SAAN - UMBRELLA SHARING IN SHANGHAI.

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School of Design

Master Degree in Product Service
System Design

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ENGLISH ABSTRACT

This thesis explored the rise of the Collaborative Consumption in the new Century. The Collaborative Consumption is a powerful cultural and economic force reinventing not just what we consume, but how we consume. Technology is enabling things that weren't possible before. Bartering, trading, swapping, and sharing are being reinvented into dynamic and appealing forms. The Millennial generation is growing up sharing — files, video games, knowledge. Moving people from a culture of "me to a culture of "us". The consequences of this shift are roots in the end of 2008, when the final crash happened, when the hyper consumption brought the market to collapse. Global recession, environmental concern, a new sense of belief and trust and real-time technologies push us to a fundamental change of the way we behave. Caring people to be conscious consumers and than collaborative consumers. Sharing behavior, in the past, where happened in offline areas of our everyday lives, people where used to share things, from food to items, and children still do it. But now sharing behaviors are becoming an online second nature, we are growing and collaborate once again.

"I believe we're actually in a period where we're waking up from this humongous hangover of emptiness and waste, and we're taking a leap to create a more sustainable system built to serve our innate needs for community and individual identity. […] I'm on a mission to make sharing cool. I'm on a mission to make sharing hip. Because I really believe it can disrupt outdated modes of business, help us leapfrog over wasteful forms of hyper-consumption and teach us when enough really is enough."[1] - Rachel Botsman

Environmental speaking, the situation in China is not that good. China is the biggest industrial Country in the world and the pollution generates is critical. At the same time Government is pushing to new and sustainable business model, that's why the author decided to develop a sustainable system, combining recycle materials and new consumer behavior. The research provides the reader with case studies about sharing economy in China and abroad. From online platform where users can exchange goods to more tangible sharing system as Mobike, that is a big success in Shanghai and it is expanding outside China too. Moreover the research was based on survey and interviews made during the entire design process, understanding people's need.

The study specifically focuses on the reinventing of the way in which umbrellas are used. Umbrella is an everyday object, so it is difficult to think of it in a new prospective. But applying what is happening nowadays is interesting to see how a common object can be translated in the new era of the collaborative consumption. That is why SAAN was born. SAAN is a product service system based on the principles of sharing. Users can grab an umbrella from different umbrella stand distributed in Shanghai and when they don't need it anymore, they can bring it back to one of the umbrella stand.

1."*The Case for Collaborative Consumption*", last modified 2010. http://www.ted.com/talks/rachel_botsman_the_case_for_collaborative_consumption/transcript?language=en

CHINESE ABSTRACT

这篇论文探索了新世纪下的协作消费的兴起。协作消费是一种强大的文化和经济驱动力，它不仅彻底改变了人们消费的品类，更是改变了消费的方式。科技让以前无法实现的事情变成可能。以物易物、贸易、交换和分享这些行为被重新塑造成了更有活力、更吸引人的交易方式。千禧年的新一代在分享的大环境下成长起来—文件、电子游戏、知识。这使人们从"我"的文化慢慢转变到"我们"的文化。这种转变的根源是来自于2008年末，那时候过度消费的现象带来了市场崩溃。

全球经济衰退、对环境保护的顾虑、一种新的信念和当时的科技发展推动我们进行了一个行为上的根本改变。人们先是变成有意识的消费者，再变成协作型消费者。在以前，分享作为一种行为，每天在我们的线下生活中上演。人们习惯于分享（从食物到小物件），小孩子们现在也还在这样做。而现在，分享行为已经成为了互联网的第二自然属性，我们又开始了协作和共享。"我认为我们现在是在这样一个时期：我们从严重的空虚与浪费的宿醉中醒来，思想有了质的飞跃，开始去创造一个更可持续发展的系统，去服务于我们的内需（包含了社群和个人）。【...】我在实现一个让分享变得更朝、更酷的任务。因为我真的相信它能替代过时的商业模型，帮助我们跨越过度消费时期的浪费形式，教育我们何时该感到满足。"[1] 瑞秋·波特斯曼

从环境的角度来讲，中国的现状并不乐观。中国是世界上最大的工业国家，因此产生的污染也是不可忽视的。与此同时，政府正在推行新的可持续性商业模型，这就是为什么我决定要结合环保材料和新的消费者行为来开发一个可持续性系统。这份研究为读者提供了中国和其他国家的共享经济案例分析。从线上的物质交易平台，到更有形的共享系统像是摩拜单车—在上海获得巨大成功，而且正在向国外扩张。此外，这份研究还基于在整个设计过程中的问卷调查和访谈（为了了解人们的需求）。

这份研究重点关注于重新改造雨伞的使用方式。由于雨伞是一种十分普通的日常用品，所以很难从一个全新的角度去思考。然而，如果试想将其融入当下的趋势，其实可以发现一个常用物件是如何在新共享消费时代下被重新演绎的有趣现象。这就是SAAN诞生的原因。SAAN是一个以分享为原则的产品服务系统。用户可以从在上海设立的不同雨伞架上获取雨伞，当他们使用完毕之后可以将雨伞归还到任何雨伞架上。

1."*The Case for Collaborative Consumption*", last modified 2010. http://www.ted.com/talks/rachel_botsman_the_case_for_collaborative_consumption/transcript?language=en

ESTRATTO IN ITALIANO

Questa tesi esplora l'ascesa del consumo collaborativo nell'era contemporanea. Il consumo collaborativo reinventa non solo quello che consumiamo, ma come lo consumiamo; la tecnologia infatti consente azioni che non erano possibili prima. Il baratto, la negoziazione, lo scambio e la condivisione vengono reinventati in forme dinamiche e affascinanti. Basta pensare alla nuova generazione che cresce condividendo la vita di tutti i giorni - file, videogiochi, foto, video, storie. Stiamo passando da una cultura dell' "io" ad una cultura del "noi".

Le conseguenze di questo cambiamento si sono sviluppate alla fine del 2008, quando l'iper-consumismo ha portato alla crisi di mercato. La recessione globale, la preoccupazione ambientale, un nuovo senso di fede e di fiducia e le tecnologie in tempo reale ci stanno spingendo verso un cambiamento fondamentale del nostro comportamento. I consumatori stanno diventando sempre più consapevoli e disponibili alla collaborazione. In passato, i comportamenti di condivisione avvenivano offline, ora invece, avviene tutto online.

"Ora, per concludere credo che viviamo in un periodo nel quale ci stiamo risvegliando da questa sbornia di vuoto e di rifuti e stiamo facendo un salto per creare un sistema più sostenibile costruito per soddisfare i nostri bisogni innati per la comunità e per la nostra propria identità individuale. […] La mia missione è rendere attraente la condivisione. La mia missione è renderla di moda. Perché sono profondamente convinta che può disgregare i modelli di business antiquati aiutarci a superare le pratiche dispendiose dell'iper-consumismo e insegnarci quando il troppo è troppo." [1] Rachel Botsman

Il contesto di applicazione di questa tesi è la Cina, in particolare Shanghai. Come è ben noto, la Cina è il Paese più industrializzato al mondo e l'inquinamento che genera è sostanzioso. Fortunatamente il Governo sta spingendo verso un modello di business nuovo e sostenibile, per questo l'autore ha deciso di sviluppare un servizio sostenibile, combinando materiali di riciclo e nuovi comportamenti di consumo. La ricerca fornisce al lettore casi studio sulla sharing economy in Cina e all'estero. Dalla piattaforma online in cui gli utenti possono scambiare merci, ad un sistema di condivisione più tangibile come Mobike (bike sharing di recente attivazione), grande successo in Cina e nel mondo.

La ricerca inoltre si basa su indagini e interviste effettuate durante l'intero processo di progettazione, così da poter capire i bisogni delle persone.

Lo studio si focalizza in particolare sull'esplorazione di come gli ombrelli vengono utilizzati. L'ombrello è un oggetto quotidiano, perciò è difficile vederlo sotto un'ottica diversa. Ma applicando il cambiamento che stiamo vivendo oggi è interessante vedere come un oggetto comune può essere traslato nella nuova era del consumo collaborativo. Ecco perché SAAN è nato. SAAN è un prodotto servizio basato sui principi di condivisione. Gli utenti possono prendere un ombrello, da diversi portaombrelli distribuiti nella città di Shanghai, e quando non ne hanno più bisogno possono riportarlo al portaombrello più vicino.

1."*The Case for Collaborative Consumption*", last modified 2010. http://www.ted.com/talks/rachel_botsman_the_case_for_collaborative_consumption/transcript?language=en

TABLE OF CONTENTS

INDEX OF FIGURES

1. INTRODUCTION

1.1 THESIS FRAMEWORK

1.1.1 WHY THIS TOPIC?

The choice of the topic could seem weird, but this is how is came up. I was walking under the rain without umbrella and I start look at someone generous to drop in under his or her umbrella. When I arrived to the destination I bought the hundredth umbrella from a street vendor, and as always, I used that umbrella twice because the next time I forgot the umbrella on the metro. So from that I start wondering myself how could be possible to act always in the same way. Forget to bring umbrella from home, buy a cheap umbrella and then lose it somewhere. As a designer, my mind set is always ready to start think about solutions, solutions and again solutions. But of course I know this is not really the right process to do things. I love observed what happen around me, so I start watch how people behave under a rainy day. People who doesn't have umbrella used to run under the first place to cover them, or the bravest people run protecting themselves under their journals or bags. Than, there are people (that's me) that buy the first cheap umbrella from a vendor on the street, already conscious to break it after 200 meters, but never mind, because you need the umbrella to do that 500 meter to arrive at home. And at the end there are that kind of people that have their own umbrella and used to share it with friends that doesn't have (again, me); even if they will lose it one day. So why people are so careless about carry umbrellas? And why we continuous buy the cheap umbrellas we found from the street vendor? This is a shame. I'm fascinating about people's behavior and how they change their behavior thanks to design, without knowing it. In that time I was reading "What's Mine Is Yours: The Rise of Collaborative Consumption" wrote by Rachel Botsman and Roo Rogers. That book was so inspiring that I started see sharing system all around me in every single moment. So I started think about how the Sharing Economy helps the consumption to passed from

25

over consumption to collaborative consumption and how this was so helpful for the environment, less things to buy and more things to share. That was awesome. So, I counted how many umbrellas I bought in one year and couldn't count them because there were too much. I realized there was something wrong with the umbrella itself, to many umbrellas broken, stolen or lost. How is it possible? The design of the product itself is quite good. If you buy a good quality umbrella you can have a big umbrella made by good materials and it could be kept for many years. So the problem it weren't seem the product itself but more than anything else it would seem the accessibility we have for umbrellas, the way in which we are using this product. Reflecting on it I recognized the shift we are living. The sharing economy is changing the way we are using items, we are not changing the product itself but how we get access to the product. So maybe this could be the key to my problem, changing the way in which I get my umbrella instead of change the design itself. At the end, umbrella is so common object that everyone think to change the design because everyone can recognized that there is something wrong with that, but few people though that maybe is our behavior, our way to use the umbrella that have to change. This is how the umbrella adventure started.

1.1.2   STRUCTURE OF THE WORK

The work is organized into three different parts:

_Background
_Research
_Design

The first section gives an introduction about the thesis, relating to where the topic came from (abstract and chapter 1). Then it explains the various methodologies used, which I will describe in more detail in its respective sections. In the chapter 3 takes place the Context, that is an overview of the umbrella's history and how the umbrella is related to the Chinese culture, as well as a literature review about the sharing economy, plus data about plastic waste and sustainability.
The second section, the research, is focused on the design research, that is a user research done from a desk research prospective, but also a field research prospective, including interview, surveys and observation. From here is way easier to find issue and opportunities to faced in the next part of the work.
The third section is the design; it's divided in three parts called project, SAAN and conclusion. The first chapter starts explore the different scenarios ending with one idea to bring to prototype, and from here I can get feedbacks and outcome to implement the concept, in order to arrive to the final output of this work. In the last chapter summaries the learning of the project, high-lining weaknesses and limitations of it. Ending with a discussion about further development of the project.

1.2   RESEARCH
QUESTIONS

This work aims to answer the following questions:

_What kind of resources and features are helpful to create a Product Service System, redesigning how we can get access to umbrella product in the new era of the Sharing Economy?

_What is the relation between the Sharing Economy, people's behaviors and sustainability, during the use of a Product Service System?

1.3   OBJECTIVES

The objectives of this thesis are to:

_Define a product service system where service design can help to redesign the umbrellas consumption, improving the experience to carries around umbrellas under rainy days, and help people to develop their sense of sustainability and sharing.

_Revaluate the aesthetic of umbrellas, as a fashion and trend items. Create values to improve the concept of the product itself, stopping to consider umbrella as a disposable object, and nudge people to change their behavior.

2. METHODOLOGY

2.1   DESIGNER MINDSET

2.1.1   HUMAN-CENTERED DESIGN

Society evolves day by day and as a consequence, everything is changing around it. Design adapted and changed according to the complexities of society. This is because the companies nowadays consider design very important. Just think about case studies like Apple, Alessi, and Nintendo's Wii. People don't purchase products, or services, they buy experience, they buy deep meaning; and to find the right powerful meaning for people it's important to observe people, understanding their needs. In order to remain competitive organizations need to look beyond the pure functionality of products or services. They must understand the emotional ties that users create with them and gradually trust in. So, the user needs is the key to develop a good output. And to do this, designers had to change their mind adapting methods and tools.

Donald Norman is the design theorist that highlights the transformation of user role in design, defining what (HCD) Human-Centered Design is. HCD is a mind-set. The user is the core of the design process. Crucially, Human-Centered Design seeks to optimize the product (service or process) for how users can, want, or need to use the product – rather than forcing users to change their behavior to accommodate the design.[2] HCD is an innovative way to observe facts and it's a creative ability that everyone have, but we need to train to bring out. HCD relies on our ability to be intuitive and to recognize patterns, to construct ideas that are emotionally meaningful as well as functional, and to express us through means beyond words or symbols. As we said HCD is a mind set, so the person that is using the HCD approach has to follow some guidelines. The thinker has to be empathic, optimistic, collaborative and open to experiment.
Empathy is the ability to put you in the shoes of other person. Empathic

person can imagine the world from multiple perspective, understanding the deeper explicit or latent needs. Great observer and listener.

Optimism is a fundamental belief. There always exist a solution for everything, no matter if the problem is big, the budget is zero and there is no time.

Collaboration is a fantastic keystone in the HCD approach, because its push to work with people from different background. The increasing complexity of products, services, and experiences has replaced the myth of the lone creative genius with the reality of the enthusiastic interdisciplinary collaborator.[3] At the end, Human-centered design is all about experimenting and learning by doing. It gives you the confidence to believe that new, better things are possible and that you can help make them a reality.

When done well, a human-centered approach fuels the creation of products that resonate more deeply with an audience — ultimately driving engagement and growth. As proof, one needs to look no further than the recent success of design-driven companies like Warby Parker, Fab, AirBnB and Pinterest. We've also recently seen digital stalwarts like Google, eBay and LinkedIn invest in the design of more cohesive and sophisticated user experiences.[4] Human-centred design – often used as interchangeable term for user centered design – in the late 90's shifted from being a techno-driven design method, to a humanized set of tools until "philosophically" becoming a mind-set, as a human-centred approach to design. HCD is also called Design Thinking when we speak about the approach and the process to problem solving, starting from user needs, ended up with innovative solutions that are tailor made to our users.

Nowadays people ask more from design.[5] They want to fell in love with beautiful and amazing experience. In order to create a great user experience we have to think the design process as an ecosystem.

In the ecosystem example, User experience is like a tree. The roots are the education (psychology, technology, anthropology, history, economics, business, etc.) while the trunk is Human outcomes (tasks, education and successes) and the branches are skills (UI , IA, interaction, user testing, user research, etc.)

Human Centered Design is the soil in which the tree is rooted allowing the tree to live and grow strong. Lastly Design thinking is the oxygen and the rain that allows the tree to breath and pull from the soil of human centered design allowing the tree to maintain its strength and value.

We can assume the User Experience as an outcome, The HCD as an approach and Design Thinking as an Education that helps to grow our tree.

2.2   APPROACH AND PROCESS

2.2.1   DESIGN THINKING

Design Thinking is a process to problem solving, creating innovative ideas and solutions. Basic assumption of the design thinking is that innovation occurs at the intersection of the three equal factors human, technology and economy. Innovation combines therefore desirability, feasibility and economy. Design Thinking states that all three factors must be considered, because only then put through an innovation. (IDEO) So design thinking is a methodology that brings together innovative activities with a HCD ethos. Innovative activities propose a new way to engage with users, through code sign sessions and rapid prototyping, designers can observe and deeply understand wants and desire of people.

In the past, design was consider as a mere tool for business, a good shape or a colour that attracts new consumer. But now Design has to be both consumer benefit and business value. That's why the design thinking methodology is so strong now and "If applied with equal fervour, it can even transform HR, finance, marketing, or operations teams—turning them into lean and agile profit centers."[6] Design thinking is a methodology that is distinguished in 3 phases: Inspiration, Ideation and Implementation.

_Inspiration. The inspiration phase start with a brief, a set of mental constraints that give a framework from where to start. a well-constructed brief allows for serendipity, unpredictability, and the capricious whims of fate—the creative realm from which breakthrough ideas emerge. (IDEO) The step after defined the brief is to discover what people needs. Designers have to go outside and observe because most of the time people can say what they want, but their actual behavior can evidence unmet needs.

3. Tim Brown and Jocelyn Wyatt , "*Design Thinking for Social Innovation*", Standford Social Innovation Review Winter 2010

4. Dave Thomsen, "*Why Human-Centered Design Matters*" https://www.wired.com/insights/2013/12/human-centered-design-matters/#article-comments

5. Matteo Remondini, *Understanding the role of product-service system designers within service design agencies in London*, Master's Degree, 2014/2015

6. Nick Morgan, "*What storytelling is and not*", last modified April 16, 2015 https://www.forbes.com/sites/nickmorgan/2015/04/16/what-storytelling-is-and-is-not-part-two/#31161f5fa7c27

_Ideation. After desktop, field research and observation the process can go on with the second phase, the ideation. Multidisciplinary people can be involved in the process and synthesis into insight the information found in the first phase. This will lead the team to solutions and challenges opportunities. It's high recommended to work in a multidisciplinary team, in order to achieve divergent thinking. Interdisciplinary teams typically move into a structured brainstorming process. Taking one provocative question at a time, the group may generate hundreds of ideas ranging from the absurd to the obvious. Each idea can be written on a Post-it note and shared with the team. Visual representations of concepts are encouraged, as this generally helps others understand complex ideas. (IDEO) Ideas will be groups and filtered and the good ideas naturally will come up.

_Implementation. The third space of the design thinking process is implementation, when the best ideas generated during ideation are turned into a concrete, fully conceived action plan. At the core of the implementation process is prototyping, turning ideas into actual products and services that are then tested, iterated, and refined. (IDEO) The prototyping could be the validation of one action in the project, or a mock-up of a graphic in a screen, prototyping will become more complete day by day, after several tests. At the beginning could be really far away for the reality. The rule in this phase is to keep iterating, that is continues prototype and implements the project with the feedbacks achieved. When the prototype phase end, the team has to ultimate product or services trough a communication strategy. Storytelling is a fundamental skill to communication. "And that's the real purpose of stories -- they help us experience reality in a way that makes sense, that we can process, and that helps us cope. Stories are how we live our lives."[7] Tell a story means to make users fall in love with the product or service that has just been created.

