

According to the feedback from above questionnaires, we summarized the following data to describe the result. We emphasized on the question 2, 4, 6, 8, 11, 13 in questionnaire A and the whole questions in questionnaire B.

Fig.3-2

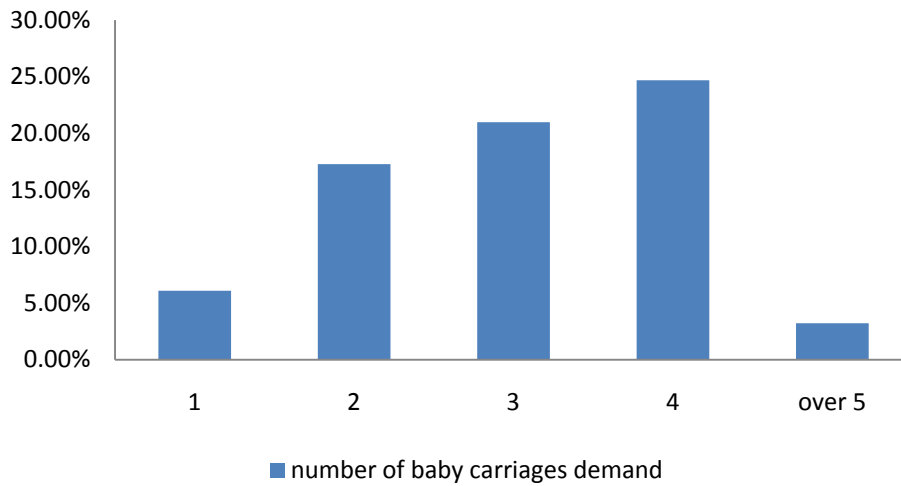


Figure 3-2 shows how many children carriages are demanded during children growing process. It can be seen that 4 carriages are acceptable by most families, about 25%. Most families prefer to buy more than 1 child carriages. However, over 5 carriages seem to be not necessary for most families.

Figure 3-3

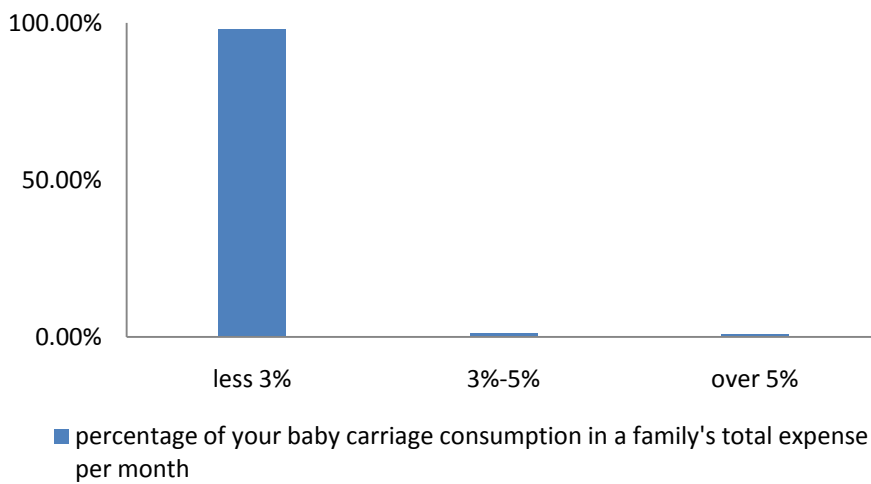
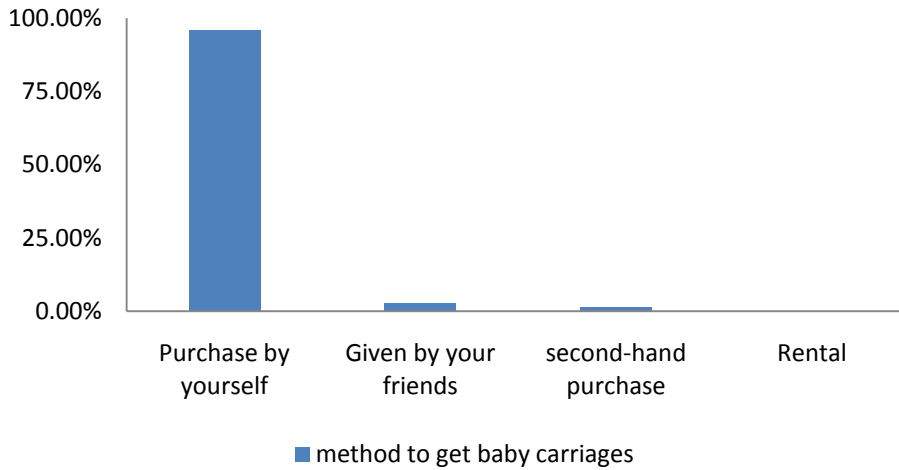


Figure 3-3 shows the proportion of consumption of baby carriages occupied in a family's total expense in one year. From the table, we can easily find out nearly all of the families spend less than 3% money in baby carriages consumption per month in China.

Figure 3-4



From figure 3-4, we can see that most families chose to buy baby carriages by themselves. Few families could get baby carriages from friends. Only one family was willing to buy second-hand baby carriage. And no family chose rental option.

Figure 3-5

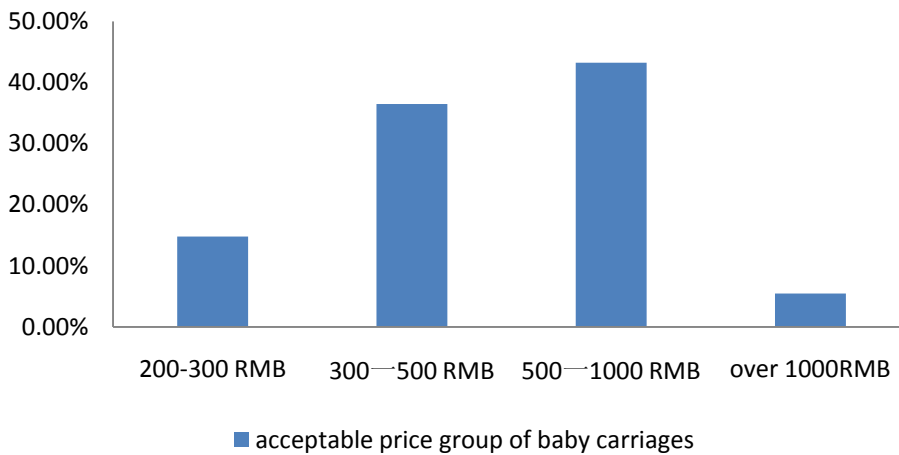
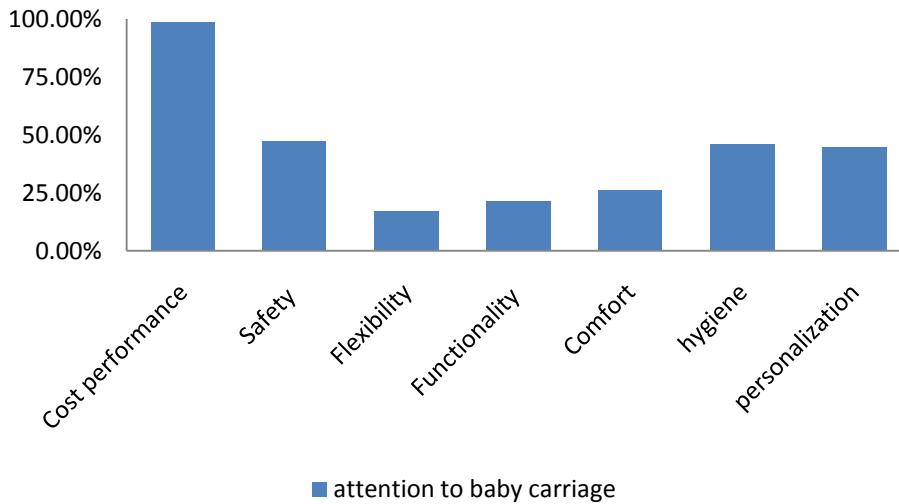


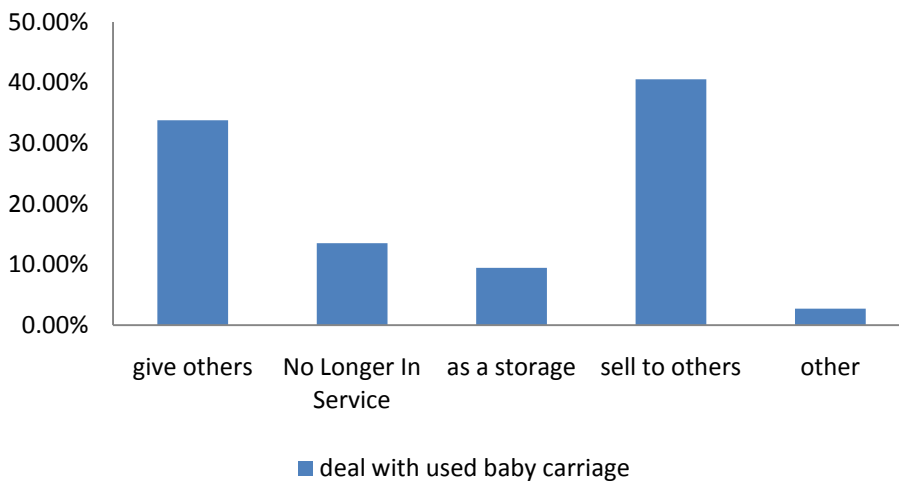
Figure 3-5 shows that three fourths families could accept more than 300 RMB to buy baby carriages. Nearly 37% families chose 300-500 RMB, and more than 40% families chose 500-1000 RMB. While few families want to pay more money in baby carriages purchase, it shows only 4 families select more than 1000 RMB option.

Figure 3-6



This question focuses on requirements of customers when they purchase baby carriages. Each family could choose no more than three options in this question. From figure 3-6, it can be seen that nearly all of the families were care about cost performance. Families also pay highly attention to safety, hygiene and personalization of baby carriages.

Figure 3-7



From figure 3.7, we can find that most families are not willing to store the used baby carriages. It seems that 35% families chose to give others and 40% families chose to sell to others. While some baby carriages were still in idle, wherein 13% baby carriages might be broken down and no longer in service. 10% baby carriages were conserved as a storage.

Figure 3-8

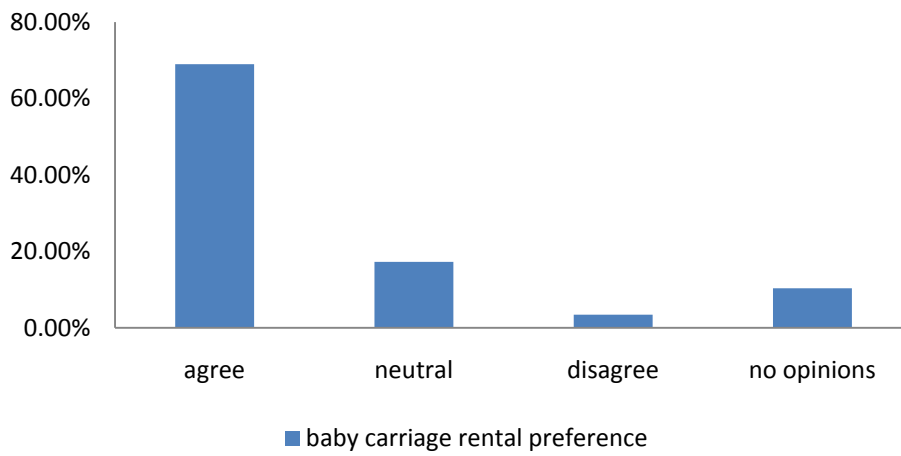


Figure 3-8 shows how participants think about baby carriages rental service. 70% families seemed to support this view. It means rental service have been accepted by most Chinese families. While 18% families still held the neutral view, and 10% families had no opinions in this service.

Figure 3-9

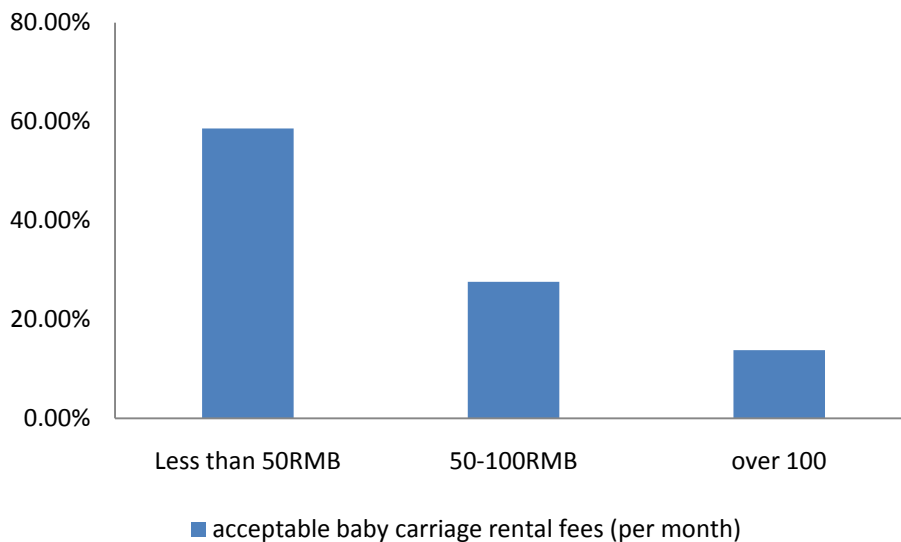
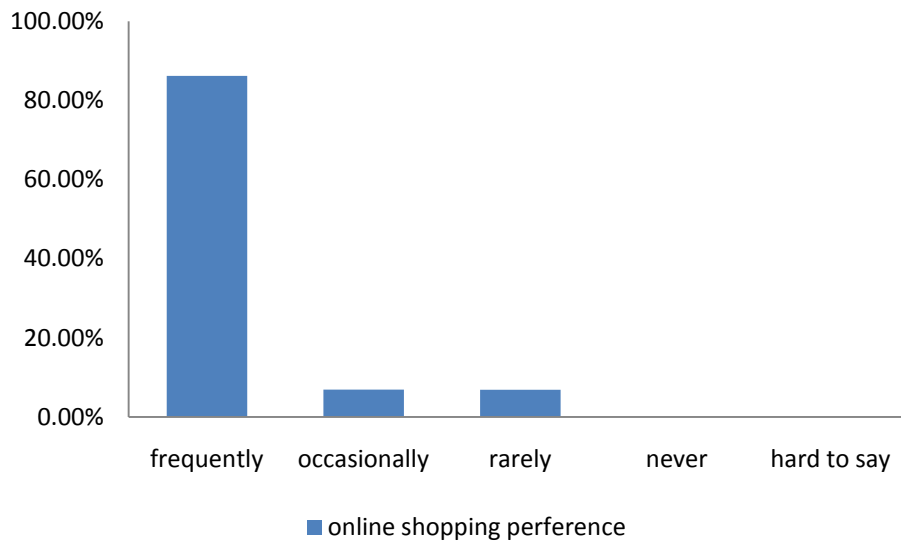


Figure 3-9 presents nearly 60% families accepted less than 50 RMB rental fees of baby carriages per month. Only 10% families were willing to pay more than 100 RMB rental fees. It is significant lower than the average level in the world.



Figure 3-10



This question tends to understand the online shopping consumption habits. From figure 3-10, we can see that more than 80% families purchased online frequently. No families never purchased online, and only 4 families did not prefer online shopping.