2.3   THE DISCIPLINES

2.3.1   PRODUCT SERVICE SYSTEM DESIGN

"If you would ask ten people what service design is, you would end up with eleven different answers – at least. Service design is an interdisciplinary approach that combines different methods and tools from various disciplines. It is a new way of thinking as opposed to a new stand-alone academic discipline. Service design is an evolving approach, this is particularly apparent in the fact that, as yet, there is no common definition or clearly articulated language of service design." This is how Stickdorn & Schneider open the chapter In the book "This is service design thinking" (2012).
Service design is a discipline that has its own methodologies and tools and which adopts design-thinking approach. Both share similar principles and so influenced each other. That's why Design Thinking is often overlapping with the term of Service Design. However, Service design is not about making services easier to use or visually nicer, "It transforms projects and businesses, enables stakeholders to collaborate and adds excitement to those who are involved."[8] Service design creates real values for costumers, enabling fluidity in the user experience using a combination of intangible and tangible channel. The matches between them form a system. When we consider a service, we are considering also the touch point around it, that is the tangible part that interacts with the users, and we consider a product itself, we must consider the service behind that give us the accessibility to have the product. So, products and services are strictly connected each other. As Matteo Remondini said in his thesis, "a more appropriate definition for service design seems to be design for product-service systems." If we consider the definition of a PSS we can get different kind of definition, even if they share the same meaning. A pass is "a marketable set of products and services capable of jointly fulfilling a user's need". (Goedkoop et al, 1999) "Where services

7. Nick Morgan, "*What storytelling is and not*", last modified April 16, 2015 https://www.forbes.com/sites/nickmorgan/2015/04/16/what-storytelling-is-and-is-not-part-two/#3161f5fa7c27

8. Livework, "*Selling service as a sustainability strategy*" https://www.liveworkstudio.com/articles/selling-service-as-a-sustainability-strategy/

are conceived and offered as products designed by taking into account a series of economic and technological criteria." (Manzini, 1993) So, PSSD is about connecting dots, designing of experience, solutions, strategies, brands, in order to project material or immaterial elements and bring the concepts to the reality (Morelli, 2006)

2.3.2   TOOLS

The author of this thesis is using a design thinking approach plus a service design methods and tools in order to develop a final product service system of an umbrella sharing.

Good service designs always deliver a good experience to all the stakeholders involved. It's important to understand how the different parts of a service are interconnected between each other's. So, a service designer has to be able to looks holistically at the service infrastructure. To do this, the author of the thesis used different tools, which are stakeholder system map and stakeholder motivation matrix. Everyone can benefit from the service, so a good service design offers best values for the entire stakeholder involved.

People are the core of the service, and service designer always put them first, it's important to understand people's desire and need, talk and codesign the concept with them are the best solution. The author, using a Human Centre design approach, developed personas and she did research trough survey, expert interviews and behavioural observation field through photo journal and body language observation. In order to understand what happened in the front and back stage, the author used costumer journeys map, blueprint and storyboard. Last step to defined a good service is to create good proposition for users, by translating intangible service in tangible and desired offering, using touch point maps, offering map and develop tangible prototype to test the service.

3. LITERATURE REVIEW

3.1   FRAMING THE CONTEXT

3.1.1   THE COLLABORATIVE ECONOMY

The research started analysing why the consumer behaviour changed in the 21th Century, for doing that we need to step back when the consumerism exploded in the mid-1950s. People began being attracted by purchase as a way to happiness and social recognition; the problems were that these behaviours fell into the excess of buying too much stuff, which lead to the hyper-consumerism. The unintended consequences were the deforestation, a higher environmental pollution and more waste. In the end of 2008, as the financial crash stroke, the hyper-consumption collapsed. What we learned from history is that when one economy model collapse, another one is ready to grow up. And in this case, the Collaborative Economy was ready to spread across the world. A Collaborative Economy is "an economy built on distributed networks of connected individuals and communities versus centralized institutions, transforming how we can produce, consume, finance, and learn."[9] Basically, the self-interest perspective switch towards a community point of view, not being limited to the neighbourhood, but expanded to the vast global infrastructure of the Internet. In this way has changed the prospective of who trust and how we can access goods and services. The Collaborative Economy creates a "systems that unlock value from underused assets by matching 'needs' and 'haves' in ways that bypass traditional intermediaries and distribution"[10] . We can recognize four different form of Collaborative Economy. "1.Production: Design, production, and distribution of goods through collaborative networks. 2.Consumption: Maximum utilization of assets through efficient models of redistribution and shared access. 3.Finance: Person-to-person banking and crowd-driven investment models that decentralize finance. 4.Education: Open education and person-to-person learning models that democratize education."[11] Now, the real question is why this hap-

pened? The industrial economy of the 20th century, where consumers were passive, has caused dissatisfaction on different field for different reasons, such as complex experience, waste, broken trust, redundant intermediaries and limited access. All these reasons caused the shit from an Industrial Economy to a Collaborative Economy.

New technologies help everyone to distribute 'idling capacity' of resources, the "untapped social, economic, and environmental value of underutilized assets."[12] So people that have hardly used goods, services or skills can be connected to someone who needs it. This innovative and efficient asset utilization is possible thanks to the Web 2.0 that helps connection emphasizing online collaboration and sharing among users. The curiosity is that we are not doing something new, because networks are as old as humans. We have always participated in networks by family, friends, schools, workplace etc. But what is changing now is how we get engaged in it: by technology. Blogs, tag, mails, tweets: people can easily communicate with everyone thanks to these tools that are changing the way we communicate and stay tuned with the world. "The real transformation that is taking place today is the fundamental shift in the way that people think, form groups, and do their work"[13] . Consumers are moving from a passive to an active role that can shape them as creators, collaborators, producers, financiers, and providers. In this new form of economy, trust and access are shifting from institutions to individuals and the power is distributed within networks of individuals and communities, not centralized anymore. In this frame we are assisting to the way in which the massive paradigm shift in how we live, work, play, travel, create, learn, bank and consume. Underlying values such as collaboration, empowerment, openness and humanness. But what are the main drivers that pushed us to face these big shifts? Summarizing what we said before the main drivers are the technologies innovation, the shifted values, the economic realities and the environmental pressures. We can assume a new form of economy and social mechanism are growing up, this is what is called Collaborative Economy. Under the Umbrella Terms of the Collaborative Economy there are other different economic systems, the Sharing Economy, but also the Peer Economy, Access Economy, the Circular Economy, the Gift Economy, the Gig Economy, On-Demand Economy and Rental Economy. In this research I'm going to analyse more in detail only on the Sharing Economy, because the Sharing Economy is the most challenging economic system that we are facing since many years and it's so big and it's so fast that we even don't know the consequences of its grown. "Coming up with a solid definition of the sharing economy is almost impossible. The sharing economy is the person to person (or Peer-to-Peer) economic activity that is facilitated by digital platforms."[14] Also defined as a "mesh" by Lisa Gansky, "is essentially a fundamental shift

in our relationship with stuff, with the things in our lives"[15] , and we are not speaking about only goods, but also services, time, money, food etc. "The sharing economy strengthens the concept of innovation. Thanks to new technological platforms (especially social media), citizens have gained the power to call and track a ride, rent out their homes, and share goods."[16]. We are not creating something new, we are doing what billions of years back humans and monkeys did, shared places, transportation, entrainments and more the other, our home, the heart. We can still notice these behaviours in the children. Children are sociable and cooperative by nature; they share things and foods with strangers. People tend to become selfish as they grow up, influenced by society and most of all by hyper-consumption. But nowadays the new generation, or generation Y, replicate our ancestor's mind-set: they grow up sharing. Sharing photos, music, comments, and Facebook statuses. "World is increasingly urbanizing at a scale unprecedented in history, and it is estimated that more than 70% of individuals worldwide will live in cities by 2050."[17] This is one of the main drivers that lead the growth of the Sharing Economy. We also have to consider the recession, "that caused us to rethink our relationship with the things in our lives relative to the value"[18] and the climate change. These causes lead us to trust more in local companies, or brands that maybe we haven't heard of, instead of trust the big company.

3.1.1.1   Collaborative Consumption

In this literature the author is going to analyse in details only one part of the Collaborative Economy, the slice that is called Collaborative Consumption (CC). The Collaborative Consumption is a "systems that reinvent traditional market behaviours—renting, lending, swapping, sharing, bartering, gifting—in ways and on a scale not possible before the Internet."[19] It basically means reinventing the approach towards consumption, shifting from what we consume to how we consume. There are three different form of Collaborative Consumption: Product Service System, Redistribution Market and Collaborative Lifestyle.

_Product Service System is the economic model based on payment for the benefit or usage of a product, without owning it. PSS satisfies users needs without giving them the ownership of the product that helps them satisfy those needs: for example, iTunes or Spotify allow users to satisfy their needs about listening to music without ac-

9-10-11-12-19. Rachel Botsman, "*The Sharing Economy Dictionary of Commonly used terms*" http://rachelbotsman.com/work/the-sharing-economy-dictionary-of-commonly-used-terms/

13. Diana Scearce, Gabriel Kasper, & Heather McLeod Grant, "*Working Wikily*", Stanford Social Innovation Review, Summer 2010

14-16. Artur Borchur, "*The Sharing Economy: Understanding and Challenges*", International Journal of Humanities & Social Science Studies (IJHSSS), March 2016

15-17-18. Lisa Gansky, "*The Future of Business is the Mesh*", last modifed February, 2011 https://www.ted.com/talks/lisa_gansky_the_future_of_business_is_the_mesh/transcript?language=en

tually letting them own any cd or cassettes. Instead, they give them a service based on the concept of sharing rather than ownership. _Redistribution Market is based on social networks that allow customers to redistribute unused or unwanted items to someone they need. Doing so, product lifecycle is extended, reducing waste. We can summarize the redistribution market with the fifth R: reduce, reuse, recycle, repair and redistribute. ThredUp buys unwanted kids and women clothing and then resells it online, paying the supplier forty per cent of the resale value. _Collaborative Lifestyle, people with similar interests can share non-products resources such as times, skills, moneys and spaces. Good examples of Collaborative Lifestyle are Taskrabbit and CouchSurfing. Taskrabbit is matching people that need tasks done with people who make money helping them to complete their to-do lists. CouchSurfing is a platform where traveller can find free room at stranger's home to stay in every part of the glob.

3.1.2   SHARING ECONOMY IN CHINA

Sharing Economy, an economic system that unlocks the underused capacity of assets from spaces to skills to stuff for monetary or non-monetary benefits, in a way that create greater efficiency and access. It is currently largely talked about in relation to P2P marketplaces but equal opportunity lies in the B2C models.
"The sharing economy is referred to as collaborative consumption, […] It is worth mentioning that the terms sharing economy and collaborative consumption tend to be used interchangeably, because the sharing economy concerns collective consumption."[20]

Everything that can be shared is going to be shared sooner or later, China is really a step forward everybody. From carpooling to shared phone chargers and basketball basket. Sharing economy in China become really famous because of its reports and data, just a quick remember about Didi Chuxing, the ride-sharing company that bought Uber out of China. That was impressive and a big news.

"The sharing economy in China is absolutely exploding. It was already worth about $299 billion (1.956 trillion Yuan) in 2015 and it's expected to grow at an annual rate of 40 per cent over the next five years, according a new report from China's government think tank called the National Information Centre."[21] The latest articles mention that amount is up to 103 per cent from 2015, so the sharing economy market trade volume topped 3.45 trillion RMB ($501 billion) in 2016. Quite impressive numbers.
In the last year, in China, over 600 million people were involved in the sharing economy, 100 million more than in 2015. And the number of employee involved in sharing economy businesses also increased to 60 million in 2016, according to Zhang, director of the Sharing Economy Research Institute under State Information Centre (SIC).[22]
As Zhang said, sharing economy is becoming a trend, and as long as it is ethically and legally feasible, everything could be shared in the future. Speaking about China, SIC predicted an annual growth of 40 per cent in sharing economy market volume. By 2020, the sharing economy is estimated to account for over 10 per cent of China's gross domestic product.
Looking to the future, Sundararajan a professor at New York University and author of "The Sharing Economy," said the sharing economy would increase the overall economic growth, because of its capacity to bring more efficient allocation of capital and assets. Moreover, increasing economic activity, it also provides diverse products and services to consumers.
"The emerging sharing economy is particularly interesting in the context of cities that struggle with population growth and increasing density."[23] Such as Shanghai, the largest city in the world by population, and the second most populated metropolitan area of the planet.

20. Artur Borchur, "*The Sharing Economy: Understanding and Challenges*", International Journal of Humanities & Social Science Studies (IJHSSS), March 2016

21. Catherine Clifford, "*The Sharing Economy Is Absolutely Blowing Up in China*", last modified March 3, 2016
https://www.entrepreneur.com/article/271903

22. China Daily, "China's sharing economy: $501 billion market volume", last modified May 17, 2017
http://www.chinadaily.com.cn/business/tech/2017-05/17/content_29377488.htm

23. Boyd Cohen and Jan Kietzmann "*Ride On! Mobility Business Models for the Sharing Economy*", Organization & Environment 27(3):279-296 · September 2014

3.1.3

WHY SUSTAINABILITY MATTERS

According to EPA (United States Environmental Protection Agency) "Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations."[24] Simply, it means conserving our natural resources and taking care of our environment and neighbourhood as best as we can. So from the large scale to the small scale, these contexts include planet earth, ecosystem, countries, municipalities, home garden, private life, good, services, behavioural patterns and so on.

Reconciliation of environmental, social equity and economic demands are the three pillars of sustainability. They are linked together because when the economy growth the environment degraded, this is because companies use natural resources without care about the consequences, but concentrate themselves to what they do in that moment, growth their business no matter how. So, to live a better life, sustainability matters.

"[In] the last century [the thinking was], if you want to grow, you should find a good opportunity. But today, if you want to be a great company, think about what social problem you could solve." – Jack Ma, Founder of Alibaba

As more population is growth, more consumption we have and therefore, more resources we have to take from the environment. The environment problem is really sensitive in country like China, because it's suffering of overpopulation and fast industrialization in these last years. Water storage and overpopulation were discussed in the first talk in the 1970s. At that time these concerns were felt just from environmental extremists, but this urgent message was fast perceived by businesses and politicians too, that's why in the country's new Five-Year Plan (FYP, 2016-20) China government included the development of green technologies, bridging the gap between country side and cities and abandoning old industry in order to build model information infrastructure. Looking from outside, it's important to understand that China's issues of sustainability doesn't come from private consumption, as in the US or western Europe happened, but they are related to the industrial processes that permit the fast Chinese industrialization. This caused pollution, but China doesn't see emissions as a problem, because the economy growth is still the priority. Therefore, sustainability is seen as a priority, but not a priority related for people, but for the economy first. That's the wrong attitude, because we have to give to people what they need for. Leaders should stop to see

sustainability as an opportunity to growth their own business, instead they should embrace this status s an opportunity to develop product and services that can support the urban centres of billions of citizens. This is the main point about how to become a green country. Nowadays, over 700 million of people live in the urban area of china, than in the rural area, and what it shocked more is that by 2020, 60% of china's population will live in the cities.[25] This will have several consequences because million of people will mode to urban centres, abandoning rural area, focusing on a consumption lifestyle. For this reason the focus should be on the consumer instead on develop a green business. China is already growing really fast on that side, more than anyone else in the world. But again, this should not the real point, because the real point is to make a change in the consumer behavior. If we produce free but consumer behaviors are strictly focused on the consumption, all the efforts from companies will be useless. By 2030, more than 220 Chinese cities will have at least 1 million citizens. That is quite impressive. We should rethink about the system, how can we deal with all those people that will move to a big cities? The idea of the smart cities is not new and it could be a good point to start with. Create sustainable cities, supported by technology, in order to help people to get access easily to sustainable services and products.

Fortunately nowadays consumers begun looking for safe, reliable and high-value products and they are willing to pay more for that kind of services. So, it starts to create a loop, where people want to buy safe products and companies are willing to produce them. Moreover Government is investing solutions to foster sustainable economy models. We all have the opportunities to change the way we are consuming.

Providing a service with a sustainable goal is a long-term strategy that asks for a totally different approach from the previous way to produce. It's not only sell products in a different way, but it's doing business sin a different way, from the industry that produced the products/services to the relationship that the company have with their consumers. Different and radical values proposition that support this sustainable business model. It's take time to do this and we can't pretend to do it in one time. If the service is really radical we should approach the market step by step, gradually introduce it in the market in order to test it understanding the need of the consumers. A core element of sustainability is to do more with fewer natural resources. But the industrial economy doesn't work in this way because people are more affected by own tangible product, that's why companies have to help people to change their behaviors. [26] "A business model for sustainability helps describing, analyzing, managing, and communicating (I) a company's sustainable value proposition to its customers, and all other stakeholders, (II) how it

24. *"Learn about sustainability"*
https://www.epa.gov/sustainability/learn-about-sustainability

25. Richard Brubaker, *"Reframing Sustainability For China, And Future Cities"*, last modified June 2, 2015 https://www.forbes.com/sites/ceibs/2015/06/02/reframing-sustainability-for-china-and-future-cities/#4e689960697a

26. Livework, *"Selling service as a sustainability strategy"* https://www.liveworkstudio.com/articles/selling-service-as-a-sustainability-strategy/

creates and delivers this value, (III) and how it captures economic value while maintaining or regenerating natural, social, and economic capital beyond its organizational boundaries."—Sustainable Business Model Research Group, 2015

Umbrellas and plastic waste

In this paragraph the author would like to share some data about umbrella waste and plastic waste that are produced around the world, evidencing how wrong is the way in which we are using the umbrella itself, from the material choosing phase to the consumer used.

_Speaking about China. According to the China Trade Market Office, you can see there are 1063 pages about umbrella patents[27], which mean 15935 patents. That is such a big number for an ordinary object like the umbrella. China is the biggest producer of umbrellas in the world, largely in the provinces of Guangdong, Fujian, and Zhejiang. (Songxia, in Zhejiang province, has more than a thousand umbrella factories.) "Accordingly to Songxia Government report, there are more than 1200 umbrella manufacturers and 40,000 employees in Songxia. The production capacity of umbrella manufacturers in Songxia is around half a billion umbrellas with a product value RMB 8 billion (US$ 1.3 billion) each year, which account for a percentage of 30% of China umbrella markets." China is a big market for the umbrella producer; the problem is the overconsumption and the material used. The majority of the umbrellas are in plastic and we can compare them as the fast fashion in the industry fashion. They are cheap people keep buying because they don't really care about it, so the consumption of these items is continues increasing.[28]

_Speaking about Japan. Japanese people, compared to the other foreign countries, don't like to get wet. That's why thousand of convenience store and train stations kiosks sell rain products, such as plastic umbrellas. When "Tsuyu" comes, the Japanese rainy season, people get crazy to buy umbrellas. Called "Tsuyu" (or plum rain) because the rain happens when plums are ripening. According to the MOTTAINAI Umbrella

Project, Japan is one of the biggest consumers of umbrella; they sell each year 130 million umbrellas. The population of Japan is instead of 128 million inhabitants. That means more than 1 people buy more than one umbrella per year. Over a lifetime, it is a big number of umbrellas. Moreover umbrellas are the second most forgotten items on trains behind clothing. When people forget them, they end up buying new umbrellas, incrementing the number of sold and lost umbrellas.[29]

_Speaking about USA. "The rewards for whoever improves the umbrella are substantial," writes Susan Orlean in the New Yorker. "The annual retail market in the United States alone is now $348 million—about 33 million umbrellas. The rest of the world, including many cultures where umbrellas are used both as rain protection and as sun shade, consumes many millions more." Umbrella is a so simple and ordinary item that everyone think to be able to redesign it. According to the US Patent Office there are four employees that work for umbrella patent only and in 2008 the office registered 3000 active patents on umbrella-related inventions. The situation was so dramatic in 2008 that the director of Totes, the largest American umbrella producer, stopped to accept umbrellas proposal because they were too much. Moreover, according to accessories census made in 2015 seven of 12 women's accessories categories tracked by NPD showed increases (Fashion/Costume and Bridge Jewelry, Women's Watches, Handbags, Small Personal Accessories, Belts, Gloves, Sunglasses, Umbrellas, Slippers, Hosiery, Scarves/Mufflers, Headwear). From the previous year, the most dramatic increase occurred in the smallest niche: umbrellas where sales soared 24%. Moreover in 2015, there is an increasing in unit sales of women's accessories tended to mirror findings in dollar sales. Two of the biggest increases came in umbrellas (+19%) and small personal accessories (+16%).30

28. J&H Umbrella Co, "*Songxia Umbrella Industry in China*" http://jhumbrella-manufacturers.com/html_news/Songxia-Umbrella-Industry-in-China-33.html

29. "*90% of umbrellas in Japan are plastic umbrellas*" , last modified July 1, 2013 https://ideaforesight.wordpress.com/2013/07/01/90-of-umbrellas-in-japan-are-plastic-umbrellas/

30. "*Accessorise census 2015*" https://www.accessoriesmagazine.com/wp-content/uploads/2016/02/2015-Census-report.pdf

Fig 3.1
Abandoned and broken Umbrella on the street
Source: http://www.elisachisanahoshi.
com/2012/04/tram-ombrelli-rotti-e-camionci-
ni-lego.html

Umbrella at the end is a complex item even if we think it doesn't. One hundred pieces and different materials compose umbrella. This item should be recycle, but to be recycled should be disassembled before throw it away, and this is not something that happened. People through it away without care about it and, as the author will show you later in this thesis, people also abandon umbrella when they arrive to a certain destination, without really care. We don't know the exact number of broken and lost umbrella every year. But considering the data reported ahead, the number is really big.

We can find interesting data about stolen umbrella. In a research conducted by Churchill Insurance, it said that in UK 11 per cent of people have stolen an umbrella in the previous year, without having moral problems. "Of those that have stolen an umbrella, almost a quarter (23 per cent) took it from a work colleague, while 18 per cent have stolen one from a stranger on public transport or at a station."[31] Theft is a really considerable number and people seeking an immediate replacement can in part explain it. More than 22 per cent of people have lost an umbrella in the last year, while 10 per cent have lost two or more. Charles Lim at Crooked Pixels writes that umbrella is perfect; keep you dry and size plus the price are not bad. And what about the behavior? Is it maybe that one that we have to change? It's hard to improve the umbrella itself, at the end; the design is still the same since when it was invented. So I'm par-

31. Direct Line Group, *"You can stand under my umbrella because I stole it"*, last modified March 1, 2016 http://www.directlinegroup.com/media/news/brand/2016/01a-03-2016.aspx

tially agree with Charles Lim. But what we can do maybe is to pay more attention on the material side and on the consumer behavior, because that is what affects the environmental issue.

THE UMBRELLA, WHERE IT COMES FROM

The first umbrella date back to 3500 years ago. There is a legend about the invention of the umbrella, Lu Ban (507 a.C. – 440 a.C.), famous engineer, philosopher, inventor, architect, carpenter and protector of the Chinese builder and crafter. The legend says that his wife invented the umbrella to bring the food to Lu Ban, protecting her self from the big storms. The idea came from the observation of the small kids repairing themselves under big leaf, so the woman built a square covered by a piece of fabric. We don't know if this legend is truth or not but we can assume that the umbrella was invented in China, but there is evidence that similar items were also popular elsewhere, ancient Egypt, and even the Aztec empire.

The umbrella is defined as an object to protect themselves from rain and sun. The name umbrella comes from Latino "umbella" diminutive form of "umbra" that means shade or shadow. Indeed the umbrella is defined as an object to protect themselves from rain and sun, also called parasol. Effectively the Ancient Egypt started to use parasol to protect themselves from sun, through a simple configurations of palm leaves attached to a stick. Than, Egyptian parasols evolved into an object used by nobles, religious leaders and royalty. Pale skin, untouched by sun, was a sign of nobles. If we take a look at the hieroglyphic paintings we can see the life of royalty and gods, which all had parasols over their heads. As the Ancient Egypt, also the kingdom of Assyria practiced tradition where only the kings were protected with elaborate made parasols.

Because of the desert and the weather, Egyptian and Assyrians never found a need to waterproof their parasols. So the invention of the umbrella happened in China in 11th century BC, where first silk and waterproof umbrellas started being used by nobility and royalty. In the early

days the materials used for the umbrellas were feathers and silk, then replaced by wax paper. Pretty soon, because of the cost too, the umbrella became a symbol of rank and status. Its ornamental function and its link with the royal castes also remained in centuries to come, umbrella represented more a symbol of belonging to a social class than a simple rain cover, as it is considered today.

During 1st millennia BC, umbrellas came to Ancient Greece and Rome. After the fall of Roman Empire in 5th century AD, use of umbrella almost completely disappeared from Europe. We have to wait the arrival of Renaissance to see umbrellas again. In late 16th and 17th century umbrellas were most wear by the nobility and royalty in France, Italy and England. At that time umbrellas were made from expensive materials, they did not providing protection from rain, but their general shape and design remembered the one used by Roman and Greece women in 4th century BC.

As the centuries went, in the 18th century the parasol spread across entire Europe over to Northern America too. At this time parasol has entered in the history of fashion. Along with the hat and the bag, the parasol was the first sign of woman emancipation as an accessory related to outdoor life. So traditionally was a female object until mid-18th century, when the will of Jonas Hanway, dared to appear in public carrying an umbrella in almost all occasions. Openly ridiculed at first, male population of England finally accepted the use of umbrella by the end of the century.

Speaking about the evolution of the shape of the umbrella we can say that the first lightweight folding umbrella in Europe was introduced in 1710 by Jean Marius and weighed less than one kilogram. Marius received from the King the exclusive right to manufacture this umbrella for five years. For a more modern mechanism will have to wait until 1759 when the Navarra scientist invents a button that opens the umbrella. This will be the final shape umbrella until the introduction of pocket umbrellas.

The pocket will give birth only in 1928 by Hans Haupt, then came the turn of Slawa Horowitz sculpture student in Vienna that improved the folding structure by creating the first compact folding umbrella.

Since then the umbrellas continue to be actively developed. In 2008 there were over three thousand active patents related to umbrellas. There are umbrellas that provide for the weather and others who know how to measure how much rain is falling. In 2008, Susan Orlean on New Yorker said that applications for patents on the umbrellas are so many that the office has four employees who care for them full-time. Those who know are sceptical about the new ideas: Totes Isotoner, the largest American company of umbrellas, explained that he stopped to consider new projects years ago. Ann Headlet, one of the directors of the company, explained to Orlean that the apparent simplicity of umbrellas leads

Fig 3.2
Jonas Hanway in '800
Source: http://forum.nuovasolaria.net/index.
php?topic=2980.0

many people to think of ways to improve them, but only few do come up with ideas that have already been designed.[32]

3.1.4.1   The History of Chinese Umbrella

Umbrellas are Chinese quintessentially, a traditional manufacture that is literally ingrained into the language. Just think of the character for umbrella san (伞) is a pictograph of the device that represents a group of people under a shelter. It may symbolize people are united under one roof. Also, the round shape of the open umbrella means reunion and happiness. According to what Cheng Dehu, manager of Beijing Ruo Shui Tang Oil Paper Umbrella Workshop said the traditional Chinese umbrella is really famous in the western world too. Cheng's company began to explore the overseas market in the early 1990s, and about 70 per cent of the company's revenue comes from exports to Europe. Cheng say "Exports to Britain and Germany alone will bring the company more than 10 million Yuan sales revenue each year." Western people are fascinating about the paper umbrellas and they buy them from China usually as gifts or decorations. Cheng also says that sales of paper umbrellas domestically have also improved in the past years. In 2010 the company sold 100,000 paper umbrellas in China, bringing in

800 million Yuan in sales and "the domestic demand for this traditional gadget has increased year by year," he says. We can assume that the demand both from Chinese and Western are really high. People love to buy these items because they represent such a high level tradition of the Chinese culture. Of course the local government tries to protect this tradition, and this is what happened years ago to Bi Liufu, a veteran paper umbrella craftsmen in Southwest China's Sichuan province. Six generation of Bi family have been making paper umbrellas but in the end of the 1990s the company faced a crisis and they were closing, when the local government funding saved them giving them 300,000 Yuan each year. After the funding, the family company counted more than 60 experienced workers. In the new century "the birth of the mass produced modern umbrella had a significant impact on the paper umbrella business across China," Bi says. But what happened in the 2010 was surprising, because the company's revenue surpassed 7 million Yuan compared two years before when it was only 1 million Yuan.[33]

China is still the country where the majority of modern umbrellas are produced, there are several provinces in China which are home of thousands of umbrella company. The biggest one, the umbrella capital of the world, is Songxia where the half billion umbrellas are produced. We are speaking about the thirty per cent of China's production, supplied by more than one thousand factories. Songxia Umbrella Industrial Zone is also name as "Zhejiang Umbrella Industrial Zone" by Economic and Trade Commission.[34] One worker can make about three hundred umbrella a day. This sounds incredible for the market nowadays, but we have to consider that handmade processes only produced thousand of years before the umbrellas, and the perception of the use was different too. Although many plastic umbrellas are often symbol of poor quality, the real tradition of Chinese umbrellas is still respected by many. The traditional areas of production are Fujian and Hunan provinces, where millions of umbrellas are produced every year and most respected Hangzhou style umbrellas are today celebrated for their quality and beauty. Hangzhou is a Chinese water town in China, its rains a lot in all seasons and the area is rich of bamboo. This is a necessary resource to produce the traditional handicraft umbrella. Oil paper umbrella has more than 230 year's history in Hangzhou, we are also aware that the first umbrella was made in Hangzhou, during Qing dynasty Qianlong 34th years (1769). The umbrella in Hangzhou is so famous that a museum was opened, the "China umbrella museum synthesized presents the umbrella culture, history, stories, technology and art mainly based on Chinese umbrella. It is the very first umbrella themed museum."[35]

Fig 3.3
Umbrella exhibition in Hangzhou
Source: https://xsally90.wordpress.com/tag/museum-of-umbrellas/

3.1.4.2   The Culture of Umbrella

The Chinese umbrella is made by silk or paper and structured by mulberry bark and bamboo. Silk umbrellas are the most expensive and the most polished, but also the most difficult to fashion and to maintain. Instead paper umbrellas are easier to fashion and to decorated. The paper used is a special tissue-thin fibrous paper. Strong and tear-resistant. Most of them are also treated with glutinous tung oil, also known as the China-wood oil, to make them impermeable and highly translucent. Once impregnated with the glutinous tung oil and allowed to dry, the paper shade is decorated. Chinese workers usually painted the shade with various designs of dragons, nature, landscapes, animals, figures, flowers, scenes from their mythology, and calligraphic characters. In-

33. Hangzhou Weekly, "*Reviving the lost art of making silk parasols*" http://hangzhouweekly.com/culture/reviving-the-lost-art-of-making-silk-parasols
34. J&H Umbrella Co, "*Songxia Umbrella Industry in China*" http://jhumbrella-manufacturers.com/html_news/Songxia-Umbrella-Industry-in-China-33.html
35. Jane Lu, "*The Umbrella and Hangzhou*", last modified June 12, 2014 http://blog.absolutechinatours.com/index.php/2014-06-12/the-umbrella-and-hang-zhou/

deed one of the highlights is the investing on the artistic embellishment of the paper shade. Besides being water resistant, the paper shade will withstand the ravages of wind and rain, just as its decorations will resist the tendency to fade over time.

The creation of one Chinese paper umbrella involves 80 work processes, divided in five parts and it takes at least ten days before an umbrella is finished (a collapsible umbrella naturally involves a 6th part: articulated joints). The five construction processes are divided in: the head, the handle, the ribs, the paper shade and the artistic embellishment. The production of each part requires great skill, since all five parts must assemble to a perfectly formed umbrella. The three most

Fig 3.4
Decoration on a Chinese traditional umbrella
Source: https://uk.pinterest.com/
pin/237846424043934196/

complex parts are: the ribs, the paper shade and its artistic decoration. In particular the ribs have to be made with a material that is both strong and pliable, the perfect one is the bamboo, at least 5 years old. Otherwise the alternative used is the bark of the mulberry tree.[36]

In the past, umbrella was a real work of art and because of their high price and scarcity, umbrella was affordable only by wealthy merchants, noble families, and royals. Very quickly wealthy females who used the umbrella as a shadow from the sun adopted the umbrellas. Because of the special process of applying oil on their cover, the umbrella was capable to protect their ladies from the rain too. Umbrella became symbol

of power in China and surrounding Asian countries. When the cost of the umbrella went down, Chinese Royal Members wanted to distinguish from the rest of the population so they used to carry only red or yellow umbrella, while the rest of the population used blue ones. At that time male started to use umbrella too, from here surrounding countries accepted umbrellas into their tradition and culture, in particular it happened in Korea, Burma, Siam and Japan. Later, umbrellas were soon exported and discovered in Europe, in particular in Italy, France and England, where the female nobility used to wear them as a fashion accessory.[37]

3.1.4.3   Why Umbrellas are still so terrible?

As we said before, the beginning of 2000 there has been a boom in requests for umbrella licenses. In 2008 there were over three thousand active patents related to umbrellas, New Yorker scribe Susan Orlean showed that more than three thousand umbrella patents where registered at the patent office and on the time four people were working on the umbrella patents. Since Orlean's article was published in February 2008, a search on Google patents shows that … (1,617 new umbrella-related filings have gone up in the USPTO database in the "Walking Sticks; Umbrellas; Ladies' or Like Fans" section, which is where umbrellas, fans, or other items on sticks appear.) Umbrella is so simple and everyday object that any person thinks to be able to rethink it. It simply being too common for a new design to break through and that's why the patent office is swamped with requests. Everyone thinks to modify the umbrella, but no one for now did a good job. We are still using the cheap umbrella you buy for forty Yuan, the one that you through away after using once because it's already broken after few meters.

So, why in 2017 are umbrellas still so terrible? How many things we have seen changing in our life? From clothes, to furniture, to cars.
There are few things that look, as they were years and years ago. Toothpicks, for example, do not change for a long time but they work very well. Umbrellas instead are rather fragile, bulky, you may often forget

them, they break because of the wind, and you never know where you throw them away. They are recyclable, but only if they are disassembled, which is never done. In addition, you will be always a bit wet, if you are using the small umbrella you get wet because it is too small, if you use the big one you still get wet when storing it because they remain soaked and clumsy. Not to mention when you climb in the car with the wet umbrella. Umbrellas are more or less unaltered since they were invented. From sun to rain protection, the most common form is unchanged but have changed the materials used. Despite this, umbrella looks far from perfect.

Fig 3.5
Man under a broken umbrella
Source: http://www.businessinsider.com/11-rainy-day-hacks-2014-4?IR=T

As on Atlas Obscura is write, "You have to wonder why, in an era when we can shove a computer into a watch, we've struggled to improve on this basic design in a way that's truly gone mainstream." Many people have tried to design better umbrellas, but look closely is not a simple mission. If so many people tried, why nothing changed? I would probably say that is because the design of the umbrella is quite good as it was invented. At the end, the main function that is to shelter from the rain is carried out quite well. Certainly it is always better to buy a large umbrella, rather than a small one because so you're covered better. It has always worked and has never been much changed. The biggest changes that the umbrella has had have been few, including:

_Foldable umbrella. In this way the umbrella is easier to carry. It is so small that it can be put in your bag, but small enough to be easily forgotten.
_Reinforced metal structure. The structure is specially designed for weather resistance.
_Aerodynamic shape. There are some umbrellas, which have been produced with a different shape from the classical, in this case the design is complicated and the production too, so the umbrella cost is very high. Most of the people still prefer to buy an umbrella from a few Yuan.
_Smart umbrella. Umbrella is connected to a device online and through Bluetooth the umbrella can be traced, so you do not forget it. In addition, the device also acts as weather alert, alerting you when bad weather is coming. The purpose is to buy the umbrella only once, making an investment. Assuming that a good umbrella, combined with a new technology can be the perfect umbrella you never lose and never break. The problem of course is the price to afford.

The first three changes are more related on structure changing. Make aerodynamic parasol or design a stronger metal structure. Instead, the last example is a good way to show that implementing the existing design with other things could be a good solution to solve problems that are related to the way in which umbrellas are used instead of the umbrella itself. It may seem like a coincidence, but it is not. What is happening in the new millennium is just a shifting about how we are living everyday life by the use of the Internet. We are facing a new era, where no matter what we are using but how we are using it.[38]

36. China Higlights, "*The Origin of Paper Umbrellas*" http://www.chinahigh-lights.com/travelguide/culture/paper-umbrella.htm

37. Umbrella History, "*The Earliest Umbrella – Chinese Umbrella*" http://www.umbrellahistory.net/umbrella-history/chinese-umbrellas/

38. Susan Orlean , "*Thinking in the Rain*", last modified February 18, 2008 http://www.newyorker.com/magazine/2008/02/11/thinking-in-the-rain

3.1.4.3   Umbrella Production

During the past, a variety of fabrics had been used for making umbrellas, from linen, cotton, leather, taffeta variety of silk to lace. Without forgetting the fabric that was first made for umbrellas only, the Gloria (which means 'bright'), a plain weave of silk and wool, and silk and cotton. After that, rayon and acetate replaced the previous materials for making umbrellas. Nowadays, the fabric used is nylon taffeta topped on an acrylic coating and a scotch-guard type finish on the top. Lately, microfiber fabrics with new water repellent finishes are also being used by the umbrella manufacturers. Umbrella manufacturing is a hand-assembly process. Aside the canopy made of fabric, the other parts of umbrella are Shaft, Ribs, Stretchers, Runner, and Handle. They can be made of wood, metal, plastic or any other such material.

_Shaft. It is usually made from wood, steel, or aluminium approximately 3/8 inch (95 centimetre). Otherwise are used fiberglass and other plastics too, for golf umbrellas in particular. When it's wood considering, shafts are made with wood-shaping machines such as turning machines and lathes. Metal and plastic shafts are drawn or extruded to the proper shape.
_Ribs and Stretchers. Ribs run under the canopy of the umbrella and stretchers join the ribs with the shaft of the umbrella. They are assembled systematically to give "U" shape to the ribs and they are usually made of steel or other metal. The ribs are attached to the shaft by fitting it into a top notch, rounded in a nylon or plastic piece with teeth around the edges, and then held with thin wire. The stretchers are connected to the shaft of the umbrella with a plastic or metal runner, the piece that moves along the shaft of the umbrella when it is opened or closed. Next, the ribs and stretchers are connected together with a joiner, which is usually a metal hinge; as the umbrella is opened or closed, the joiner opens or closes through an angle of more than 90 degrees. There are two catch springs in the shaft of each umbrella; these are small pieces of metal that need to be pressed when the umbrella is pushed the shaft to open, and again when the umbrella is scrolled the shaft for closing. Metal shafts are usually empty, and the catch spring can be inserted, while a wood shaft requires that a space for the catch spring be hollowed out. A pin or other blocking device is usually placed into the shaft a few inches above the upper catch spring to prevent the canopy from sliding past the top of umbrella, when the runner goes beyond the upper catch spring.
_Canopy. The canopy of the umbrella is hand sewn in individual panels to the ribs. Because of the curve of the canopy, each panel has to be cut

in one piece. Panels are sewn at the outer edges of the ribs. Each panel is cut separately from piles of materials called gores; although hand cutting is more typical, but is possible to cut them with machine too. The typical rain umbrella has eight panels, although there can be six panels in smaller umbrellas such as parasols and children's umbrellas. The larger umbrellas can have twelve panels too. The fabric used for a good-quality umbrella canopy is usually nylon taffeta, with acrylic coating and a scotch-guard type finish on the top. The fabric supplier usually applies the coating and finish. The manufacturer can choose fabric patterns and designs. The tip of the umbrella that passes through the canopy can be covered with metal or left bare, depending on the manufacturer. The handle is connected to the shaft at the end of the process, and can be wood, plastic, metal, or any combination. The end tips of the umbrella, where the ribs reach past the canopy, can be left bare or covered with small plastic or wood end caps. This completes the process of making an umbrella.

The above-described process is typically followed for making a stick umbrella. There are collapsible rain umbrellas too, which are more complicated than the last one, even if they are made through the same basic technology. The difference between the two is that for making the foldable umbrella, it necessary to have an extra set of runners along the top of the umbrella and it has to have two pieces of shaft.

A good quality umbrella is always comfortable to use and its usage serves for which it is made. Years ago, if an umbrella had a big number of panels was considered to be of good quality but with the improvement in quality of fabrics and other materials, it no longer stands as a criterion for a good quality umbrella, the number of panels is usually a matter of style and taste rather than quality. Nowadays, what is important is to look for the comfort of the handle, the ease with which the umbrella is opened and closed, and the closeness with which the canopy segments are connected to the ribs. [39]

39. Made how, *"Umbrella"*
http://www.madehow.com/Volume-1/Umbrella.html

3.2   CASE STUDIES

The case studies the author analyzed are related to the sharing economy around the world. Mobike is the famous bike sharing in Shanghai. Innovative product service system because it doesn't have bike holder/station as the usual bike sharing, but users can lock and unlock the bike whenever they are in the city. The second case study is Peerby a pure sharing economy case study because it survives with financial support and users can exchange goods through the online platform. The third case study is Method. This is not a case study related to the sharing economy but it's more related to the circular economy and to the key point to use recycles material to create new product. Indeed Methods is using ocean plastic waste to create packaging. This is a good example to have because it's important to be consciousness about environmental resources and what we can use to minimalize the using of them.