Figure 3-11

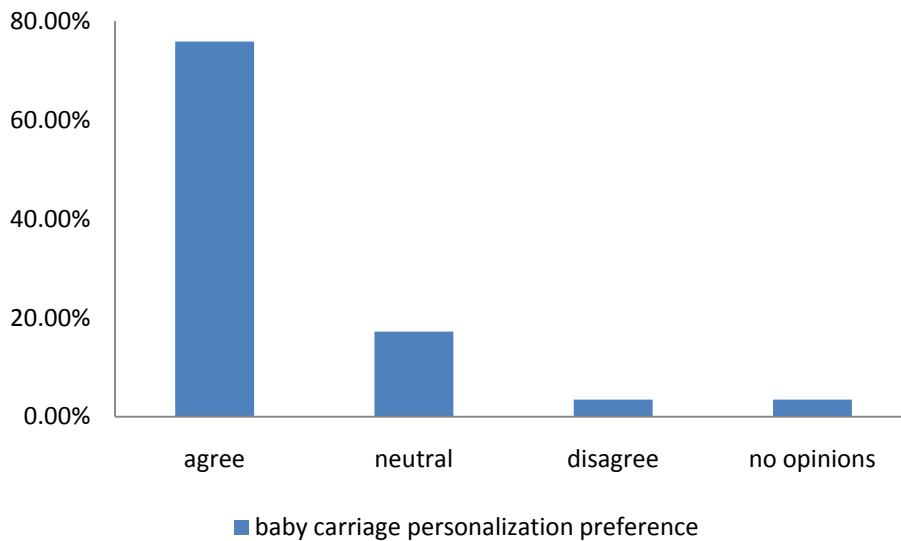
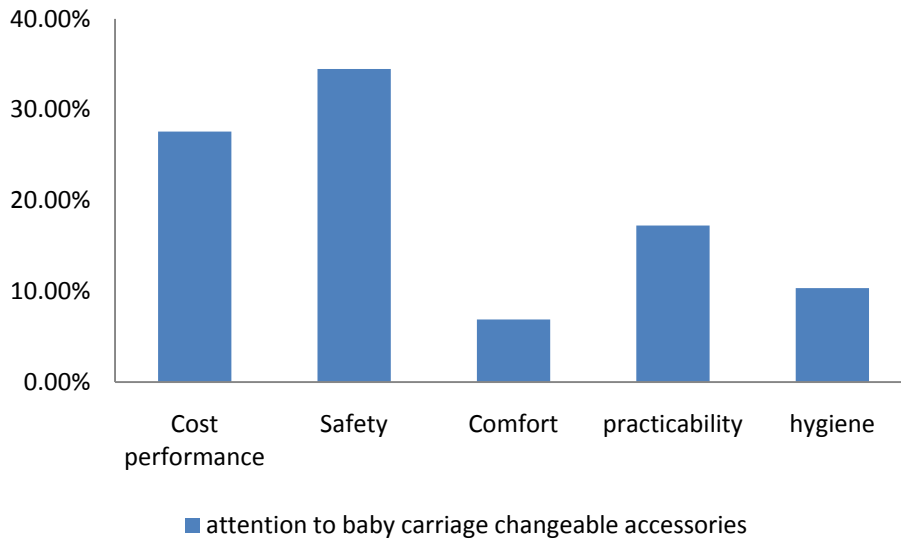


Figure 3.11 shows how participants think about personalized baby carriages. Nearly 80% families preferred personalization. It seems personalized baby carriages would be popular in Chinese market. While 15% families still held neutral view.

Figure 3-12



This question focuses on customers demand when they change accessories of baby carriages. From figure 3-12, it can be seen that most families choose safety as their central concern, about 35% families selecting this option. Following safety assurance, families also pay highly attention to cost performance, practicability hygiene and comfort of baby carriages.

Figure 3-13

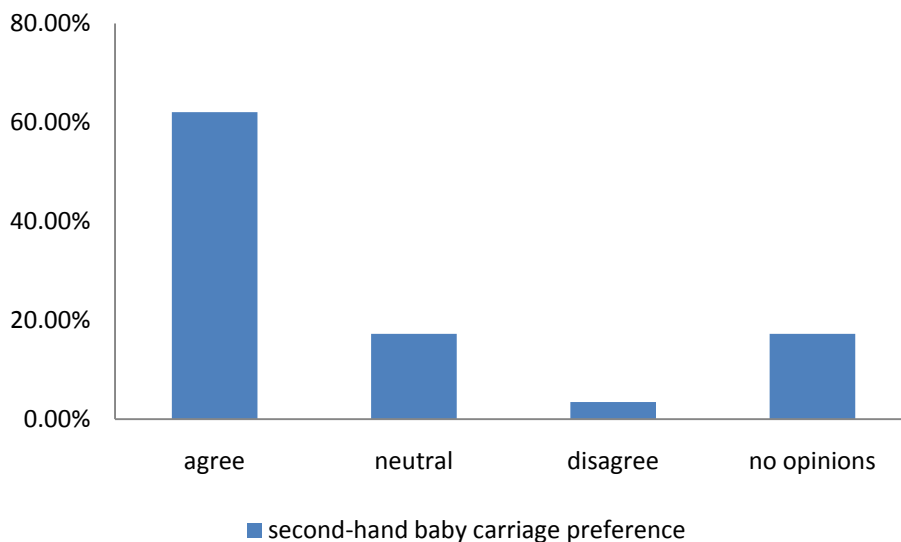
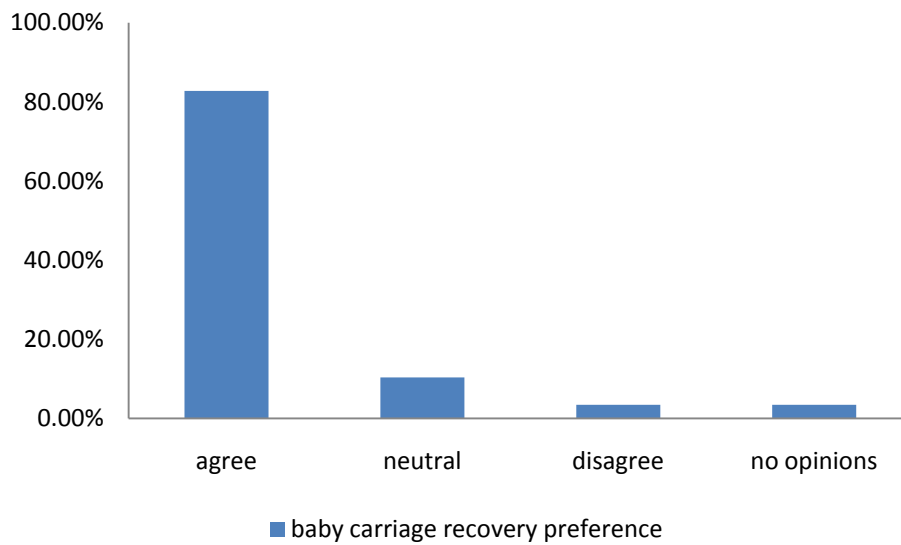


Figure 3-13 shows that 60% families were willing to accept second-hand baby carriages. Nearly 20% families had no opinions in this question. It seems they might not fully understand second-hand market. However 20% families still held the neutral view.

Figure 3-14



From figure 3-14, we can see that baby carriage recovery service have been widely accepted by Chinese families. 80% families chose agree in this question. While, some families seems to prefer store the used baby carriages.