3.2.1   MOBIKE

Mobike is the new service, based in Shanghai and Beijing, which allow you to rent a bike everywhere in the city. Every bike has a GPS tracker that enables you to check every bike's location; it's also very recognizable thanks to its bright orange wheels and a thick steel frame. After paid deposit of RMB299 you can find the nearest bike to you and booked it, the reservation works for fifteens minutes, than you scan the QR code to unblocked and use the bike. The deposit is refundable and it will take up to 1-5 working days for it to be processed after you request for a refund. There are two kinds of bicycles, the first one is the one that was launched before on the market, it costs RMB1 every 30 minutes. The second one is lighter, with a basket and use of solar energy and it costs RMB0,5 every 30 minutes. When your ride is finished you lock the bike somewhere public. The service shows that in China, Shanghai and Beijing in particular, people use Sharing Systems and they need it. Mobike encourages people to ride public-sharing bike system to cover short distance, aiming to solve the last minute problem. Furthermore the users are not forced to leave the bike in a specific place because they can leave it in every public parking around the city. Lock and unlock system is really easy to use. So far, this service is the only grab bike app available in English. To make sure that the service works, the bike density must be high. That's why Mobike has to be always ready to put new bikes in the city. Furthermore, the cost of production for one bike is really high, it's around 3,000 yuan ($440), which is a shame when the bikes are damaged or stolen. To prevent this problem and to keep the sharing idea alive, last year Mobike has introduced stricter penalties based on a user credit-rating system. Its base starts at 100, adding one point for each instance of appropriate sharing, and subtracts 20 for each violation. You can redeem yourself by reporting the improper parking of others and each report is worth one point. Since the end of July, those with credit scores below 80 had to pay 100 yuan for each half-hour of bike rental. Another problem is that the weight of a bicycle is 25 kg, quite heavy for an agile ride. Also the bike was designed to people of small stature, these features raised complaints from users, which is why Mobike has designed a more agile, light bike, introduced in the city late last year. Last problem found regards the registration process. If you are Chinese is quite easy and quick, but for non-Chinese ID holders the process is a bit tricky. The user needs to send to Mobike a copy of the passport and additional photos. The process should happen fairly quickly but it can take up 48 hours to precede the registration.
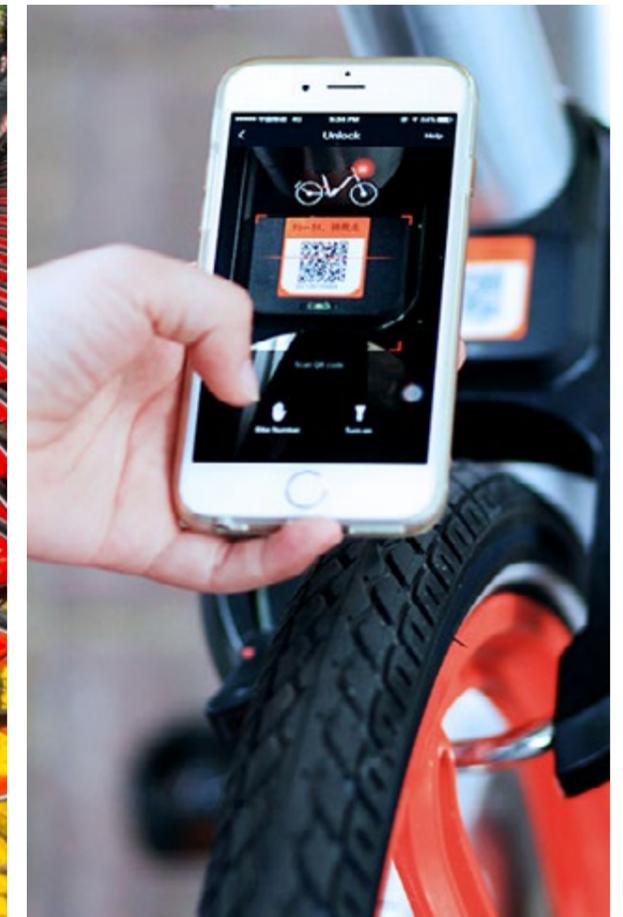
Fig 3.6
Mobike in Shanghai with some users
Source: http://www.chinadaily.com.cn/china/2016-10/19/content_27112008.htm

Fig 3.7
Unlocking Mobike
Source: https://flipboard.com/@youngwoom-ic1vfc

Fig 3.8
Mobike
Source: https://projectgus.com/2017/04/sharing-bikes-in-shanghai/

3.2.2   PEERBY

Peerby is a sharing platform that helps neighbors share household items. Members post something they want to borrow, and neighbors get an email or push notification to which they can respond quickly. According to the company, most lenders are connected with potential suppliers within 30 minutes or less. The owners can make some extra cash by delivering the item themselves or let Peerby arrange delivery by bike messenger. Anyway, the company is surviving because of the investors. Peerby was launched in Amsterdam in 2012, the service is now available in more than 20 cities around Europe and they also have some pilots protect in the United States. The company is now profitable because of the commissions from a new "Peerby Go" model which offers insurance and delivery options. Perry Go is a kind of upgrade of Peerby.

"People are social animals," Weddepohl says. "We like to help each other out. Borrowing things is probably one of the oldest behaviors in nature, and we are just making it easier through technology. We created a platform that makes it easy for people to find that neighbor that's willing to lend what they need." Thanks to Peerby members don't have to spend hundreds of dollars on things they'll use once in a while. They can share items. The service allows members to save money, meet people and live green. The aim of the sharing is to help each other and Peerby is doing it really well, people can get access to items without owning them through their neighbor. In an era when sometimes people doesn't say hello, this service seem so fresh. Finally people communicate again. The only big weakness in this system is that the service has to be big enough to ensure the functioning, but it seems they are dealing very well with this. The service is growing really fast in Europe and America, recently in Asia too. Indeed when the costumer is the pioneer of the city Peerby encourages him to spread the service in the city.
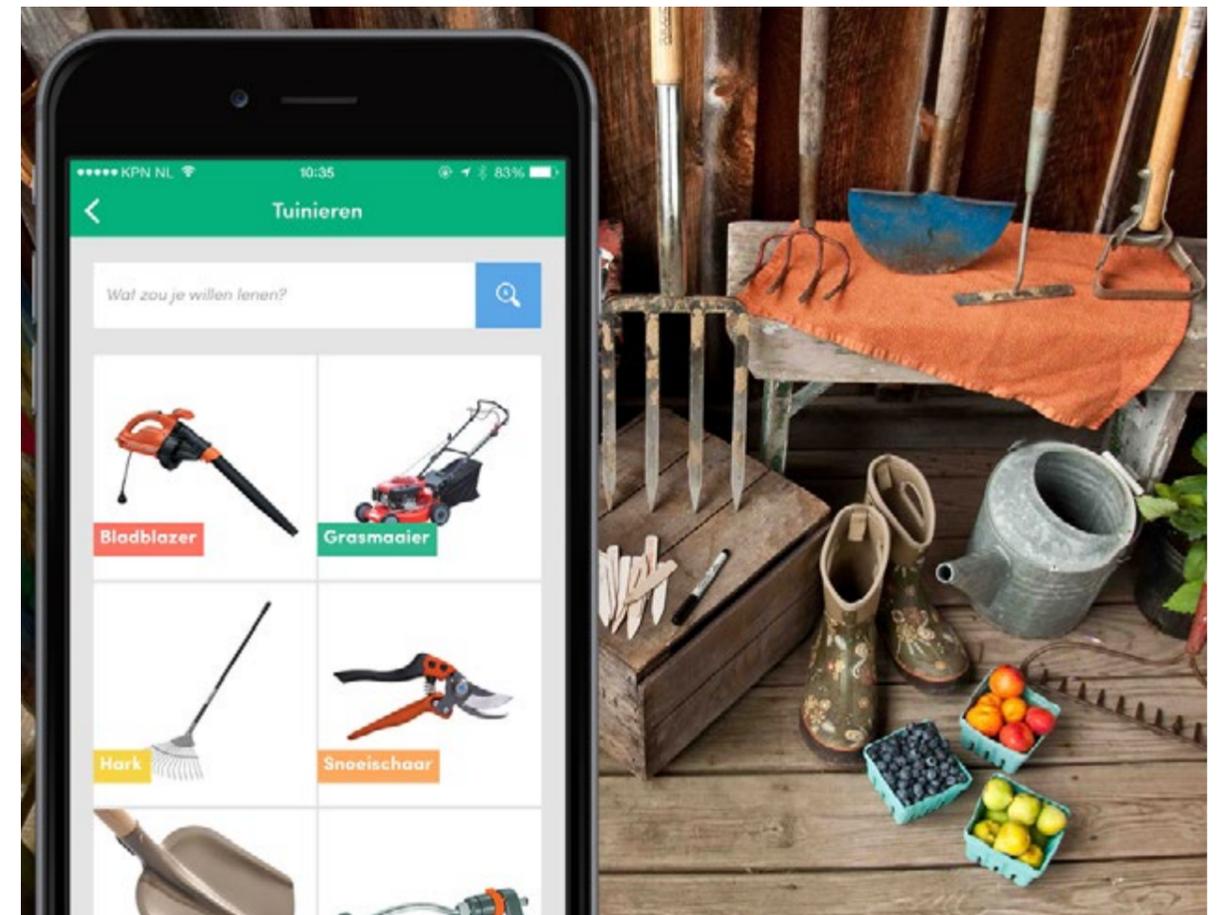
Fig 3.9
Peerby users
Source: http://www.plan-c.eu/en/belgian-cases/case-detail/peerby

Fig 3.10
Peerby App
Source: http://blog.peerby.com/vertrouwen-komt-te-voet-en-gaat-te-paard/

3.2.3   METHOD

Method Home is a soap factory located in Chicago; they produce soap, ready to sell it on the market. User can find the products online or in some retailers too. The peculiarity of this brand is its green side. The soap factory houses, manufacturing, bottling operations and the distribution system are under the same roof. Having everything in one building allows they to reduce carbon footprint. Method Home is working with recycle materials, so every packaging is made with recycle plastic and they worked on a new technology to recycle ocean plastic waste in collaboration with clean-up groups and volunteers that collect plastic debris from the beaches of Hawaii.

Method Home thought about the entire service. They didn't stop to think about to make recycle product, but they thought about ever everything, from the production of the soap itself to the distribution, to the packaging production. Everything is under the same roof, in this way the pollution is reduced. The cost of the products are affordable by the middle class, that is an incentive to push the consumer to buy the products, moreover the products look very well done. The company has a design studio that work mostly on the packaging, studying new design and pattern for every season and for special edition too. Method Home is a quite new company, they are located in Chicago and they don't have much retailers. That's why for some people could be complicated to buy them. But this is the only wakens the author can find on it.

Fig 3.11
Method
Source: http://methodhome.com/beyond-the-bottle/ocean-plastic/

Fig 3.12
Plastic waste in the Ocean
Source: http://www.backstagetales.com/a-plastic-ocean-the-truth-uncovered/

Fig 3.13
Method packaging
Source: https://www.pinterest.co.uk/wragwrap/reusing-plastic-bottles/?lp=true

4.   DESIGN RESEARCH

4.1   **FIELD RESEARCH**

4.1.1   OBSERVING THE CONTEXT

Exploring the context in which our society is moving, you can understand the shift that we are experiencing. We are moving from over-consumption to a more conscious consumer. This type of behavior influences not only our lives but also the modern society around us. Lifestyles are changing and therefore facets of everyday life change. Modern society, China in particular, it's interfacing with various issues, including the environmental sustainability. We all recognize that natural resources are important and, more importantly, we must preserve them and use them in moderation, otherwise it will lead to a point where there will not be resources needed to move forward. The overproduction has led to a high rate of pollution and this is leading many countries to adopt rules against pollution and encourage new economic business models.

The author has interfaced the new shift on the sharing economy and, how a product service system can be studied and applied to the Chinese context in modern society. A famous object of the Chinese culture is the umbrella. Chinese umbrella was really famous in the past, as a parasol and later it became a rain cover. For years the umbrellas were handcrafted, but they were expensive too. Than the technology found a way to redesign that and now it's the normal umbrella that everyone have. The problem is that people think about the umbrella as a disposable item, they buy it and after short time they throw it away. The author wanted to know from people what they think about umbrella, so the author asked them few questions through a questionnaire, that you can see it in the next chapter. Then the research goes on with interviews to experts, Gabriele Tempesta and William Morris, two experts in the Sharing Economy, waste management and urban design fields. Last step was to identify online comments about umbrellas and their usage, in order to reach people that are not reachable by the questionnaire and to have a gen-

eral overview about what people think online. The whole process and research lead the author to come up with good insights, a valid scenario and a good quality Product Service System project.

4.1.2 QUESTIONNAIRE

In order to reach a certain number of people the author made a questionnaire to spread it to friends, family and strangers. Chinese and International people too. Thanks to the questionnaire the author reaches 128 answers. The most interesting questions and answer are below.

The questionnaire clearly highlight that people don't really care about umbrella, because more of the 50% of the interviewed take the umbrella with them only if the forecast say that is going to rain and almost the 30% never take the umbrella with them.

People are used to buy from one to three umbrellas every year and most of the people are divided in two groups that are willing to pay from 16 to 35 RMB and 36 to 70 RMB.

If it's raining people don't care about if the umbrella is good looking or not, they buy it or they stolen it. Indeed 30% of the interviewed have stolen umbrella in their life.

Fig 4.1
Question n.1,2,3
Source: The author

Fig 4.2
Question n.4,5,6
Source: The author

Fig 4.3
Question n.7,8,9
Source: The author

Do you usually take your umbrella with you whenever you leave home?

7%
Yes, alwaysO

12%
nly if I remember it

52%
If the forecast says it's going to rain

29%
No, never

How many umbrella do you usually buy in one year?

21%

72%

7%

0%

01   -3   4-66   +

How many umbrella do you lose in one year?

30%

60%

8%

2%

01   -3   4-66   +
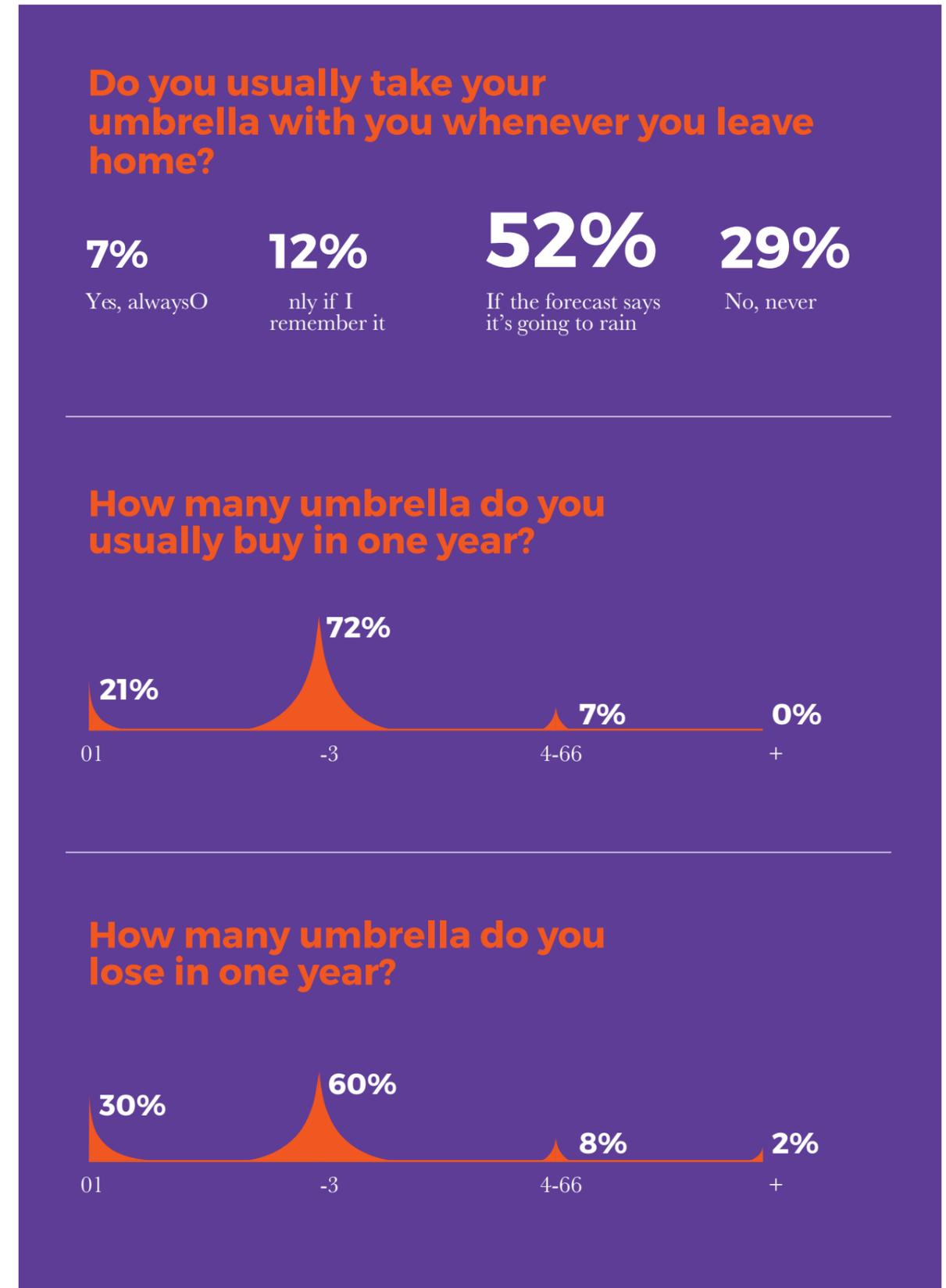
How much are you willing to pay for an umbrella?

€2- **5%**
€2-5 **42%**
€5-10 **40%**
€10 + **13%**

Have you ever stolen an umbrella?

YES

NO

What do you do when your umbrella is broken?

21%
Abandon it when you reach the destination

13%
Repair it

59%
Throw it away in the garbage

7%
Other

Would you share your umbrella with a stranger?

YES

NO

Do you consider the umbrella as a fashion item?

39%
Yes, but if it is raining I don't care

13%
Yes, I'm always careful about the choice

48%
No

Talking about the usage of the umbrella, what do you dislike the most?

Always wet

Aesthetic

Other

Annoying to bring it around

Never have it when you need

Size is too small

From the feedback people would like to have fashion item instead of having just a simple, ugly and bad quality umbrella. Almost the 40% of them care about the aesthetic part of the umbrella, but if it is raining and they need to buy one, they don't care about it anymore. Anyway, people would love to share their umbrella with a stranger, which is a very good data because even if Chinese people are shy they are demonstrating to be into the system of the Sharing Economy and their willing to share items. The last question of the questionnaire was about additional comments that interviewed could leave if they had anything to say. So the author collected the most significant and curios comments that people express.

As we can understand from the questionnaire and the comments, most of the people like the umbrellas because they consider them for its functionality, but they thinks umbrella is uncomfortable to carry around, that why they always forget it. Then, umbrella usually is not made by good quality materials, that's why it breaks easily. Moreover most of the people would love to have a colourful, good looking and fashion umbrella. *"Always have an umbrella in the car (it also is the only one I use) therefore if I travel by train/ public transport I obviously never have an umbrella with me."*

"Umbrellas are so uncomfortable and old. Designers should do something!!!"

"I am not the right person to ask about Umbrella as I love rain and feel it because give me a sense of freedom."

"Umbrellas have to be colourful and funny to be used in grey and sad days! :)"

"I never buy pretty umbrellas because I'll forget them somewhere very soon, even though cheap umbrellas will break very soon :("

"I hate umbrellas, to me it's the most uncomfortable accessory!"

"Also, it's really not elegant, when big wind blow the umbrella into a weird shape"

"Umbrellas are the most forgotten objects :-((("

"I strongly prefer my jackets hood! :-)"

"Hope umbrella could be as poetic as rain ☂."