Figure 3-15

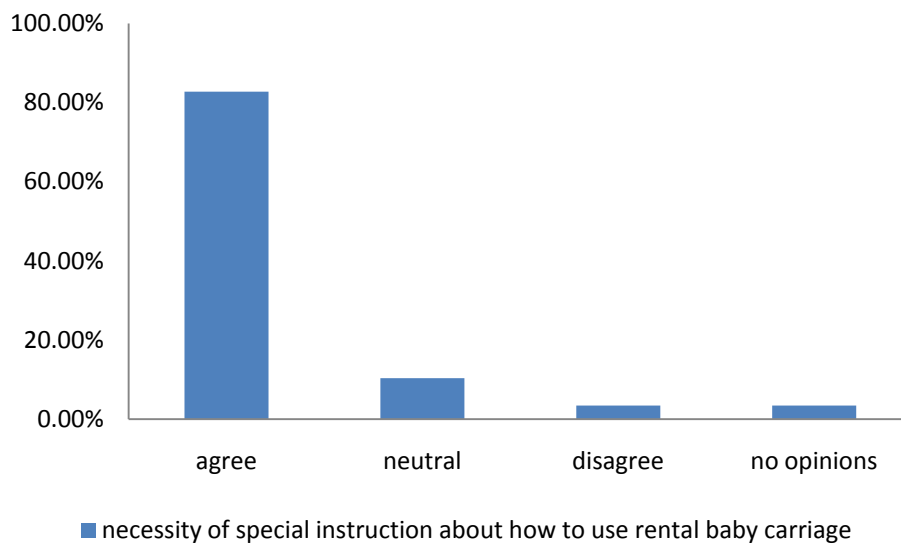
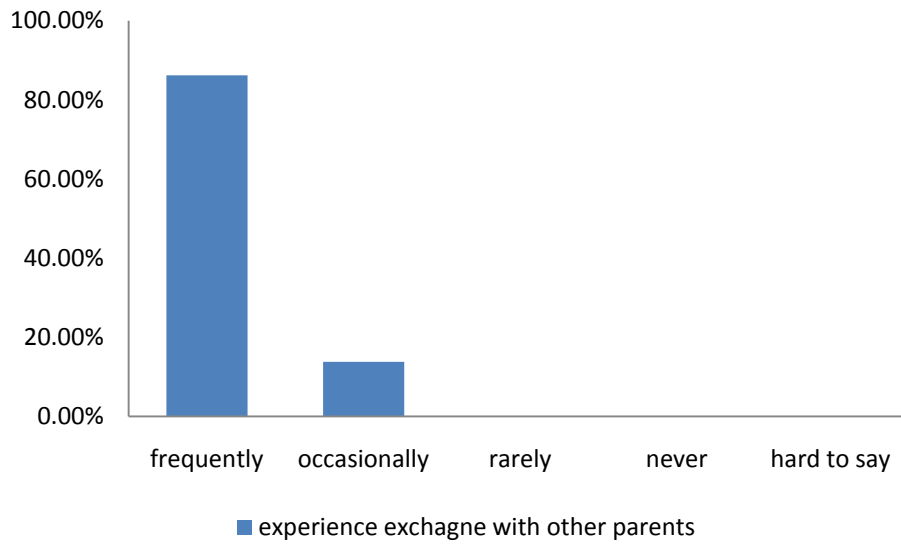


Figure 3-15 present the necessity of special instruction about how to use rental baby carriages. It seems that baby carriages leasing service are still a new view in Chinese market, most families are not familiar about this service. Thus 80% families required the instruction of the service.

Figure 3-16



This question tends to find out how families exchange experience with others. From figure 3-16, we can see that all of the participants were willing to share their experience with other parents. 85% families frequently communicated with other families and 15% families exchange experience occasion.

## **CHAPTER FOUR: RESULT DESCRIPTION AND RECOMMENDATION**

### **4.1 Result analysis**

In the present age, baby carriages are playing increasingly important roles in the lives of families with children. Owing to Chinese special culture and one-child policy, new families pay a lot of attention on children. They wish their children will grow up in the best condition.

Convincing arguments can be made that baby carriages in the Chinese market combined with a Product Service System is possible and meet parents' requirements. To start with, according to the first questionnaire, most families will buy no less than 2 baby carriages, like baby stroller, baby walker, and baby bicycles. Obviously, more and more families will acknowledge that baby carriages are necessary; they are good helpers for children and parents. Moreover, most families think baby carriages with good quality are very expensive which is a big economic pressure for them. Specifically, in the Chinese market, the international brand baby carriages cost about several thousand RMB as the same as parents' salary per month. But they don't trust the quality of domestic brands with cheaper costs. When the baby grows up, they don't need baby carriage any more, most families have no idea about how to deal with it. Then it transferred an environmental pressure to them. Lastly, young families need diversification of baby carriages, such as personalization and flexibility.

In summary, I would concede that baby carriages rental product service system has a bright future in China. Despite that we should do a lot to meet people's needs. Baby carriages rental product service system is acceptable by most families. Then we send the second questionnaire to the same sample to understand what people's opinion to baby carriage rental platform so that thus assist us to improve baby carriage product service system design more efficiently.

It is evident that new families accept baby carriage rental and wish a more convenient, diversified and economical platform come out. Firstly, most families think baby carriage rental is a good solution to solve these problems effectively. It avoids families paying a certain amount of money to buy baby carriage which disperse and reduce economical pressure. Secondly, online shopping is increasingly prevalent in the contemporary world. More exactly, you can have more choices and have home delivery service which can save you a lot of time and money. Parents accept using second-hand piece and pay close attention on safety and hygiene to baby carriage changeable accessories. Thirdly, more and more young parents keep a watchful eye on environmental problems. More precisely, they agree greatly to baby carriage recovery and changeable accessories to prolong products' life-cycle which descend environmental pressure. Finally, communicating with others and sharing experience play an increasingly key role in modern lives. Parents need a platform to know more knowledge about how to bring up a good baby and growing with babies together.

On the basis of the above description, people need an integrate baby carriage platform to use baby carriages with high quality and lower price , dealing with used piece, sharing with others. Overall, I am convinced that baby carriage rental platform should further promote the development of baby carriage industry and meanwhile the suppliers should introduce measures to regulate this industry more effectively.

## **4.2 Recommendations**

Baby products services system could be recognized as a kind of market timely requirement. In current baby carriages' industry, services system is essential and significant for manufactures to activate business and promote competitive power. China has already built up many baby carriages' leasing websites to meet such demand. However, most websites have sole function, and only support transaction platform to second-hand baby carriages. The products exhibited in such websites

could not be insured the safety and hygiene. Therefore, this kind of service system could not effectively recombine the industry structures and integrate resources. Finally, it does not fundamentally solve the problem, Chinese baby carriages market still face the serious challenges.

According to previous analysis, it can be seen that the primary participants within baby product life cycle include consumers and enterprises. Such participants state following rental requirements.

*For consumers:*

- Quality and safety assurance

Quality and safety assurance are the most important elements for children's products. It is worth nothing that the two elements make children live a basic and safe life.

- Hygiene assurance.

It seems that babies are still immature and vulnerable. Thus Parents always pay high attention to hygiene problems. Renew and personalized demand. Obviously, babies are preferred to new and distinctive products. Vivid color and comfortable materials could easily attract babies' interest and fit their aesthetic need.

- Good price

The products could not be so expensive beyond the accepting range of customers. Under the quality and safety assurance, a high cost performance is desired by customers.

- Simple structure, sustainable usage time and convenient modification

These factors could effectively enhance the useful time of baby carriages and improve the practicability. It not only saves the money for customers, but also reduces the resource waste and environment pollution.

- Good after – sales services.

A systematic after – sales service could increase the recovery efficiency, and effectively coordinate the demand and supply in baby carriage market.

*For enterprises:*

Baby carriages rental product service system brings numerous benefits to suppliers. To start with, the system informs them about the latest products on the market. Therefore, with the help of platform, enterprises can make their products more economical and less time-consuming to customers. Moreover, the changeable accessories of baby carriages can be a genuine form, which can inspire them to design more creative products. Recovery second-hand and using changeable accessories can promote enterprises brand image which contribute to environment protecting and saving resources. Specifically, instead of wasting time and effort to do user experience research, enterprises can get the first-hand information about parents' using experience and competitor's data which is good for industry' development. Such enterprises state following rental requirements :

- Master latest user experience data to promote the follow-up products development and innovation
- Assess the damage data of baby carriages' leasing system. During the usage process, products are ineluctable to wear and destroy, reasonable compensation is necessary for customers.
- Extend their market share in baby carriage market
- Increase their revenue and reduce the cost.



## **CHAPTER FIVE: LEASING SERVICE SYSTEM ANALYSIS IN BABY CARRIAGES' MARKET**

### **5.1 Introduction of an optimized baby carriages' leasing website under product service system.**

The optimized baby carriages' leasing website belongs to oriented product service system. Customers could apply to suppliers for leasing when they demand baby carriages, such as going out for a walk. Suppliers still have the ownerships of these products, they could also support the maintain service and recover the products. Customers do not need to buy baby carriages, they only pay the using fees. First customers need to pay a certain amount of deposit which depends on the level of products. The actual cost depends on the usage time. Through this website, customers could select the products which they prefer, and also choose the suppliers who have the higher reputation. In addition customers will not be worry about the products disposal problem; enterprises will recover the products through this website. The recovery products could be renewed, discarded, recycled and split. Baby carriages manufacturers could collect the user experience data through this service system to promote the follow-up products development and innovation, thus to improve the brand image and reputation.