"I have had nice umbrellas, but unfortunately I loose them easily. So I don't know if would pay again for a good/expensive one. I hope you are designing a sharing umbrella system :) so one could use the umbrella and drop it in another place after the rain!!"

4.1.3   INTERVIEWS

In order to have different valuable prospective and key insights is good to interview experts. These kinds of interviews are really good in the Inspiration phase, because they can give systems-level view of the project area in which the author is working on. So the author decided to interview two people. Gabriele Tempesta, strategy director for City Innovation Department in YANG DESIGN studio, William Morris, Research Manager for Collective Responsibility an innovation-consulting firm focus on sustainability and innovation.

4.1.3.1   Gabriele Tempesta

The first interview took place in YANG DESIGN with Gabriele Tempesta, strategy director for City Innovation Department. The author found really interesting the background of Gabriele and the projects he was following in Shanghai.
YANG DESIGN is a Chinese design consultancy. They were the first to receive the Red Dot Award for city furniture design. YANG DESIGN launched its own "City Innovation Department", so to make Chinese cities smarter by designing urban products, services and spaces.
Gabriele is focusing on design for citizen-cantered smart cities. He is committed to design product service system that supports sustainable lifestyles and societal change. He works on experience in sustainable product, system design, interaction design, user study and service design. The author decided to have a chat with him about those topics, in order to have a point of view about Smart City and what does it means innovation for the city in his opinion.

The author asked the background of Gabriele Tempesta.
Gabriele Tempesta is an Italian product designer. He studied product design in Politecnico di Milano and he got a bachelor in 2010. He start to be interested in environmental sustainability thanks to professor Vezzoli, because of his design course on system sustainability. Gabriele attended a Master of Science in Industrial Design at Eindhoven University of Technology (TU/e). This department focuses on the design of intelligent systems, services and related products for societal transformation. That's why Gabriele was starting to be interested in the smart city. Really curious person, developed by himself skills related to PSSD and service design.
Now Gabriele is exploring the vision of YANG DESIGN in Shanghai, Strategy Director of YANG DESIGN City Innovation Department. And from here they start to be interested in the concept of the smart city. Tough topic for a design consulting because it is usually interpreted more technically as engineering, so the big industries are the ones that play the main roles, such as IMB, CISCO etc.

The author asked the definition of Smart City.
Gabriele affirmed there are many definitions of Smart City and the meaning itself is continuously changing. The concept of smart city was born in the late 2000s. We are talking about intelligent cities, technology allows administrators to make informed decisions, or even allows cities to self-manage certain aspects, such as traffic. This is the most well known interpretation of the smart city, but there are other interpretations, such as the combination of the use of renewable energy, low environmental impact, with ICT technologies. And then we have another interpretation, the social one. Citizens, through computer technology, can actively participate in important decisions about their community. Internet is used as a tool to get feedback and involve citizens in decision-making.

The author's question was spontaneous, the author is afraid by technology because sometimes it seems to have a lack focus on people. Gabriele says that everyone mentions this problem. The smart city seems to be a technology push to monopolize the city. We have the example of a Korea-built neighbourhood. Citizens are holding a card that is scanned at every place people so, so municipality can collect data. But this neighbourhood is already obsolete, because with smartphones you can do these things without the use of additional technologies. Monopolizing a city with a single operator or technology is unreliable because it is difficult to upgrade or scale up a smart city from scratch. If the city is already exist, it can rely on small/medium businesses that install more manageable services. Gabriele thinks it is more convenient to work with the cities already built, so to implement the services as the built environment already exists. Understand the needs of the various districts and

decide the strategy to use. Which provider you trust and which technologies, whether to rely on foreign companies or start up local businesses.

The author asks if a Smart City is sustainable or not and what he means by sustainability.
One of the real reasons why Smart City was born is to handle it better, so Smart City is sustainable. Gabriele says that if you can measure the resources, you can also control and consequently manage more efficiently. In terms of efficiency, smart city tends to be sustainable, but it is not always hoped that the technology that is being used is green. The smart city mainly deals with data and management, then the technologies that are used are a separate thing.

Gabriele, along with his department, developed cards that summarize the six pillars of a smart city, which are: government, people, environment, economy, living, mobility. To find these six pillars, papers from different authors have been taken, and the indicators that were going to define the smart city were combined and integrated with each other. The indicators were grouped and then organized in macro area. The cards were then completed with reference image and actions with which cities can become smart.
Smart cities have so many facets. Examples of classical examples such as swapping items platforms, which require the use of ICT, have been reported in the six pillars. So they make it a Smart City service.

Speaking about mobility, the author asked to Gabriele what he think about Mobike.
Gabriele argues that Mobike's usability and design are very beautiful. They are increasingly implementing the service with additional partners and additional services, so they see them very well in the context of Shanghai. They are also really expanding. Gabriele likes very much as a service because it also stimulates sustainable behaviors. Speaking of Sharing Economy, the author asked Gabriele if Mobike is part of Sharing Economy or not in his opinion and he thinks he is, he thinks it's not pure Sharing Economy because it is a very difficult goal to reach but that he does part. Forgetting property and sharing resources is a difficult aspect for people. Close up people are approaching it and surely thanks to the ICT is all a lot easier.

4.1.3.2

William Morris

The second interview was made with William Morris, Research Manager for Collective Responsibility an innovation consulting used to focus sustainability and innovation. "Founded with the fundamental belief that that a sustainable world can only be achieved through awareness of issues, finding tangibility in business cases, and development of cross-sector collaboration, Collective Responsibility acts as a knowledge base, catalyst and facilitator between stakeholders."
The author found really interesting the focus on sustainability as a key to innovation. So she decided to interview William regarding the sustainability of a PSS and how he considers Sharing Economy in China. If it is sustainable or not and the consideration he has regarding Mobike, the new bike sharing system in Shanghai.

The author asked the background of William Morris.
William Morris is from UK. He studied for a Master's degree in Environmental Technology from Imperial College London and got a Bachelor's degree from the University of Bristol in Chemistry. He worked as a researcher at the University of Bristol and he worked for a waste management company in the UK, where he developed a thesis about environmental technology and specifically in Circular Economy. The Sharing Economy was part of everything in his studied and the Product Service System too. He focused on the role of the waste management company in the case of PSS become huge. Now he is based in Shanghai and since 2014 he is working in Collective Responsibility, an innovation-consulting firm that used to focus on sustainability and now more on innovation.

The author asked if China is ready for a Sharing Economy.
William found this question really interesting. Asking to me: Does Chinese people ready for it? Or is it the Government? Is it the system ready? He considered it as a multilayer question. William thought that Chinese people are. At this point I replay asking why there are so many damage on Mobike, so considered this question William thought about the last hackaton he did with Collective Responsibility. The main topic was car sharing and Chinese people didn't understand what sharing mean, in particular linguistically speaking that was a big issue for the. Only when the organizers mentioned them Mobike as an example they realized what Sharing more or less meant. So for them it was not car sharing, but Mobike car. That's why in his opinion the thesis I'm developing should

be sold more as "Mobike Umbrella" for example than "Umbrella Sharing". This was just for say that the author should find another way to sell the PSS, not really saying that is a sharing system but maybe put the focus on another aspect of the service.

Speaking about Mobike, the author asked to William what he thinks about this new bike sharing system in Shanghai.
William likes Mobike. The principals are really good, and it is a business model that highlights the competitive landscape. Especially in a place like China where you are in the production capital in the world so the capability is to produce quickly and copy quickly. Mobike is facing sustainability, but what we think sustainability is? What the aim for us? If Mobike's aim is to decrease localized pollution and increase cycling in city they achieved that. If the aim was to reduce waste probably they don't. But sometimes you have to pick your priority, your solution. William supports to do everything you can, as Mobike done at the end. It's just a shame that there are more than five of the same bikes sharing system in Shanghai, but at the same time it was inevitable, because of its competitive market. William seems really worried about the latest process of the system. What will happen if a bike is damaged? For sure the designs for dismantle is really important in a PSS and it has to be studied really well.

So what does it mean sustainability and why the design of dismantle is important, the author asked.
So sustainability is a really difficult concept to explain and there are many definition of it. But William thinks that sustainability is the production of the economic grows without consuming the world resources. And it's all about your priorities. The issues you are searching a solution for. Covering every single aspect of sustainability is impossible, because we are not living in a sustainable environment. So we have to do the maximum we can do to be sustainable. As mentioned before, design for dismantle is really important. If you are designing an umbrella one of the key important is to identify all the points of friction, where the most valuable points to break are. As for example Patagonia does with its products. When they design a clothes they are testing and testing and testing till one thing breaks, and then they repair it and test it again. In this way they know where is the valuable point to break, than they design their best. So William suggests to do the same for the umbrella. Design it and test it forced on wind. Create modularity and so create a recycled umbrella, if it's broken bring it back and reshape it. In this way you are creating a second life, a loop, a circle. It's all about design stage, or at least find a partners for dismantle, as Renault did with Sita Suez waste company.
The author responds that she doesn't want to create an overproduc-

tion of umbrellas, of course she would like people sharing umbrellas between each other but she can't force people to do it. So she can suggest it from the project, and that is what she is planning to do it. William answers that someone will copy the project so for sure there will be an overproduction of umbrellas, the market is competitive and you should find a way to differentiate your project.

Speaking about the thesis project, the author asked to William what he thinks about it, and if it's a part of the Sharing Economy or not in his opinion.
William starts answering me saying that in his opinion the project the author is developing is not purely Sharing Economy, even if it's coming from the Sharing Economy. For William the truly Sharing Economy is to leverage access capability. For example the service Bla Bla Car, in your car you have three seats access capacity, so you can use them by having money paid. Sharing Economy is when people communicate with each other, Product Service System is when you create capacity and then you leverage it, it's coming from the Sharing Economy but it's not pure.
William lost so many umbrellas this year that he stops buying them. From a waste prospective, the quality of umbrella is low. If you create value proposition where you can create an access to high quality umbrella, you stimulate consumer to use the service. Quality is an issue. William tells an episode of his life happened few days ago. He was going to the gym, it started rain and he went in the family mart to buy an umbrella, the umbrella were cost 60RMB, it is not a lot of money he said, but knowing himself, he knows he will lost the umbrella in two days or he will leave it in one place. So at the end he didn't buy the umbrella. Umbrella is a lost of money.
Speaking about the project the author is developing, William reflected about the Product Service System saying that in your case, a person does not use an umbrella, but an umbrella is used by more people, this generates more profit because it is enough to produce less and earn the same or more. So it is not convenient for you to produce waste, but longevity products. Now, what are the incentives to produce high quality umbrella for a company in China? No one, because it costs less to make low quality umbrella. A normal umbrella manufacturer cares about productivity and waste. In your case, we are talking about renting, and you are concerned that the product is of high quality and longevity because otherwise you should also think about the maintenance phase. Therefore, for the production of normal umbrellas, waste is externalized. What happens after the sale is not responsibility of the manufacturer. For the author is different. She is interested in what happens next, because she is the one who has to handle it. So internalizing waste is what the author is, that is responsible for, in somehow these will affects the business model. All this, it is to say that the PSS that the developer is planning, is positive

to sustainability. Because she is stimulating economic growth without extracting more resources. William thinks that this model can fit into the Sharing Economy. It's not pure Sharing Economy because it's creating more capacity in order to leverage the access of that capacity, but it is still Sharing Economy.

4.1.4   ONLINE RESEARCH

For more information about people's opinions on the umbrella object and its use, the author has conducted an online search by identifying the most significant people's comments on articles. So part of the research was done by reading and collecting comments from people who wrote online. As you can see in the following pages there are some

Fig 4.4
Comment on "The Telegraph"
Source: http://www.telegraph.co.uk/men/ the-filter/11169323/Why-real-men-dont-use- umbrellas.html

Mike Thomas · 3 years ago
Like today, wearing a suit on my way to work, I used my umbrella.

Why? Because I really do not want to go my early morning meetings soaking wet through.

screenshots of comments gathered by online articles research.
People use the umbrella for its functionality, to cover them from the rain. People don't want to lose the possibility to do something if they don't have an umbrella and so if they lose it, they are willing to do whatever thing to have an umbrella soon, even steal it. As Anna E.Boch in her article explains that taking other people's umbrellas is a great idea. "Where all of my former umbrellas are, I have no idea. They have entered into the nebulous vortex of lost umbrellas—probably someone in the Financial District is enjoying one right now. But I'm not bitter. That's because I take other people's umbrellas. "Now wait a second! Isn't that stealing?" Well, friends, not exactly."[40]

40. Anna E.Boch, "*Under your umbrella*", last modified October 23, 2009 http:// www.thecrimson.com/article/2009/10/23/under-your-umbrella/

Fig 4.5
Comment on "Il Post"
Source: http://www.ilpost.it/2016/10/10/
un-ombrello-migliore-e-possibile/

It seems that when you need an umbrella and you don't have one you can take whatever umbrella catch your eyes catch.

All of these are good insight to take care for a new re-imagination of umbrella. It seems that the umbrella itself is doing its job pretty well. We never questioned ourselves if we are acting in a proper way. Why people have to consider the umbrella as a disposable object. Losing objects is not a justification to continue buying them. That's why the author investigated more in this aspect and she understood the behavior of the people is not the only issue, but most of the time the quality of the umbrella is not that high and so the umbrella breaks easily.

Fig 4.6
Comment on "The Wire Cutter"
Source: http://thewirecutter.com/reviews/
best-umbrella/
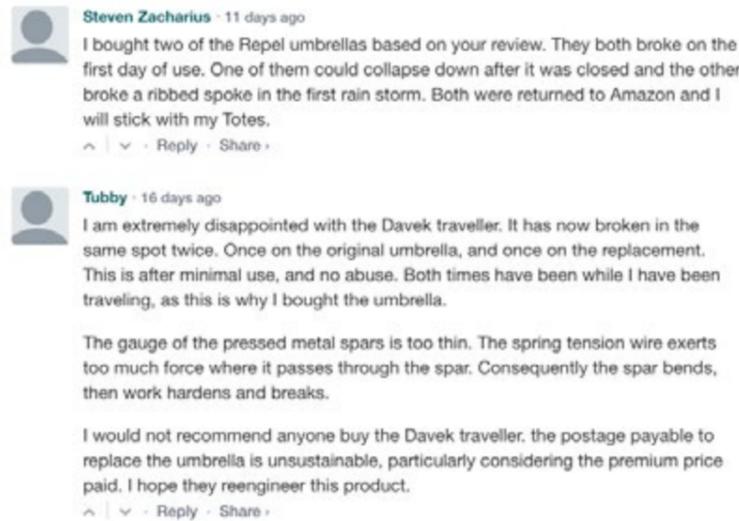
The problem is that this issue is valid for most of the umbrella and people don't want to buy expensive one because they know these umbrellas are going to break it. The point is that this is a loop.

People do not want to buy expensive umbrellas because they know they are going to lose them in a short time, and if they do not lose them, they have to throw them away ways because they break them. While some umbrellas are of superior quality are still fragile. An umbrella is made up of more than 150 different parts and therefore if one part breaks the entire umbrella it must be replaced. It is very difficult to repair it.

Fig 4.7
Comment on "Youtube"
Source: https://www.youtube.com/
watch?v=1ue9_ptmehU

Fig 4.8
Comment on "Kotaku"
Source: http://kotaku.com/japanese-vend-
ing-machines-now-lending-out-umbrel-
las-1737986764

If you think about it, it is anomalous that we have not invented anything more modern and efficient yet. A technology that does not make us wet in the rain, and at the same time does not always forget, does not stick in the eyes of the passers-by, does not break continuously. Nothing to do, for now umbrellas are the usual old and precious umbrellas.

4.1.5   GATHERING INSIGHT

From the research and the literature review the author got lots of information and she understand what are the problems of the umbrella. First of all we have to say that the umbrella itself is not a bad concept, but it is not precise and defined. Considering the whole life process of the umbrella we can find few errors in the production phase and in the dismantle phase. Speaking about the production we can say that the quality is a big issue to solve. People wish to have a good quality umbrella because they know its durability could be longer, but not a lots of brand do it and most of the time when it start raining it's more easy to buy an umbrella from the street vendor instead of look for an umbrella shops. Speaking about the dismantle phase we can say how this phase is a big issue for every country. In China doesn't exist a recycle collection of materials and so dismantle of umbrella is really hard to do it. The same is happened in Italy. For the moment there is no separate collection for umbrellas, which have dumps and incinerators as the only end. Yet the materials of which an umbrella is made will all be recyclable, but this type of service has never been budgeted for economic reasons: separating the various components of the umbrella would cost too much. A citizen could work on this separation, but it would not solve much because the economic umbrella canvas is made of polyester, which if it is not in the form of usable dress, must be conferred on the indifferent (in Italy), despite being perfectly recyclable - And recycled, at industrial level, for decades.
By the way, considering a good quality umbrella associate with a well studied dismantle phase, the price of the umbrella goes up and not everyone is willing to pay a high price for an umbrella because they know they are going to lose it sooner or later. So in this phase is showing up another important issue. Nothing regarding with the product itself, but instead with people's behavior. From the questionnaire we know that more than 70% of the people don't like to carry umbrellas around. We can assume that is why they lose them or forgot them at home most of the time, indeed more than 50% of the interviewed take the umbrella only if the forecast say that is going to rain. Almost 60% lose one to three umbrellas per year and 30% of the interviewed has stolen umbrellas in their life. Considering the numbers of the interviewed (128) the results highlights how the behavior of the people is wrong with umbrellas. People lose them, abandon the, steel them, throw them away without thinking to recycle them. On the articles "Why Making a Better Umbrella Is Way Harder Than It Seems" Ernie Smith ends it saying

that the umbrella should be the first object that should teleport if the teleport will be invented one day, in order to have umbrellas into the hands of people walking out into rainstorms. "If there's something I could redesign about the umbrella, I would make it possible to only be there when I need it, and go away when I don't." This could be the key point to deep understand in order to study a new product service system with umbrella as a product.

4.2   CASE STUDIES

The case studies the author analyzed are related to the umbrella product service system around the world. UmbraCity in Vancouver is based on a vending machine that distributes umbrella in university campus, than we have BrellaBox in New York another vending machine, third service is Umbrella Here, light that you can put on the top of the umbrella and show to the people if you are willing to share your umbrella with someone else. The last two services were born in China and they are really recent product service system called Molisan and Hujie Web.

4.2.1   UMBRACITY

Umbracity is the new sharing system located in the British Columbia University in Vancouver, also called Raincouver. The system is working only in the campus and helps students to go from one building to another one without getting wet. People can sign up online or in one of the four buildings where the umbrella kiosks are located, swiping the students' card they can get access to the service. The service is free for 48h, than you have to return the umbrella in one of the kiosks, otherwise user are going to pay two dollars per day, until the bill rise up to twenty dollars.

Interesting service because it developed in a university campus, the system is small and it has the potentiality to scale up easily. The service is free, giving you the possibility to keep the umbrella for 2 days. Moreover UmbraCity has a partnership with Common Thread. Common Thread, is a social enterprise that creates jobs for people with barriers to employment, together with UmbraCity they developed an umbrella-only recycling bins conveniently located next to the kiosks where anyone and everyone at UBC can dispose their broken umbrellas at, and not just UmbraCity's.
Despite the design machine is versatile and adaptable to different kind of situation, the design seems to be really mechanical and not good looking. To grab an umbrella, the user has to slide out the umbrella for all the way on the machine, it's annoying and it takes more than few seconds to slide the umbrella out, so people queue too. The service is free for 48h and it should be working as a service system, but if the user doesn't return the umbrella in ten days, they will have the ownership on it and is not pushing people to return the umbrella.

Fig 4.9
UmbraCity
Source: https://popupcity.net/umbrella-sharing-service-for-students-in-vancouver/

Fig 4.10
UmbraCity on the street
Source: http://www.businessinsider.com/umbracity-is-vancouvers-solution-to-disposable-umbrellas-2015-10?IR=T

Fig 4.11
UmbraCity Machine focus
Source: http://www.businessinsider.com/umbracity-is-vancouvers-solution-to-disposable-umbrellas-2015-10?IR=T
Fig 4.12
UmbraCity
Source: http://www.businessinsider.com/umbracity-is-vancouvers-solution-to-disposable-umbrellas-2015-10?IR=T

4.2.2

BRELLABOX

brella from BrellaBox, it goes to pay USD 15 (103 RMB) for a disposable umbrella. Last but not least, the service works if there are enough vending machines to cover the city, giving the possibility to rent and give back the umbrella when people need it.