Through this website, customers could directly, accurately and conveniently understand the suppliers' information, and further recognize products quality and feedbacks. Suppliers could easily and effectively advertise their products, and understand customers' demands. Furthermore, parents could also share and exchange their experience in using baby carriage, baby education and etc.

#### ***5.1.1 Products***



Fig.5-1 products of baby carriage (Wu Ting,2011)

In order to meet consumers’ demand in baby carriages’ safety, hygiene, convenience and personalization, leasing baby carriages is different from normal products. According to the analysis of questionnaires and surveys, we need to consider the whole life cycle and design the products from each stage within the life cycle. Based on customers’ preferences and children’ demand, we could distinguish the models of products, such as baby strollers, baby walker, baby bicycle, baby tricycle and baby motorcycle. As we know each component has different functions, manufactures can produce standardized component which could be installed in different baby carriage models. Thus customers could choose their favorite models and reform the products based on their preference and demand. This design could not only satisfy customers, but also realize material recovery and recycle. It integrates the products manufacturing procedure, and lengthen products life cycle.

Table. 5-1 Modularization of baby carriages (Wu Ting, 2011)

<b>Model</b>	<b>Baby Strollers</b>	<b>Baby Walker</b>	<b>Baby Bicycle</b>	<b>Baby Tricycle</b>	<b>Baby Motorcycle</b>
<b>Function</b>					
<b>User’ special function</b>	Bassinette Cover Buffer	Cushion Cover Armrest	Seat Cover	Seat Cover	Seat Buffer
<b>Structural function</b>	Wheel Frame Handle	Wheel Frame	Wheel Frame Brake	Wheel Frame Brake	Wheel Frame Brake

	Brake apparatus Foot-treadl e		apparatus Foot-treadle	apparatus Foot-treadle	apparatus Battery
<b>Auxiliary function</b>	Sunshade Plate Storage basket	Tool	Sunshade Storage basket Bell	Sunshade Storage basket Bell	Storage basket

From this table, we could find that components are easily changed and renewed. The Structure of baby carriages are simple and practical.

### 5.1.2 Service

#### Leasing service

Leasing service can be identified as two ways, short time and long time.

- Long time:

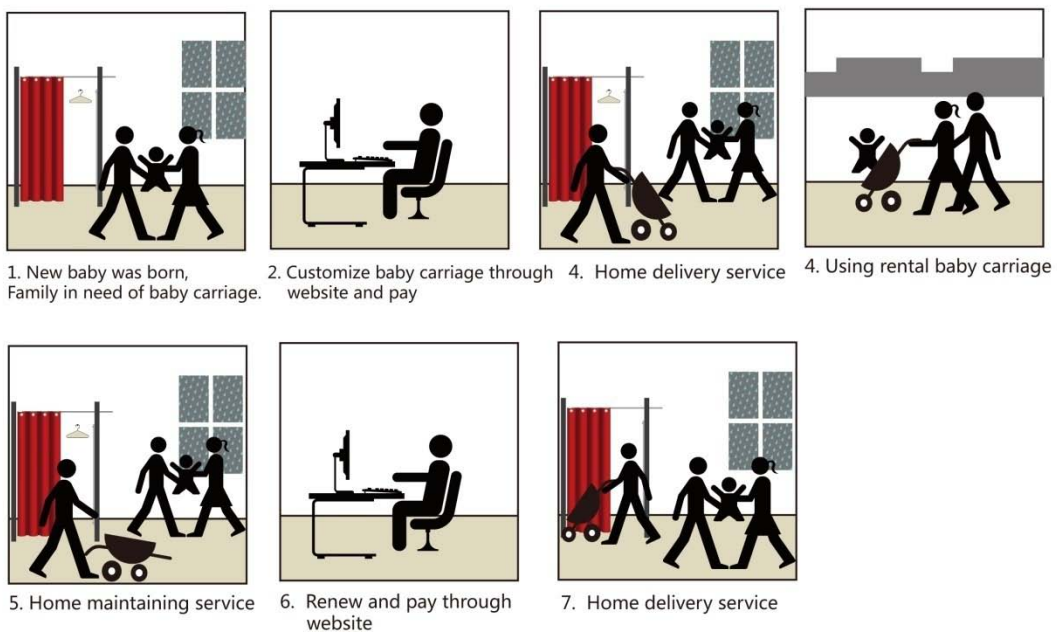


Fig.5-2 User map of long time leasing service (WuTing,2011)

Long time baby carriage leasing service means that customers could rent different models baby carriages during different children growth period. For example, customers may rent baby strollers when their babies are just born, and they may rent baby walkers after 1year. The service system can be operating in the whole baby growth process. Customers can select products from optimized baby carriages' leasing website, and also state personalized requirements to suppliers through the website. Workers provide the home delivery service, and customers can pay the fees to enterprises on websites. If there are any problems during the usage period, customers can contact the enterprises by phones or website. Maintenance workers can directly repair the product at home or provide a new one. When the leasing baby carriages are expired, customers could extend loan time through paying the extra usage time from optimized baby carriages' leasing website. If baby carriages are no longer demanded, customer could contact the enterprises to take products back.

- Short time:

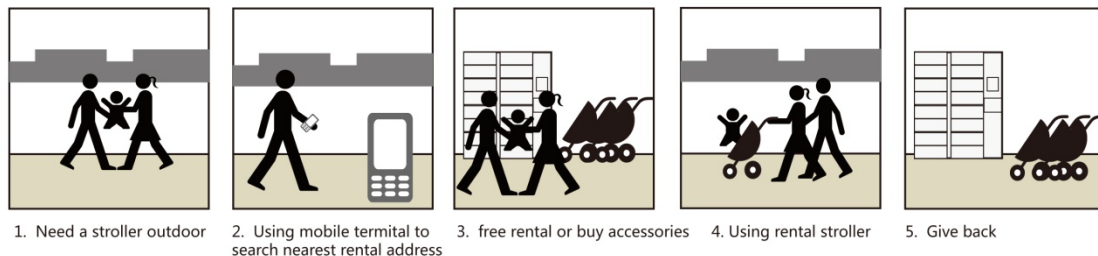


Fig 5-3 User map of short time leasing service (Wu Ting,2011)

Short time baby carriage leasing service focuses on baby strollers. Suppliers will set up service centre in shopping mall, fairground, exhibition hall and other public places. Customers could rent baby carriages temporarily in such service centre. It seems that parents do not need to carry baby carriages all the time, and they can also choose diversified products depended on difference places. Customers can get the information of these service centers through the optimized baby carriages' leasing website, such as location, baby carriages types, service time and etc. They could also download the APP software into their mobile phones to assist them to find out the

nearest service centre. Service centers charge the fees based on using time, and refund the deposit when customers return the baby carriages. Component can be changed for free in service centers, thus to increase the safety and hygiene assurance of the products.

*Recovery and trading services of baby carriages*

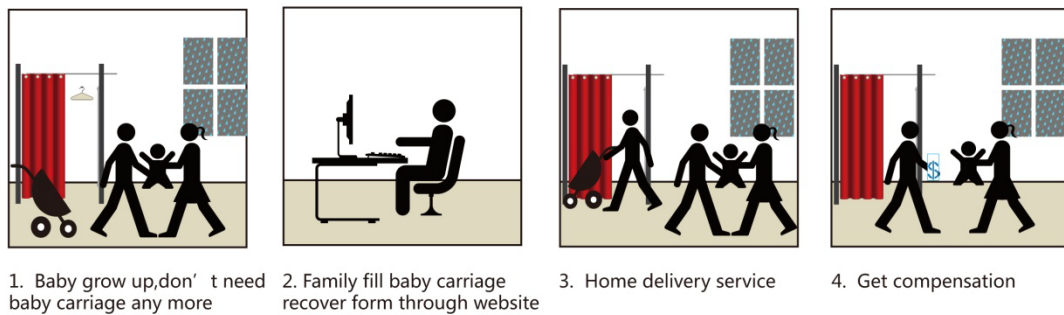


Fig 5-4 User map of trading services of baby carriages (Wu Ting, 2011)

Many families, have already owned baby carriages, could contact enterprises through optimized baby carriages' leasing website. Firms will take such baby carriages back and support a certain amount of compensation to these families. It not only effective provides a recovery channel for enterprises, but also reduces the cost for these families.

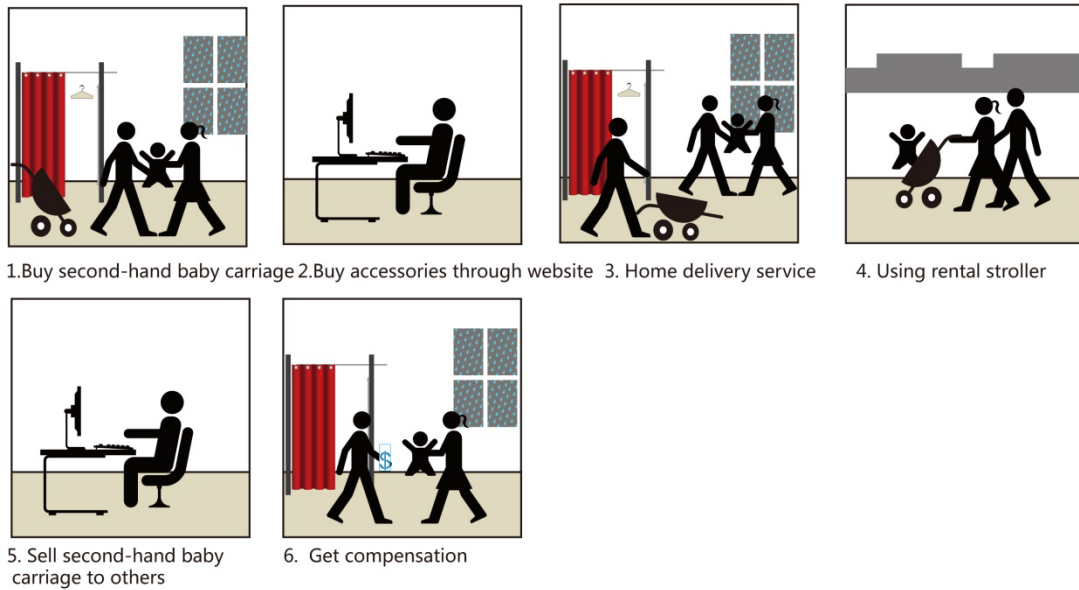


Fig 5-5 User map of recovery services of baby carriages (Wu Ting.2011)

Some families, have already owned baby carriages, prefer to sell these products by themselves. They can buy diversified components from optimized baby carriages' leasing website. Workers will support home delivery service and change these components for free. It ensures the safety and hygiene of used – products, thus to increase the liquidity of the used baby carriages.

#### *After – sale service*

Customers could support the feedback to enterprises through optimized baby carriages' leasing website. They could also find some relevant web links through the website, such as using experiences, APP software download, baby carriage GPS system and etc.

#### **5.1.3 Systematization**

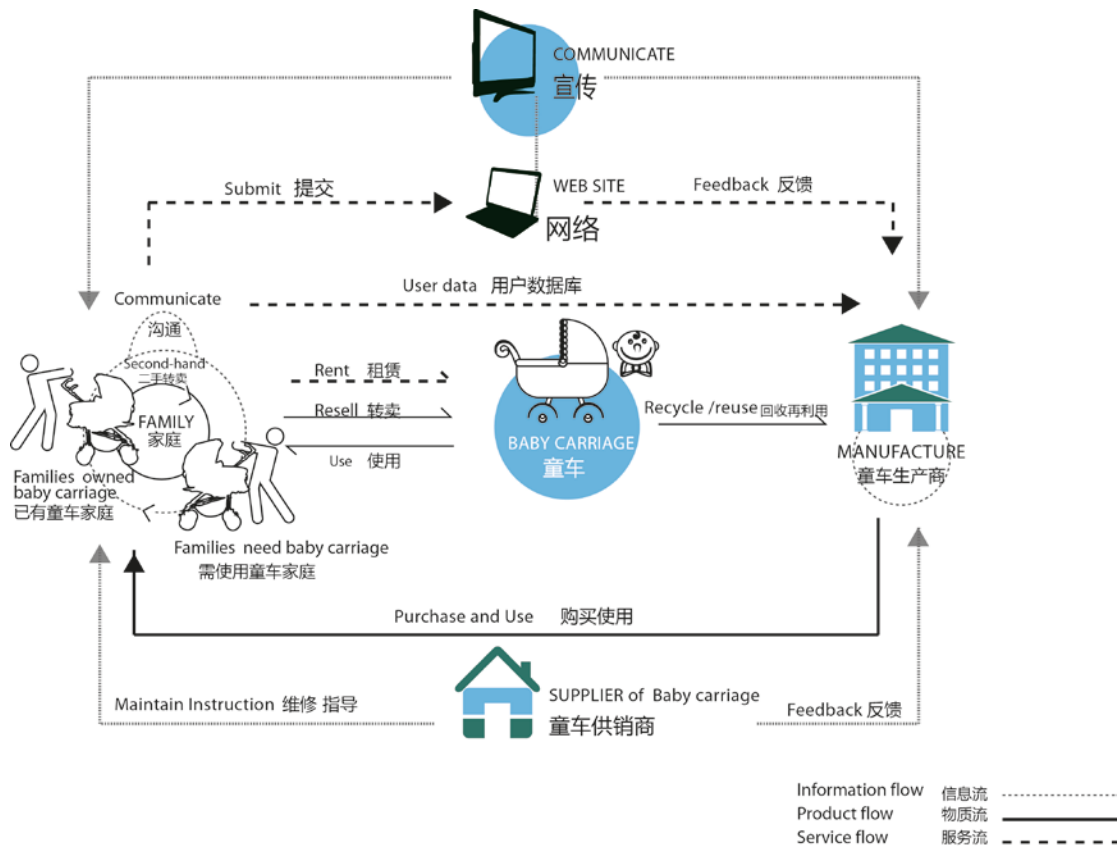


Fig 5-6 System map(Wu Ting,2011)

Product service system integrates the whole participants within baby carriage market.

- Customers could state personalized requirements through optimized baby carriages' leasing website. Suppliers could provide the options about color, model, materials and functions based on the requirements, which realize the interaction between customer and suppliers. Furthermore, enterprises could obtain the latest using experience data from the website to promote the follow-up products development and innovation, thus to improve the brand image and reputation.
- Short time baby carriage leasing service significantly reduces the inventory of baby carriage enterprises. In addition, it could advertise the brands of baby carriages in public places.
- Optimized baby carriages' leasing website offers an exchange platform to share

the baby care knowledge and experience.