Brellabox is the service based in New York that give you the possibility to rent an umbrella from vending machine located in over 500 locations throughout the city. The vending machine is equipped of 50 umbrellas and a screen where you can swiping the debit card, pay and you can insert your phone number, so the service can remind you when to return your umbrella at the nearest vending machine. The cost for renting is USD 2.50 (17 RBM) for up to 12 hours, and it's also the possibility to purchase disposable umbrellas for USD 15 (103 RMB) each. The idea has been tested in different universities and in the city of New York as a pilot program. BrellaBox is also planned to design an app to be used in conjunction with its new machines. The company wants to provide machine for the city, universities and for business too. Employees, guests, or members can rent an umbrella for a length of time, and a price choice by the business. A sticker will take place in their window signifying their participation in the program.

Everyone lost, forgot and broke umbrellas. So the perfect combination is to get access to umbrella only when a person needs it. The service is showing the need of having an umbrella sharing in the city. People don't want to carry umbrella around the city, that's why they are willing to use this service. Users can get access to an umbrella easily and the service remembers you to bring the umbrella back to the nearest machine. It's a simple system and environment friendly too. Indeed users are no longer forced to buy the cheap umbrellas from the corner store, they have the possibility to rent a good quality umbrella and than give it back to BrellaBox.

BrellaBox seems a good service system, but it has some weaknesses. First of all the vending machine seems really ugly and this is not a good point for the aesthetic of the city. The process to rent an umbrella is mechanical and slow, the user has to swipe the card and pay every time, the machine doesn't provide subscription or log in system. Each time the rent payment is USD 2.50 (17 RBM), almost cheap service, but many other cheap umbrellas are available at the corner store. An umbrella usually cost USD 4 (27 RMB) and it's available at the first drop of rain. The rental rate seems not attractive compared to availability of low cost umbrella. If you use the service twice, you have already exceeded the cost of an umbrella. Moreover the umbrellas from BrellaBox are foldable, which means small. In this way, the service does not seem convenient. Without considering the fact that if the costumer decides to buy an um-

Fig 4.13
BrellaBox
Source: http://2paragraphs.com/2016/04/
brellabox-renting-umbrellas-2-for-12-hours-on-
shark-tank/

Fig 4.14
BrellaBox Speach
Source: http://www.disneyabcpress.com/abc/
shows/shark-tank/episodes/724/photos/

4.2.3

UMBRELLA HERE

Umbrella Here is a light that you can fit on the top of your own umbrella, its turn on when you are available to share your umbrella with someone, just like a taxi. Umbrella Here comes with a mobile application, users can simply control their Umbrella Here by the app and also keeping in touch with new friend met signing up on the website. Umbrella Here turns into a weather gadget when you are not using it outside home. It turns red when the weather is hot and turns blue when its cold. When it's raining it blinks reminding you to bring your Umbrella Here and your umbrella with you.

Interesting service that it shows a peer-to-peer system of Sharing Umbrella. Through a simple object the user can transfer his umbrella into a taxi-umbrella and share his way with a stranger or a friend for free. Umbrella Here has more than one function, it can remind you to bring your umbrella, or it can tell you when it's going to rain or not. If you share your umbrella with an interesting person you can log in on the website, enter the time and place you met, add the person as a friend, and continue the conversation. Umbrella Here is a product service system developed by 4 students in Hong Kong. With their project they have been to Beijing for exhibitions and Shanghai for competitions. From 2015 the team moved to Shanghai because the responses from China were much better than Hong Kong, even the investors were more willing to try something new. China is a good environment to try new product service system. The brand Umbrella Here is mostly referred to the light gadget that you can buy on the website, not included the umbrella. So the options are two, spend more money buying their umbrella, or find an umbrella that can fit the light. The Umbrella Here can't be fixed on every kind of umbrella, and in this way it seems a waste of money because the Umbrella Here is USD 40 (275 RMB). Otherwise it is still possible to buy their umbrella for USD 13 (89 RMB). The total of the shipping is more than 300 RMB. A bit expensive for an umbrella and an App that tells you when is going to rain or not. Another week point of this product service system is about the system to work. People on the street need to know what the light means, otherwise they'd just think it's a weird umbrella design.

Fig 4.15
Umbrella Here
Source: http://umbrellahere.com

Fig 4.16
Couple under the Umbrella Here
Source: https://www.kickstarter.com/proj-ects/1369020620/umbrella-here-light-up-your-umbrella-for-sharing

Fig 4.17
Detail of the product
Source: http://umbrellahere.com

4.2.4   ## MOLISAN AND OOMBRELLA

In China appeared two different service of umbrella sharing system. Unfortunately the author doesn't have so much information to share regarding these two services, because they are really new.

Molisan, which means "Magic Umbrella" it's the new service that give the possibility to rent an umbrella for 20 RMB, by scanning a QR code. People with a high enough score on Zhima Credit — a credit-rating system embedded in Alipay — can skip the deposit. For the fee of 2 RMB per day, users can pick up one of the company's umbrellas. The rental period is 15 days, and renters can renew for three additional days after which they will be charged a late penalty of 0.5 RMB per day. So far, the Shanghai-based start-up, has already reached agreements with both the Guangzhou and Fuzhou city subway companies to place kiosks there. At least six stations on the Guangzhou metro have adopted Molisan and it is expected to provide between 500,000 to one million umbrellas in Guangzhou this year.

Hujie Web is also offering umbrellas for rent. Thanks to its app, the company aims to provide a platform where unused items — from bicycles to briefcases — can be rented out to others. On Weibo platform there are posting photos of umbrellas locked to city fences, ready for rental through Hujie.

Fig 4.18
Molisan in a metro station in Guangzhou
Source: http://www.newsgd.com/news/2017-05/11/content_170544499_2.htm

Fig 4.19
Hujie Web in Shanghai
Source: http://www.chinaminutes.com/british/news/20170526/263405.html

5. PROJECT DEVELOPMENT

5.1   NEEDS AND OPPORTUNITIES

The research was important to identify needs and opportunities for a successful PSS. The literature review touched different aspects of the study, first of all, what is defined as sharing economy and how the sharing economy is approaching in China. At the same time, how Chinese people approach it. Second the author gave an overview about the sustainability and how the plastic of the umbrella is influencing the waste in China and all over the world. At the end of the literature the author wrote about the umbrella and its use. In the research field, it was possible to learn from the people what are their issues, in order to be able to design a project directly for them. Understanding the real needs of the final uses is key point of the HCD.

The author gather different case studies in order to used them as inspiration and find opportunities and limits on them. Mobike in particular highlights how Shanghai is ready to welcomed PSS based on the sharing economy, and how much the entrepreneurs are willing to try new business model. Indeed after the launching of Mobike, other entrepreneurs founded bike-sharing system in Shanghai.

Sharing economy is definitely recognized in China and it keeps growing. This is demonstrating how the topic of the study is a positive and modern theme.

Thanks to interviews with experts and the questionnaire to people the author reached many insight and defined the path she is going to follow to develop the project. People would like to stop buying bad quality umbrella because they know they will break it or lose it. And at the same time designer can't stop to think about the design itself of the umbrella instead of designing a service made for people's behavior. Experts evidenced how a product service system should provide a dismantle phase in the project or at least to have a closed loop that couldn't produce

waste. Sharing economy help to improve people's behavior facing new alternatives to offer to people. Everything is a consequence; it is a loop. The PSS the author is creating has to fascinated users, in terms of good looking and functionality too.

Furthermore, a research about the typical Chinese umbrella was helpful to better understand the scenario in which the project will be included. Thanks to the inspirational case studies a people's opinions the author is able to create a product service system in the context of Shanghai.

Identifying needs and opportunities we can defined many insight that are summarized in the following three points:
_Sharing economy in China and Shanghai. The Sharing Economy is increasing in all over the world, in particular in China. The Sharing Economy is more a necessity than a pure option. There are too much assets that could be shared or reduced in a controlled number. The density population in the city is increasing and we cannot implement the Hyper-Consumption anymore.
_Sustainability is an important key point of the study. People have to know what Sharing Economy means and how we can live sharing assets. The author chooses to work on the umbrella because umbrella is an object that people lost, broke, stolen, and at the end they buy it again. It's a circle that never ends. Billion umbrellas lost or broken every year. And also the materials whereby the umbrella is produced are not so sustainable because of its difficulties of disassembly. There's enough metal in them to build more than 25 Eiffel Towers each year, and enough polyester (which takes about a century to biodegrade) to cover New York City.
_Create a PSS. The main scope of the study is to design a tangible project, a Product Service System, based on umbrella, that its able to give to people the possibility to get access to umbrella in a different way. Sharing economy helps to change the way we get access to things. Nowadays people are always more online connected. The author wants to use the powerful of the Internet to create this PSS.

5.1.1　　　　THE SHIFT

　　　Sharing Economy is in rapid evolution in the world, but in particular in China. The Chinese Government had demonstrated that it's ready to get a new kind of Economy. From the study, we also have to consider the particular case of Shanghai. The largest city in the world by population, with 24,150,000 inhabitants recorded in 2013, increased by approximately 37% compared to the previous census. The "economic capital" of China also has the second most populated metropolitan area of the planet. Shanghai should be ready to the Sharing Economy because it can help to distribute assets to the city avoiding Hyper-Consumption. The Sharing Economy is also possible thanks to the Internet of things. "Smartphones and smart watches simplified the access to information tremendously and allowed the customer to quickly check the availability of specific services."[42] In particular we are speaking about how people are facing with this new Economy. "It's not restricted to age, it's just that they're more of the digital native. Their lives are based online, day-to-day."[43]

5.1.2　　　　PROJECT GOALS

　　　The project goals of this study are:
_Create a Product Service System. The tangible outcome of the study will be the creation of a PSS based on an Umbrella; the service will have a type of business model that can give the possibility to apply the project in different cities and countries.
_Create Awareness. Through this study I want to create awareness about the new era in which we are facing in these last years, the Sharing Economy. The Sharing Economy is increasing everyday and lots of people are already using Sharing Economy Services without knowing why and what they are. So I want to focus on this intangible part too, in order to let people know the benefits for them and for the environment, indeed another outcome strictly connected to this is the fact that design can improve our daily life.

42. *Business Journal of the German Chamber of Commerce in China*, Feb/Mar 2016. http://china.ahk.de/fileadmin/ahk_china/GC_Ticker_Landingpage/GC_Ticker_PDF_Versionen/GCT_201601_print.pdf

43. Coli Shek, "*No purchase necessary: the sharing economy in china*", last modified February 3, 2015 http://knowledge.ckgsb.edu.cn/2015/02/03/consumers/no-purchase-necessary-the-sharing-economy-in-china/

5.2   DEFINING THE PERSONAS

Before starting to develop the PSS is important to understand for whom the author is designing. Incorporating user goals, needs, and interests we are able to identify three different personas that will be the users of the service. According to the Human Centred Design approach, a persona is a way to model, summarize and communicate research about people who have been observed or researched in some way. Each persona represents a significant portion of people in the real world but not everyone, this is a way to understand people's need and desire. Empathy is an important skills that allow the author to understand the point of view of the people.

For the reasons above the author individualized three main characters that are explained properly and detailing in the following pictures and descriptions.

Alessandra Frecci,
33
Italian
Senior Designer
Single

Description:
Frinedly, creative and Idealistic person. Italian Senior Designer that moved in China when she was 25. She loves Chinese culture and she speaks perfectly Chinese. During her travelling in Asia she loves to meet many different people, talk and travel with them. She is a backpacker and environmental friendly too. Alessandra takes care about sustainability. She used to use natural products, doing garbage collection and adopting a vegeterian diet too. She belives that everyone can do small actions to make a differnce in the world.

Quote:
"I love Chinese art. In my opinion is important to preserve heritage and traditions of this amazing culture. I'm always interesting in new way of seen things, from art to every kind of product. Innovation it meens this for me."

Motivating:	**Demotivating:**
_Cares about the environment. _Art lovers.	_Meteoropathic, wheather really affects her behaviour.

Lou Jian,
44
Chinese
Project Manager
Married

Description:
Hardworker and serious person. Interested in new business model. Responsable dad of 2 son. He belives in strong value, such as loyalty, respect, friendship and he trasmits these values to his family. His wife, Lyn, is housewife and she loves to take care of house and familty. In her free times she is a volonteer of association no profit and she also orginzes social events. Lou loves to help young enterpreneurs who run their businesses, giving them advices and sometimes supporting them financially. He belives in social innovation and new technologies that can improve the everyday life.

Quote:
"My busy schedule doesn't allow me to go out often. So during the week, I used to move to work by metro station or by walk too, to breath some fresh air. I live close to my office, so It's a quite good walk. but I don't like to swear or get get during raining day, because everyday I Interact with clients and I should look good everytime."

Motivating:	**Demotivating:**
_He has to looks perfect to speak with clients. _Carry umbrella is uncomfortable.	_Not patient person, he wants to have all at once.

Aqui Chang,
25
Chinese
Student and Fasfion Blogger
Single

Description:
Fashion addicted and enthusiastic person too. Aqui is a Marketing student, her parents passed down to her the fashion addiction. Mom is a fashion designer and her dad is a gallerist of modern art. Aqui loves to go out with friends, she used to go to restaurants often, but she hates bad weather, in the previous years she lived in LA for a while, but she doesn't like to sunbath. She consider herself as a pioneer in the fashion field, indeed she runs a fashion blog on Instagram and she has thousand of followers that imitated everythings she does.

Quote:
"As a fashion blogger I always look for the new and fashionable itmes that no one have. I'm a pioneer, people follow me and they do what I do. So I can never seem out of look, everythings I wear is stylish. I don't wear couture, but a middle class items, so everybody can afford it. "

Motivating:	**Demotivating:**
_Art and Fashion lovers.	_Hate cold weather and don't like
_Doesn't like tan.	to go out when it's raining.
_Bags too small to carry umbrella.	

5.3   DESIGN BRIEF

Considering the main goals, opportunities and needs identified through the research and literature review; the author is able to define a design brief in which the design concept can be created. So, the aim of the project is to focusing on the new era of Sharing Economy, in the context of Shanghai, in order to create a product service system that reinvent the way in which umbrellas are used. Thanks to the inspirational case studies and the insight from questionnaire and experts, the author is able to say that the design concept is an umbrella sharing that will reach different people's need, highlighted by the comments the author received. Secondly, the business model has to be simple, intuitive and sustainable. Users could have access easily to the umbrellas without queuing to get them or struggling for a mechanic and robotic system. Last but not least, the author wants to provide good-looking umbrellas. As it mentioned before the system has to be functionally fascinating, but also it has to look beautiful, in order to reach users easily and keep them in the service.

So far, the design brief can be defined as:

Design a product service system that can give access to umbrellas in certain places of Shanghai, embracing the principals of the sharing economy and highlighting the aesthetics cultural value of the umbrella.

6. SAAN

6.1   THE PROJECT

SAAN is a product service system based an umbrella sharing. As we saw from the case studies above we know that these case studies, such as BrellaBox and Umbracity, are supported by a vending machine that distribute umbrellas. SAAN is based on the same concept, but the vending machine in this case is simple, user friendly and good-looking. User can book the umbrella through the app and reach the location where the umbrella is following the map. Arrived to the umbrella stand the user can unlock the umbrella and pick it up for one day to a maximum of three days. At the time of registration the user must pay the refundable deposit of 150 RMB, through WeChat or Alipay, each time the user is going to use the service, the system withdraw ten RMB per days, till the third days. If the user don't return the umbrella in any umbrella, the system will keep the deposit and the user couldn't use anymore the service until he returns the umbrella. In order to nudge people to bring back the umbrella there is a rating system, as Mobike use. When the user register to the service he receive 100 points, for every good and bad actions the rating goes up and down, in this way people are motivated to do good action.

6.1.1   THE OFFERING MAP

SAAN is a product service system based on the principle of Sharing. SAAN is an umbrella sharing system. The three main points of the services are: Sustainable product, sharing system and new way for of expression. Sustainable product because the umbrella used for the service is made with recycled materials, all the service has to be a loop, in order to don't create more waste, both plastic and metal. Recycled materials usually make umbrellas, but no one disassemble the umbrellas, for this reason when people through them away they are not recycle, because umbrellas are still assembled. SAAN provides good quality umbrellas that can resist for long time. When the umbrellas are broken SAAN provides the disassemble and assemble process in order to keep their life longer. The umbrellas used for SAAN are not disposable, if they are broken the service fix them. The second point of the service is the sharing system. SAAN is based on the principle of Sharing, so user can rent an umbrella for among of days and then give it back to the closest place where umbrella stands are, that are partners like Wagas, Baker & Spice and metro station. The third point is a new way of expression. Chinese Umbrellas are really famous and it's a part of Chinese Culture, the problem is that this kind of umbrella are handmade parasol, they can't protect people from the rain, but only the sun. Moreover Chinese umbrella is a really expensive item, because of his handmade labour. So SAAN provides a stylish umbrella, we don't want to see the ugly umbrella that everyone sells on the corner of the street. We want to bring back the art into the Umbrella items, but in a more fashion and interesting way. That's why SAAN gives the possibilities to be a new canvas for students that want to express themselves.

Everyone can benefit form SAAN, from the partners, the environment, students and citizens.
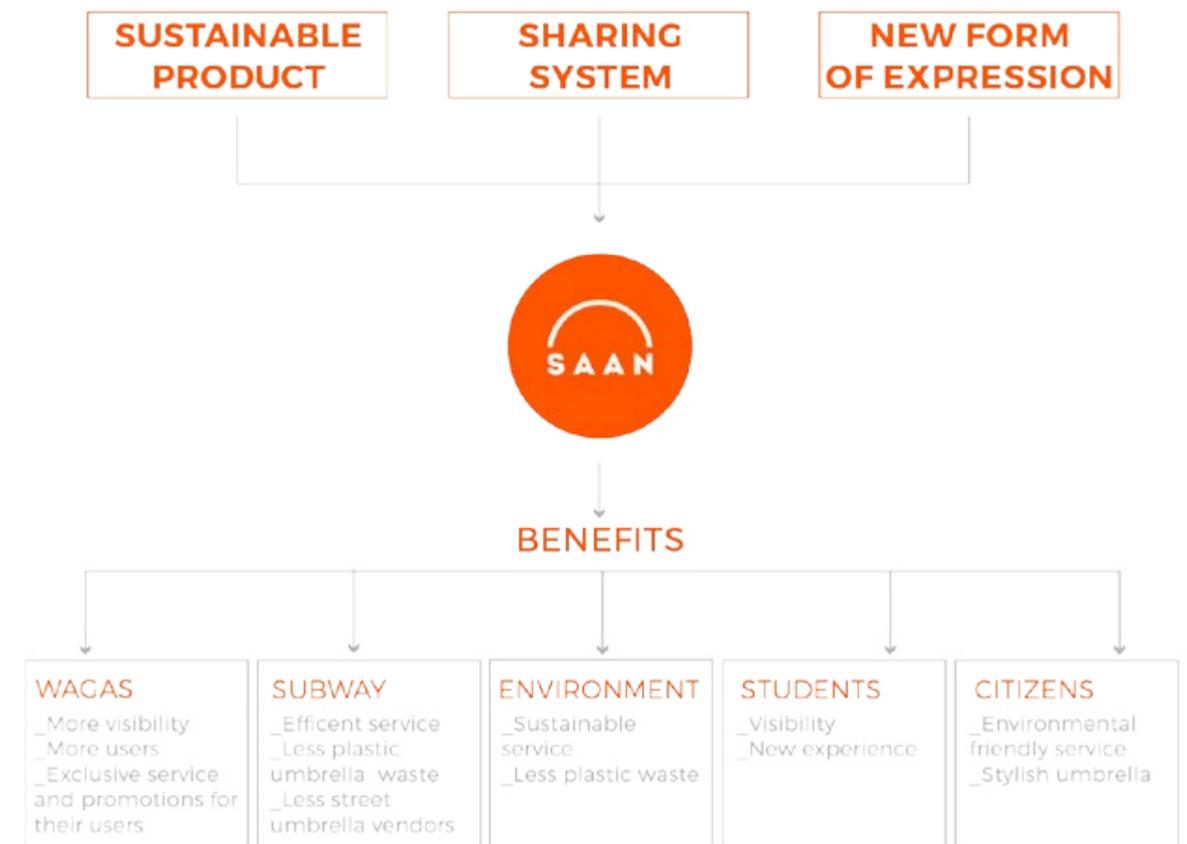
Fig 6.1
The Offering Map
Source: The author

6.1.2   **HOW DOES IT WORKS**

In order to avoid having a big number of umbrellas in one umbrella stand, instead of another one, SAAN also provide a redistribution system, so the umbrella can be equally distributed to each partners.