## 5.2 Design of optimized baby carriages' leasing website

### 5.2.1 Frame

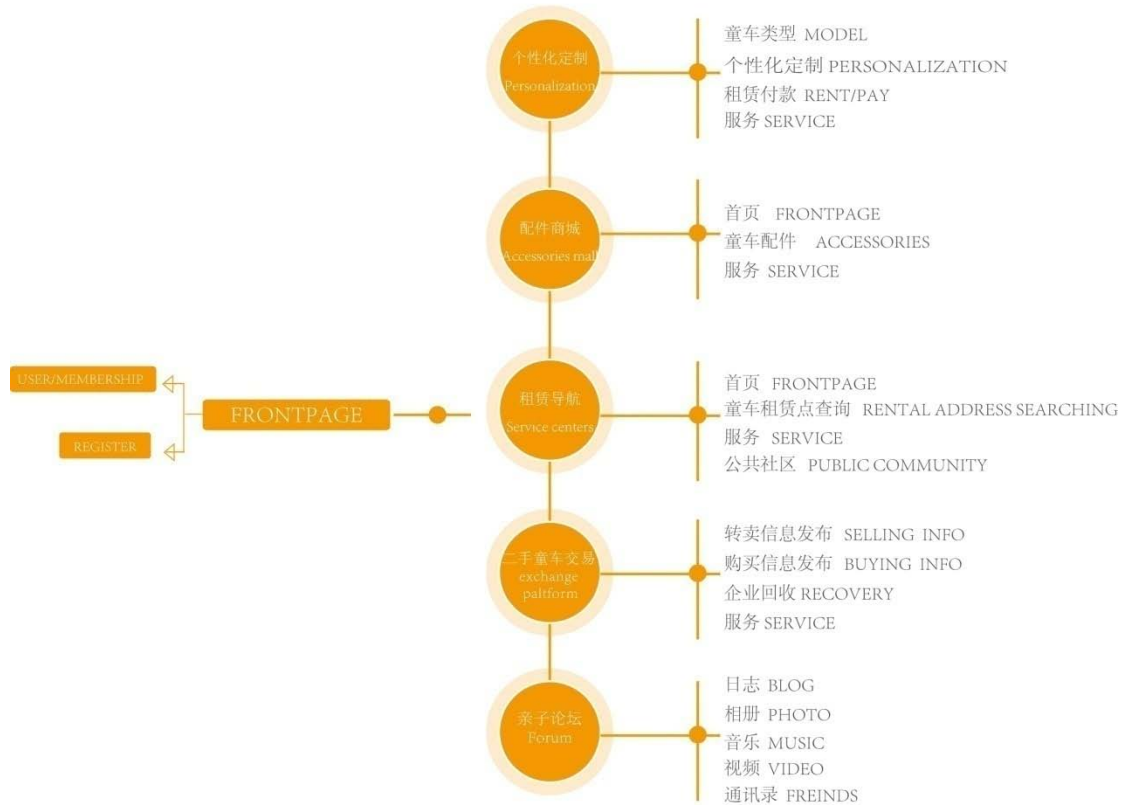


Fig 5-7 Website frame (Wu Ting.2011)

From the diagram, we can see that the function could be identified as five factors, personalization, service centers, component mall, used – baby carriage trading service and exchange platform.





Fig 5-8 Website frontpage (Wu Ting.2011)

### 5.2.2 personalized baby carriages customizing

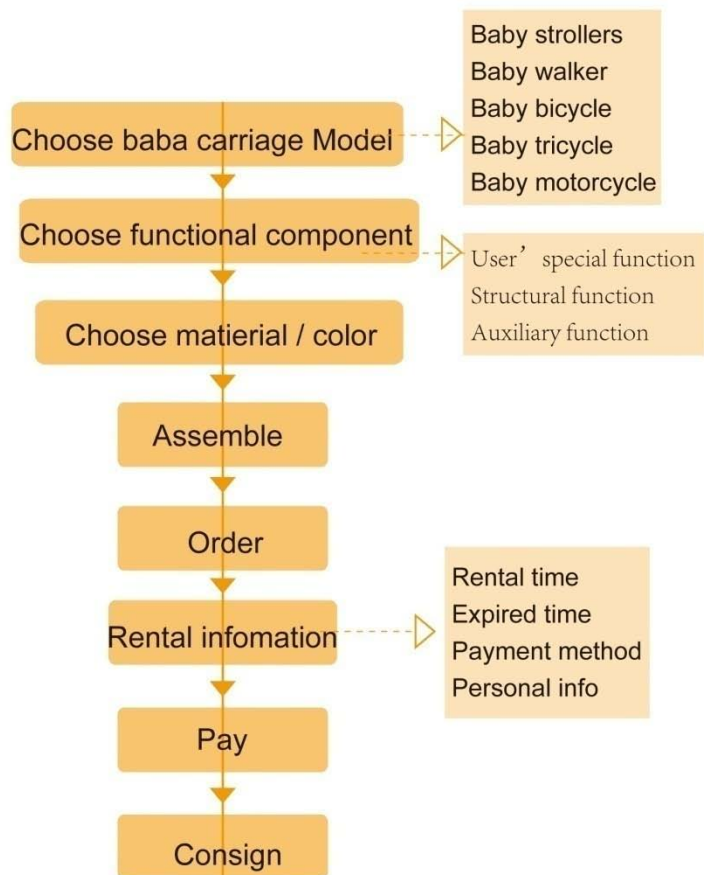


Fig 5-9 Process of personalized baby carriages customizing (Wu Ting.2011)

Customers could register an account on optimized baby carriages' leasing website, thus they could login the system to state their requirement. Firstly, customers need to confirm the model of baby carriages. Then they could choose the components base on their preference. Following to make sure the color, material and size of the component. Finally, customers could realize the baby carriages assembling on website. After modification, customers will place orders to enterprises. The order need to clarify the rental time, expired time, payment method and personal information. Thus workers will deliver the products to the home.



Fig 5-10 Webpage of personalized baby carriages customizing (Wu Ting.2011)

### 5.2.3 Component mall

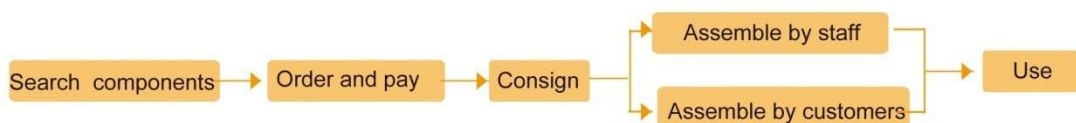


Fig 5-11 Process of component mall(Wu Ting.2011)

Component mall provides diversified components on optimized baby carriages' leasing website. Customers could change the component instead of changing baby carriages. It effectively extends the usage time of baby carriages and reduces the cost for customers. Workers will support home delivery service and assist customers to change component for paid. Customers can also change the components by themselves following the accessory specification.

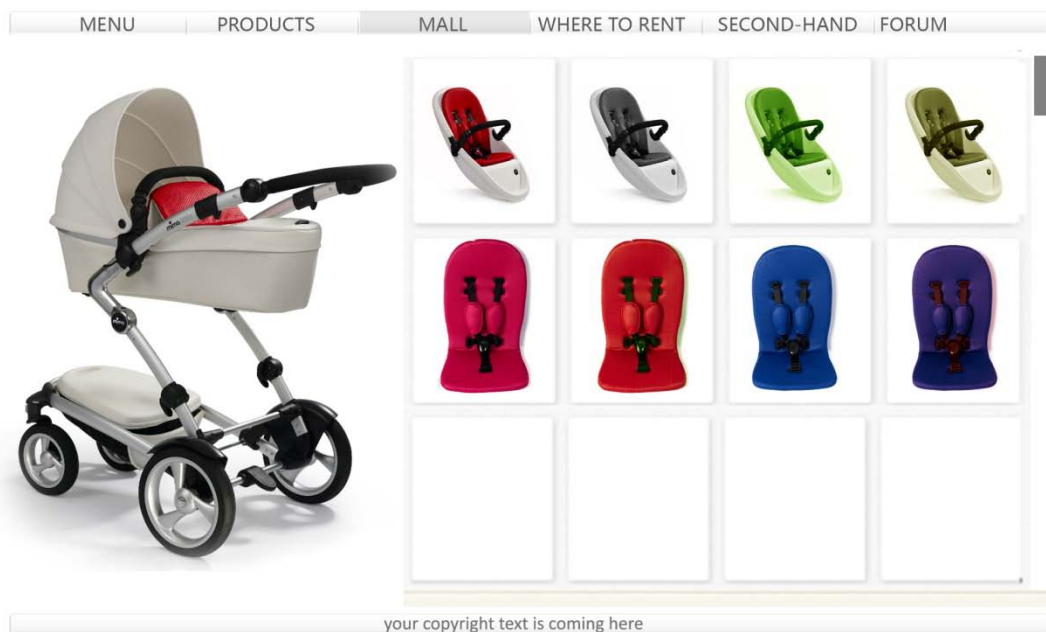


Fig 5-12 Webpage of component mall (Wu Ting.2011)