The service is simple, user can download the app and book the umbrella whenever they need it, for rainy day but also for sunny day, as we now Chinese used to use the umbrella to cover themselves from the sun too. App also provides forecast information so user can check the weather when they need it. Thanks to this the app sends notification 10 minutes before the bad weather is coming, so user can have the possibility to book the umbrella before, avoiding buying one. User books the umbrella through the app and they can follow the map to reach the destination. Arrived to the destination, the technology NFC (Near Field Communication) in the umbrella stand recognized the ID of the umbrella booked and it allows the unlock process from the base, in this way it doesn't need any QR code because the technology can unlock the umbrella by itself. A luminance sign on the base of the umbrella stand it said if the umbrella is lock (red), unlock (green) or can be booked (no light). When the umbrella is unlocked, user can pick it up. In this moment the service automatically withdraws ten RMB. The user can keep the umbrella from one day to a maximum of three days. The service after the first 23 hours sends a notification to the user saying that he still has one hour to bring back the umbrella, if the user want to keep the umbrella for 2 days doesn't need to do anything. The service will withdraw other 10 RMB for the second day and 10 RMB for the third if the user doesn't return the umbrella. Otherwise, if the user wants to bring back the umbrella he has to book the spot in one of the umbrella stand around the city. The process is the same at the beginning; user goes to the umbrella stand with the umbrella. The umbrella stands will has the red light (because it was booked before by the user) than the user just has to put the umbrella in the right spot he booked. The NFC technology recognized the umbrella and it will lock the umbrella. User can pick up the umbrella to one of our partners and if they bring it back to the same place they car earn more points on the score SAAN system. Otherwise, they can place it to the closest umbrella stand they prefer. In order to avoid damages and lost SAAN has a ranting system, thanks to that users have their own score and if they do something wrong the score goes down, otherwise goes up. If after three days the user doesn't return the umbrella, he will be banned from the service and the system will keep the deposit of 150 RMB. The umbrella has a Bluetooth system that can track the position of the umbrella, so if the user is going to far from the umbrella, the service will send a notification, in this way the author can avoid that people lose or stolen the umbrellas SAAN.

Fig 6.2
Umbrella stand details. Green light mean unlocked, red light means booked and no light means that the umbrella is available to be booked.
Source: The author

6.1.2.1   Rating System

6.1.3   **PARTNERS AND COLLABORATION**

As the author said before, in order to avoid damages and lost, SAAN provides a score rating system. When people adopt good behaviours they will be rewarded with scores, otherwise they will be punished and the service will take off score.
When user log in to the service they will have 100 score in total. And than the rating system will follow as write here:

+1 Normal umbrella round.
+1 Report damage or malfunction.
+2 Bring back the umbrella to the same place where you pick it up.
+3 Inviting friends.

-10 If you damage the umbrella and you declare it.
-20 If you damage the umbrella and you don't declare.
Down to 0. Causing umbrella's loss or you don't return the umbrella.

If the user returns the umbrella, after the three days, he can still be part of the service but the initial score will be 80, instead of 100. The service allows this behaviour twice, after that the person will be banned from the service. Moreover, when a user goes under 80 points the service per day will cost 50 RMB per day, instead of 10 RMB per day.

To make this service work, SAAN takes advantage of collaborations with different figures. SAAN placed its umbrella stands in Wagas and Baker &Spice café and to some metro stations. Thanks to these, SAAN has spots to place the service. Moreover, in order to have a nice pattern on the umbrella's canvas, SAAN gives the possibility to students to put their design on it.

6.1.3.1   Wagas Concept, Baker & Spice

SAAN decided to have cafés in Shanghai as a partners because when start raining people usually cover themselves going in a café to drink something, or just go there waiting that the rain goes away. People that are already in the café don't want to go out anymore because they usually don't have umbrella and when the raining season comes is really hard to prevent the weather. So there won't be free space for people that come in. People that are outside run to cover themselves in any place and if this place is a café they are not going to spend so much money because it was an unexpected situation. All of these are issues that the author decided to faced and give them a shape. Through the collaboration with SAAN, the partners can push the people that are inside to go outside and the people that are outside to come inside. Partners can use the Wechat official account to nudge people to do what they wish. So there are different ways in which the cooperation worked.
In order to push people that are inside the cafés to go out and use SAAN, the service send them a notification of the bed weather before all the other users outside, so the users inside can have the possibility to book the umbrella before. Moreover the ten RMB the user is going to give to SAAN are converted in Wagas points too; and if the user is not subscribed to the Wechat official account of Wagas he can not received that score. In this way people are pushed to be part of the Wechat account. Registering to Wagas account means to earn one point per every RMB

spent on full priced items. Points can be redeemed for member-only through e-coupons and special promotions. With SAAN people can earn points on Wagas account and have access to promotions.

So, for the users that are inside, the ten RMB are converted in Wagas points. Instead for the users that are outside, the ten RMB are converted into discount for a promotion that has limited time.

As the author said, the users that are outside have to be pushed to come in and spend money at Wagas. In order to do this when people come inside to take the umbrella a pop up advertising appear on the screen, saying that with the ten RMB already spent for the umbrella they can get a discount for the promotion that appear on the screen. People are nudging to buy because they already spent that money and it seems a loss if they don't take advantage from the offer. Moreover, to use the promotion they must be registered on the Wechat account, so if they are not they will do it to receive the promotion.

These users are people that pick up the umbrella in one of the Wagas and Baker &Spice store, as it writes before if the users bring back the umbrella at the same place they will received 2 points on the SAAN account, instead of 1. Moreover, if the users that take the umbrella here return the umbrella in the same place they will have a special promotion from Wagas that it will be available for a limited time, that is the day they bring back the umbrella. Since people who need umbrellas move to the outside of the store, Wagas and SAAN have decided to sponsor take-away or non-binding foods so the user can decide whether to stop for a short while or buy and leave. And depending on the hours there will be different kind of promotion. From breakfast, to break, to lunch or dinner.

For the initial cooperation it has been decided to use fifteen stores between Wagas and Baker & Spice around the city, in order to allow and push the users to ring back the umbrella in the same place, these spots are in the main centre of Shanghai.

The store chooses to be part of the service renting the umbrella stand that will take place in the store. SAAN provide for them a redistribution system of the umbrella and more umbrellas if they need it. The advertising and promotions are chosen between SAAN and Wagas.

The locations of the stores are the following. The author decided to take these locations because these places are in the main points of the city and searching them on the app "Bon App" they are the place with the highest score. So locations really appreciated by the users from Wagas and Baker & Spice.

So, for Baker & Spice we have:
  No. 195 Anfu Lu
  No.1376 Nanjing Xi Lu
  No.1378 Huamu Lu
  No.300 Huaihai Zhong Lu
  Lane 569, Yunle Lu
  No.100 Zungyi Lu, The place III
  8 Century Avenue, IFC Mall

For Wagas:
  No.70 Donghu Ll
  No.1233 Lujiazui Huan Lu
  No. Jiaozhou Lu
  No. 283 Jianguo Xi Lu, The Loft
  No. 268 Shuicheng Nan Lu, Carrefour
  No. 86 Xianxia Lu
  No.299 Jiujiang Lu
  No.169 Wujiang Lu

6.1.3.2   Shanghai Metro

SAAN decided to have Shanghai metro as partners with this project. SAAN is going to give the umbrellas and umbrella stand to some of the main metro stops. Shanghai metro will rent the materials and SAAN will give a percentage on the money it earns in one year. The system is way easier than Wagas because there are not promotions as advertising. The users can take the umbrella in one of the umbrella stand and than bring it back to the same umbrella stand to earn two points on his SAAN account, otherwise bring it back to other umbrella stand and earn one point. The umbrella stand will take place in the spot close to the ticket office, so people don't have to look for it because usually the ticket office is quite visible. The umbrella stand is a modular piece, so depending on the flow of people the station has, there will be more or less umbrella stand. Every umbrella module can contain sixteen umbrellas, so for metro stops that have more than three exits the minimum number of module will be ten. For metro stops with more than 5 exits the minimum number of module will be twenty.

The following metro stations have been chosen because they are in the cross between two or more metro line. The main circle in which all the stations are is within the line 4.

The metro station that are involved are:
 Jing'an Temple
 Changshou Road
 People's Square
 Changshu Road
 Jiao Tong University
 Hujiahui
 Jiangsu Road
 Longd Road
 Hanzhong Road
 West Nanjing Road
 South Shaanxi Road
 Tiantong Road
 Laoximen
 Xiantiandi
 Jianshan Road
 Zhaojiabang Road
 Shanghai Indoor Stadium
 South Huangpi Road
 East Nanjing Road
 Century Avenue
 Madang Road
 Lujiazui

6.1.3.3   Students

SAAN decides to involve in the project students from college, university and every school possible. The umbrella is a piece of art in the Chinese culture, so the author decides to bring back the art and use the canvas of the umbrella as a new form of art that students can express through it. If students want to apply for it they can do it through the app on the section "Are you a students?", they need to send to SAAN full name, email, explanation of the project and than the file in which there is the graphic of it. SAAN will choose five graphic four times per years. The Umbrella will be a seasonal item, as all the fashion industry is.

Fig 6.3
Example of screenshot of the app if the students want to apply for the competition.
Source: The author
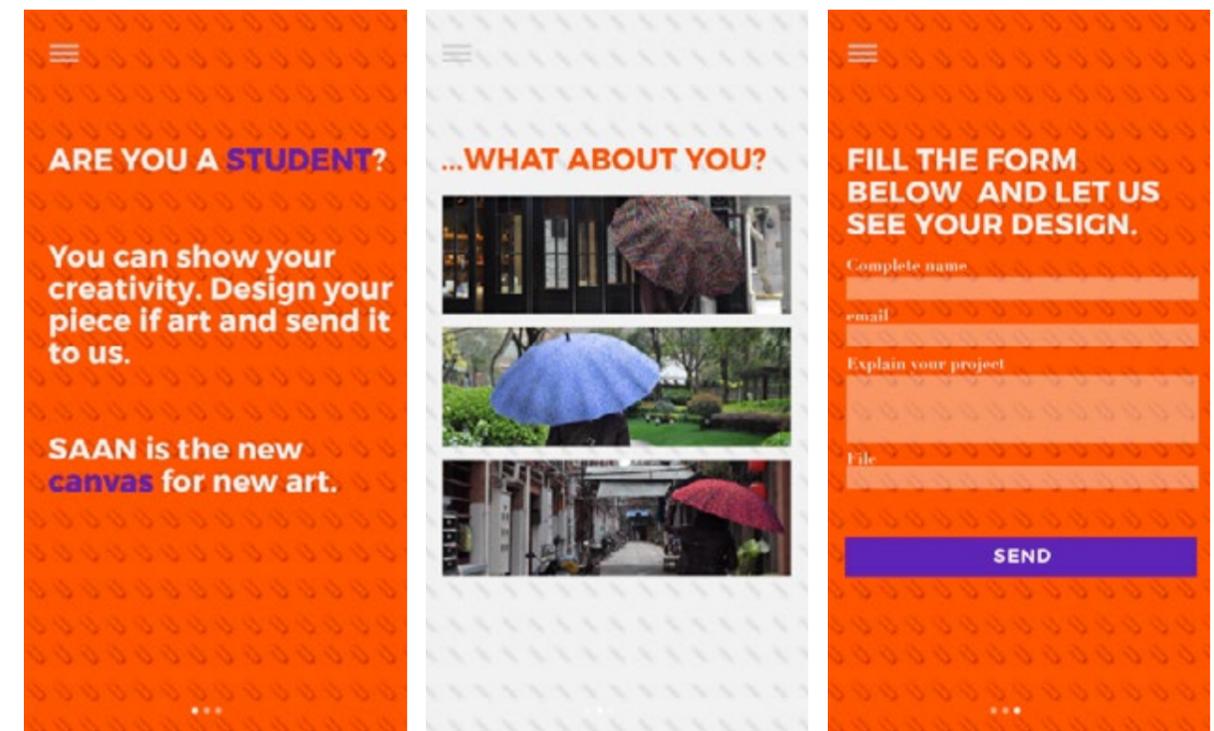
6.2   THE SYSTEM

6.2.1   FIRST COSTUMER JOURNEY

In the following lines the author is going to explain visually how the service works, through a Costumer Journey. The first costumer journey is going to clarify the journey of a user that is already registered to the Wagas account and SAAN service. The user is in the café and the notification of the bed weather arrived. From there the user book the umbrella and go to grab one at the entrance of the Wagas store. She uses the umbrella and the day after arrive the notification that she still have one hour to bring back the umbrella, so she books one spot to bring back the umbrella in the same place where she grab it. The promotions that pop up are two, the first one when the she take the umbrella and the second one when she bring it back too Wagas. In the first one the ten RMB of the service are converted in Wagas Points that the user can uses to have e-coupon and promotions. The second promotion is a time-limited promotion; valid only for the day she delivers the umbrella to the umbrella stand. In this way people are gentle invited to spend more money in Wagas.

Fig 6.4
It starts raining, and the user receives the notification.
Source: The author

Fig 6.5
Open the app to book the umbrella before the other because you are in Wagas
Source: The author
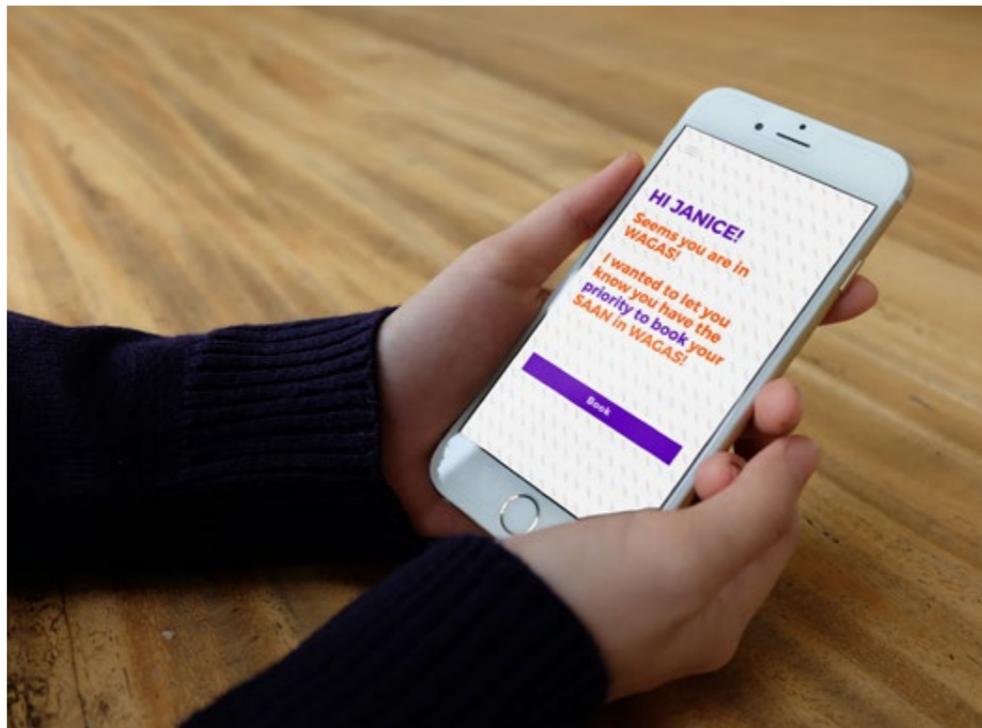
Fig 6.6
Book the umbrella with its name
Source: The author
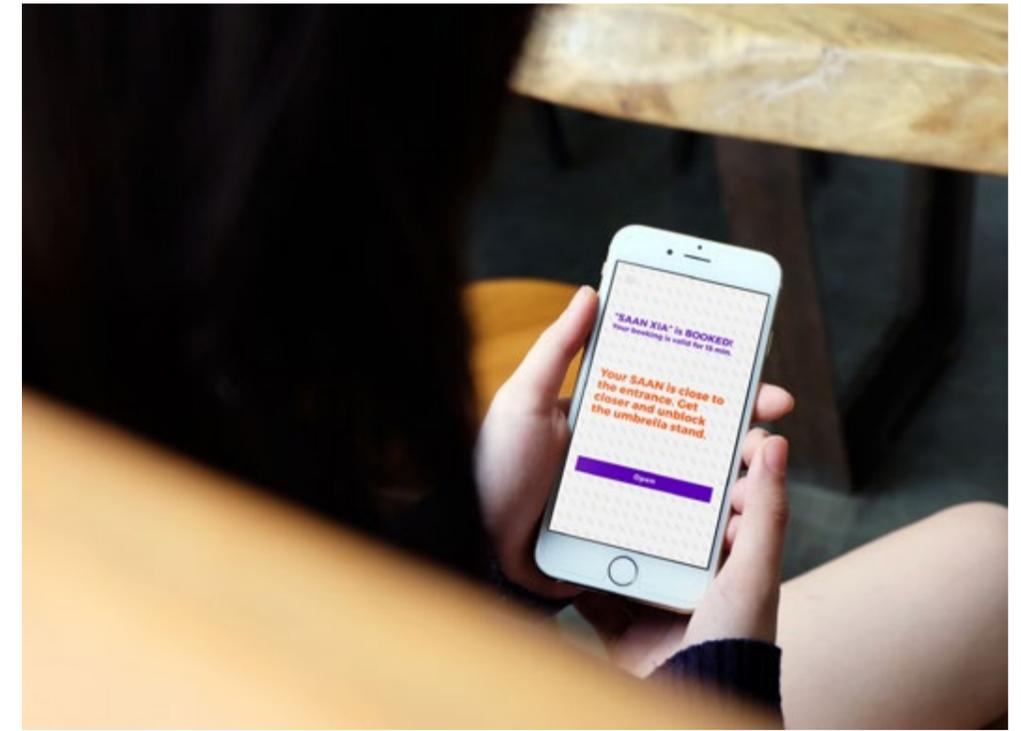
Fig 6.7
Grab the umbrella with the right name
Source: The author
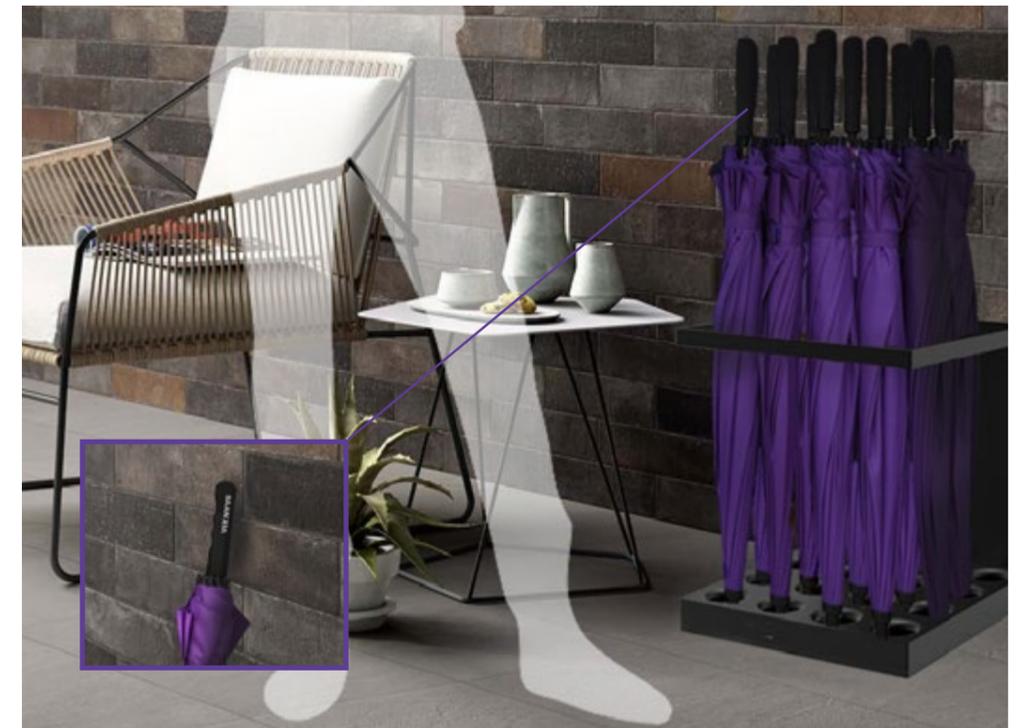
Fig 6.8
Unlock the umbrella with the green light and earn points on Wagas account
Source: The author