### 5.2.4 Service centers

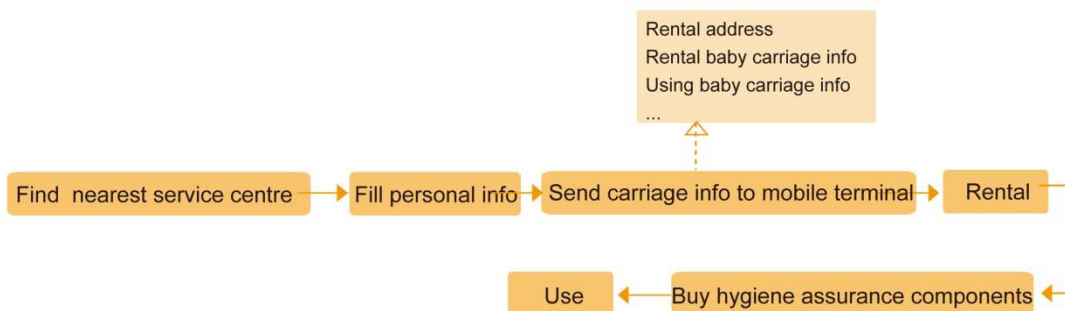


Fig 5-13 Process of using rental baby carriage outdoor (Wu Ting.2011)

Customers can download the APP software into their mobile phones from optimized baby carriages' leasing website, to assist them to find out the nearest service centre. They can also changed components for free in service centers, thus to increase the safety and hygiene assurance of the products. If customers have some problems, service centers could timely find out the location of the rental baby carriages through GPS system. It ensures baby carriages can be returned on time.

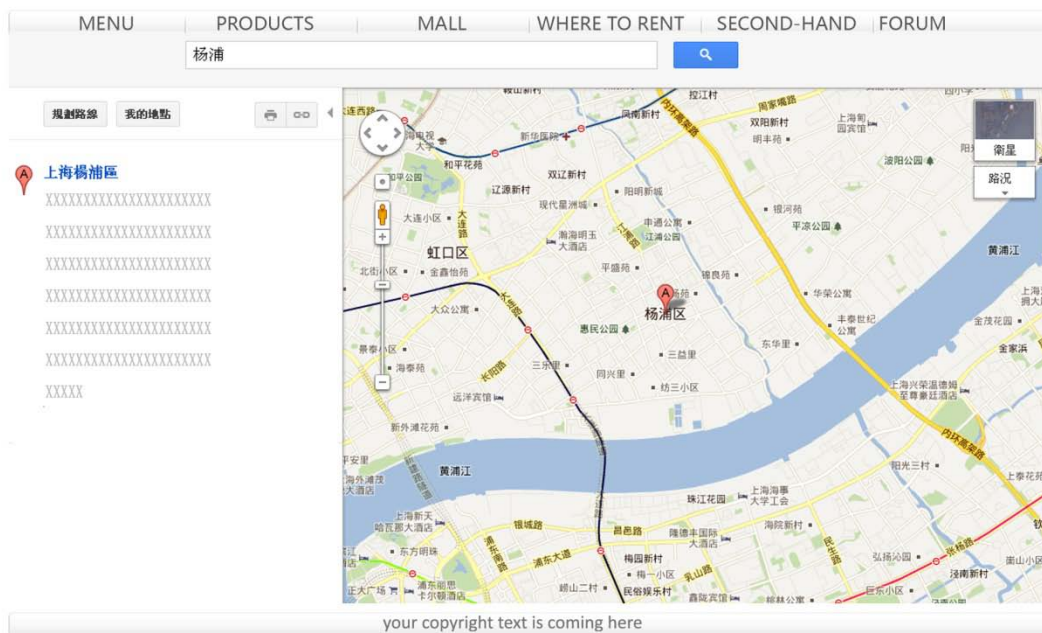


Fig 5-14 Webpage of using rental baby carriage outdoor (Wu Ting.2011)

### 5.2.5 Used – baby carriage trading service



Fig 5-15 Process of used- baby carriage trading service (Wu Ting.2011)

Families which have already owned baby carriages can upload the relevant information of the products to optimized baby carriages' leasing website. Firms will take such baby carriages back and support a certain amount of compensation to these

families. On the contrary, customers who want to buy used - baby carriages can also upload the requirement to the website. The system will automatically match the information and prompt the suitable suppliers.

### ***5.2.6 Exchange platform***

Optimized baby carriages' leasing website supports an exchange platform to share the baby care knowledge and experience. Parents can take about the products, education and other information through the platform. Enterprises can also obtain useful information from this exchange platform.

## CHAPTER SIX: CONCLUSIONS AND PERSPECTIVE

### 6.1 Conclusion

On the basis of the above analysis, it is convinced that product service system is very important to modern industry. PSS benefits sustainable development in a more scientific and systematic way. It combined products and services which meet customers' need but no require the ownership of product itself which save a great deal of resources. It is a brand's long-term strategic planning.

Service is advancing at an amazing speed in present-day society and we are already in Service Industry. Product service system is still a blank in Chinese market in the mean time that foreign baby carriage industry has got a success with PSS strategy. Such as Darebin baby capsules, ENG GROUP, DISNEY and so on. Domestic brand GOOD BOY has attempted to carry out PSS strategy. They combined high quality products and unique service organically to improve product value, brand image, social image with high value added. Thus realize the resource sharing by suppliers, retailers and customers. It has been identified as a paragon to sustainably develop in economic and ecological field. To introduce the concept of integrated PSS in the marketing is a milestone for changing social consuming ideas. On balance, we should further promote the spread of PSS knowledge in 3 levels of business, government, social public opinion and reach the ultimate goal of comprehensive sustainable development with creating and improving PSS.

We selected 81 Chinese families to be a sample, which include 27 families do not need baby carriages recently, 27 families intend to buy baby carriages and 27 families have already owned baby carriages. Two types of questionnaires issued in October and November 2010 respectively. Through the analysis of these questionnaires, we realized the current demand of Chinese baby carriage market. In addition, combining the feedbacks, we attempt to build up the product service system in Chinese baby

carriages market. To the best of our knowledge, this paper focuses on the product service system involved with a country having the largest population. In addition product service system is still a new area for China as an emerging market.

The optimized baby carriages' leasing website belongs to oriented product service system. Customers do not need to really purchase baby carriages, they only pay the using fees. Through this website, customers could select the products which they prefer, and also choose the suppliers who have the higher reputation. Enterprises will recover the products through this website. Through this service system companies can promote the follow-up products development and innovation, thus to improve the brand image and reputation. Furthermore, customers could directly, accurately and conveniently understand the suppliers' information, and further recognize products quality and feedbacks. Suppliers could easily and effectively advertise their products, and understand customers' demands. Finally, parents could also share and exchange their experience on this platform.

The strategy of the website highlights the "sharing" service concept, to support leasing service to customers. It increases the quality of produces, the utilization ratio of component and the life cycle of baby carriages. In addition, it reduces the customers' expense, resources consumption and environment pollution.

## **6.2 Perspective**

Future research may use other methods to measure our research, such as market microstructure, and try to provide more detailed and clearer evidence to realize the Chinese baby carriage market behaviors. There are still some insufficient and problems in our research. Obviously, questionnaire is a good way to collect useful information and analyze the result reasonably. However, it could not avoid subjective factors during analysis process. In addition, the time and place still have

their limitations. All of the eight cities are big cities, which have advanced economy in Chinese market. And the survey time is centralized during two months.

Product service system is still an emerging branch of science. Under the service economic and experience economic background, it has been a significant design strategy. Product service system seems to guide the new development direction of designers and enterprises. It effectively reduces the cost, optimizes resource allocation and promotes the reputations for companies. With the rapid development of China, product service system has played an important role in enterprises growth process. Therefore, further research in product service system will improve the development of Chinese baby carriage market. We hope this paper could provide some useful information to manufacturers and customers to understand the effect of product service system, and also attract more academic research to focus on Chinese baby carriage markets.



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