Fig 6.10
Discover Wagas promotion
Source: The author

Fig 6.9
Take the umbrella with you
Source: The author
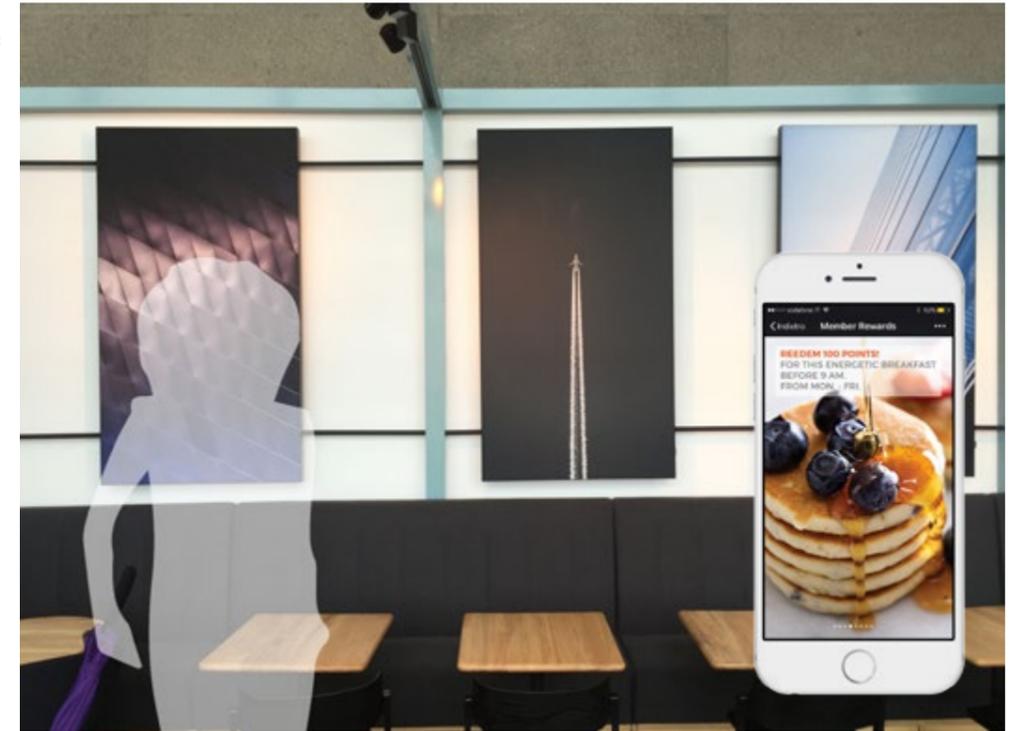
Fig 6.11
Enjoy SAAN and remember to bring back the umbrella
Source: The author
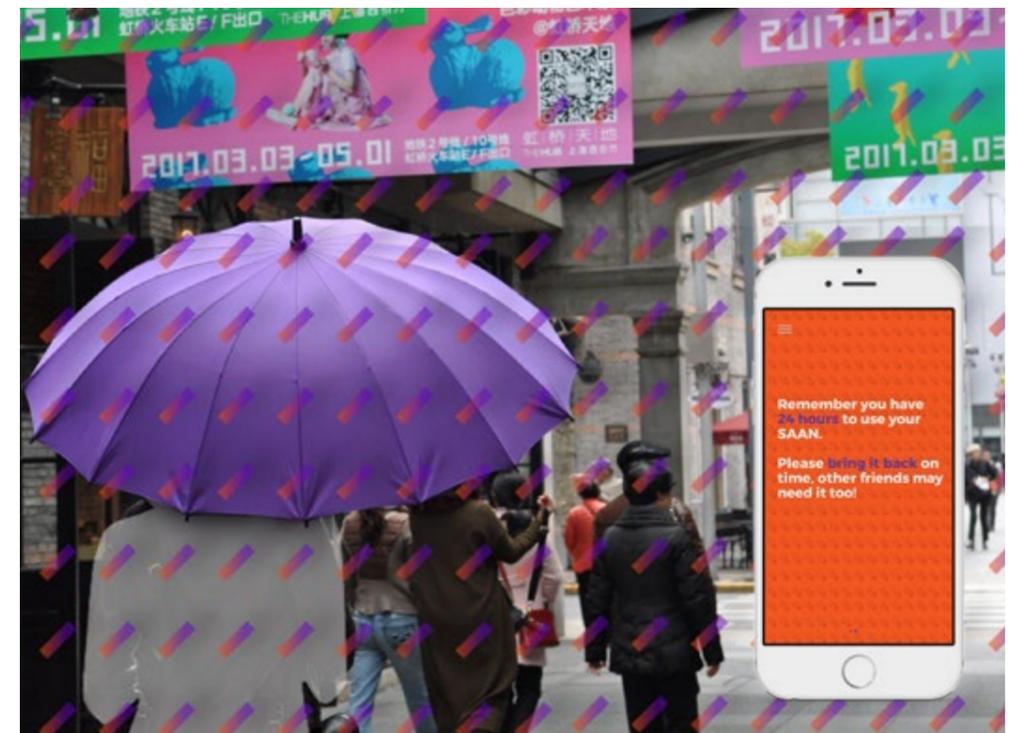
Fig 6.12
*The day after the notifi-
cation has been received.
One hour to bring back the
umbrella*
Source: The author

Fig 6.14
*The spot is reserved with
the red light and it will be
reserved for 15 minutes.*
Source: The author

Fig 6.15
Put back the umbrella
Source: The author

Fig 6.13
*The user books the spot to
bring back the umbrella on
the same place where she
picked it up the day before*
Source: The author
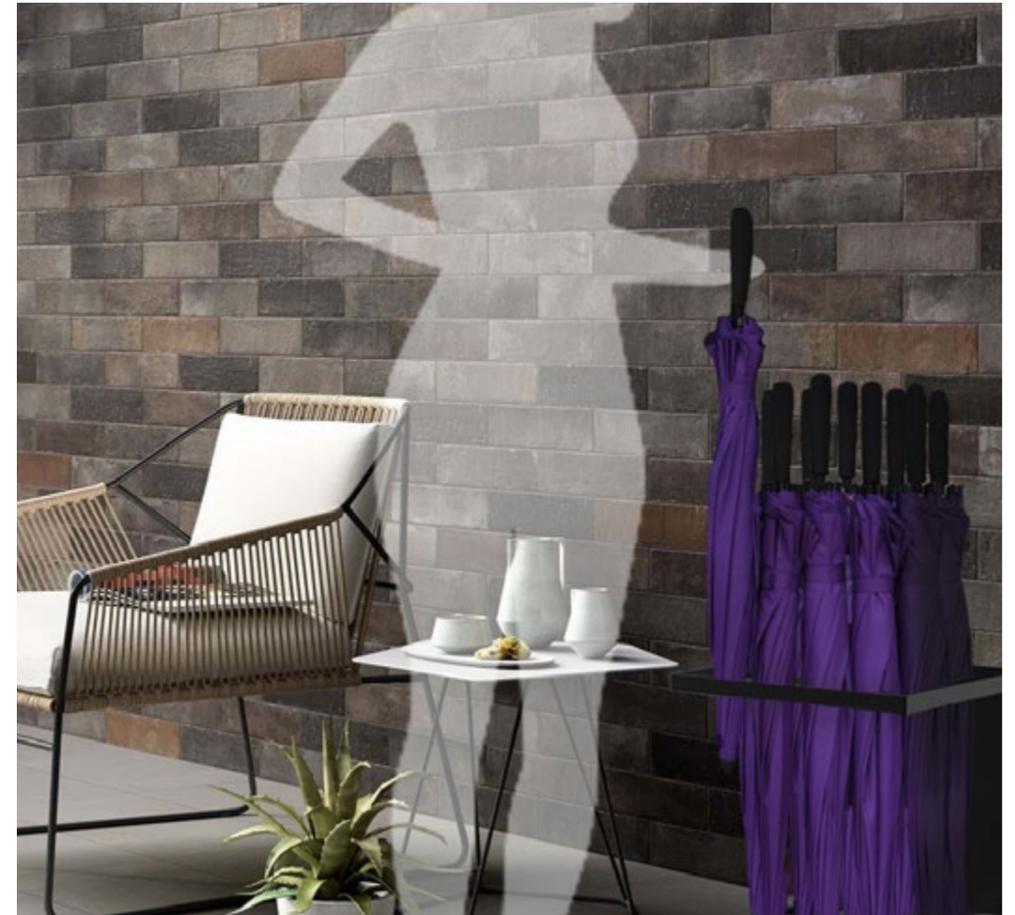
Fig 6.16
*Locked the umbrella
automatically and earn
two points on SAAN score
because the umbrella was
bring back to the same
place of the day before
Source: The author*

Fig 6.18
*Buy the food on the promo-
tion, paying with Wechat
or Alipay
Source: The author*

Fig 6.17
*Got the promotion that has
limited-time to be used
Source: The author*

6.2.2   SECOND COSTUMER JOURNEY

In the following costumer journey the author is going to explain another case of user journey. The author is not in Wagas when he receives the notification of the bed weather, but he is walking on the street, so he decides to book the closest umbrella, which is in Baker & Spice. When he enters he will receive a promotion available for a limited time and this promotion nudge people to buy because it said that the money already spent are going to be the discount of a unique promotion for the user. So the user go inside to take the umbrella booked and he also buy food. From there, the day after he decides to bring back the umbrella in another spots that is the metro station. In this case, when the user brings back the umbrella, he won't receive Wagas promotion because he didn't go to the same place of the day before. In this case when the user deliver back the umbrella he will receive one point on his SAAN account.

Fig 6.19
Got the notification of the
bed weather
Source: The author

Fig 6.20
Look for an umbrella free
Source: The author
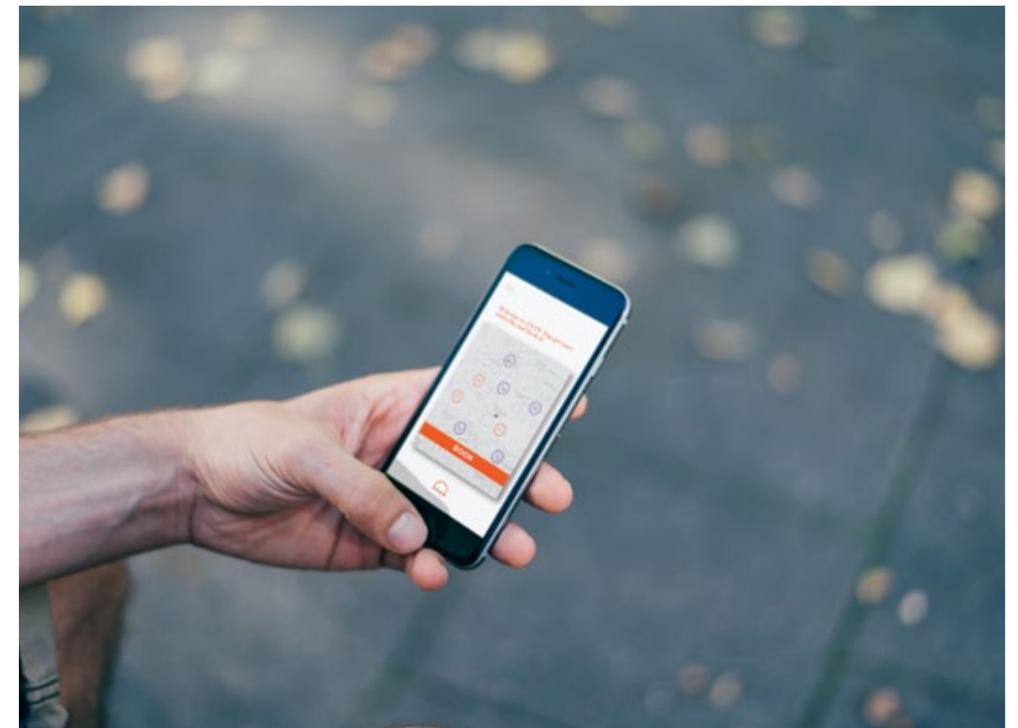
Fig 6.21
Book the closest umbrella in
Baker & Spice
Source: The author
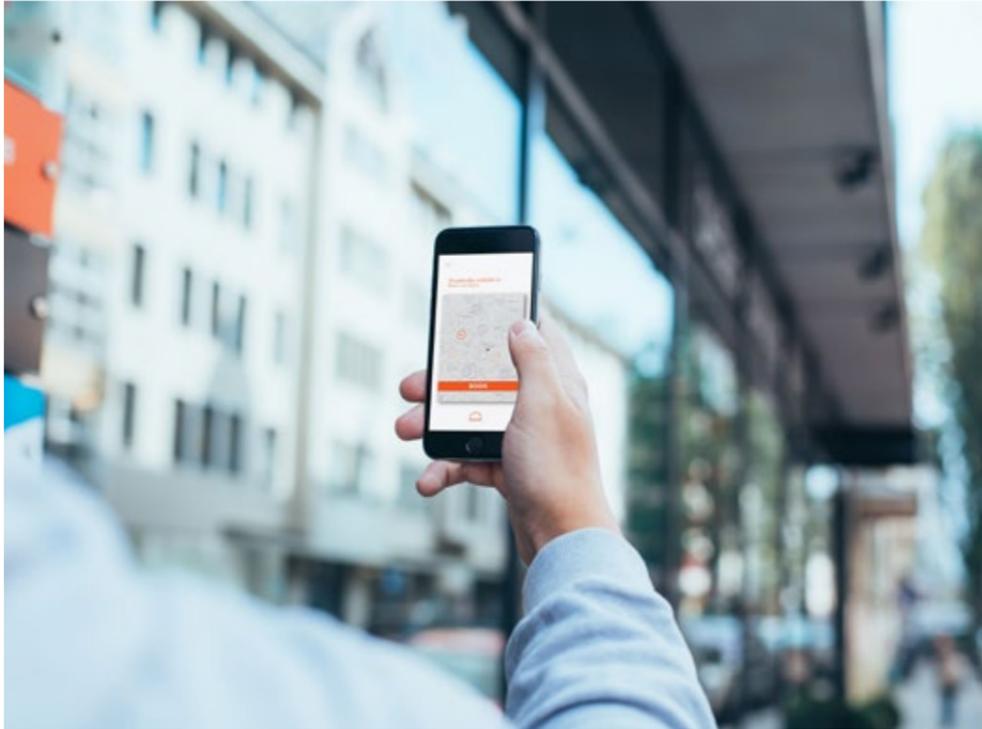
Fig 6.22
Follow the map
Source: The author
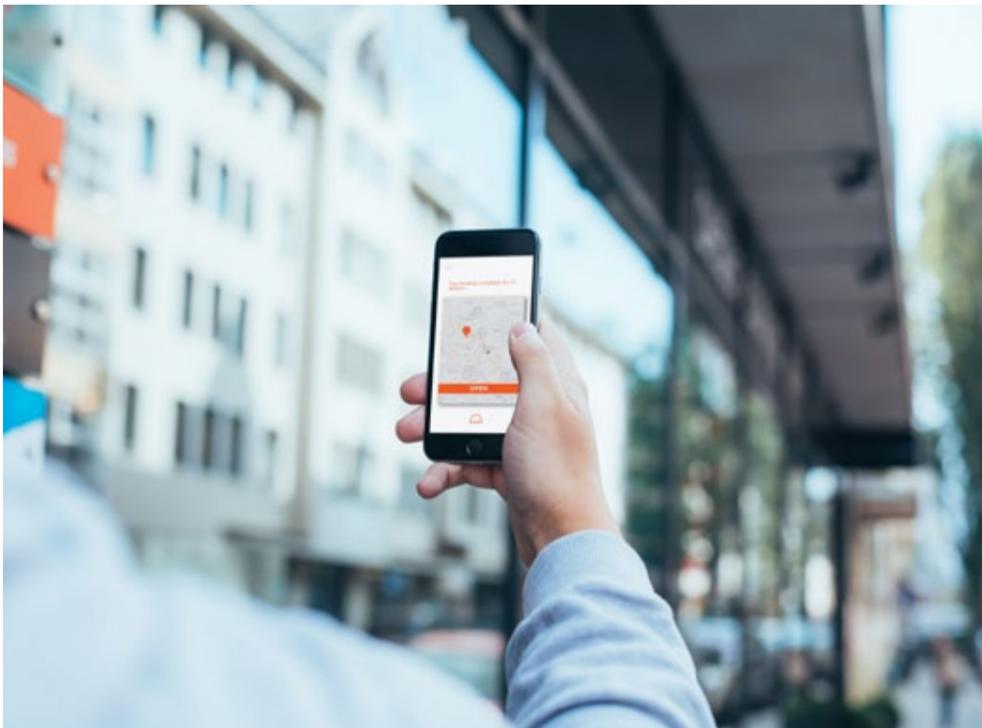
Fig 6.23
Grab the umbrella
and have a look on the
promotion
Source: The author
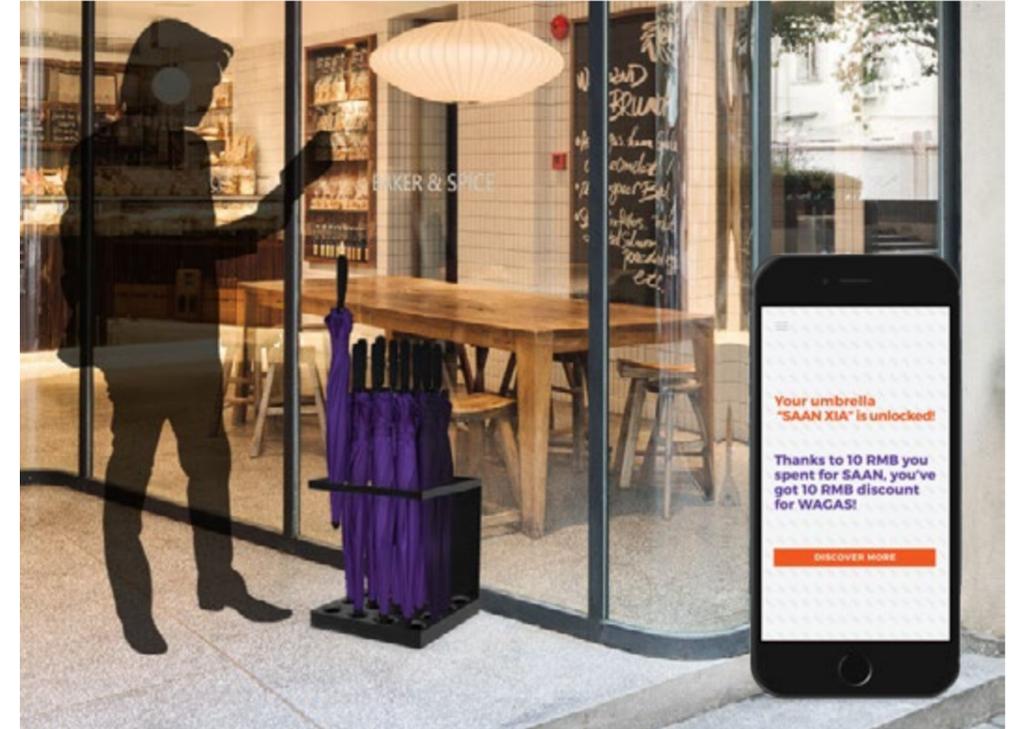
Fig 6.24
Show the promotion to have
*food and drinks*
Source: The author
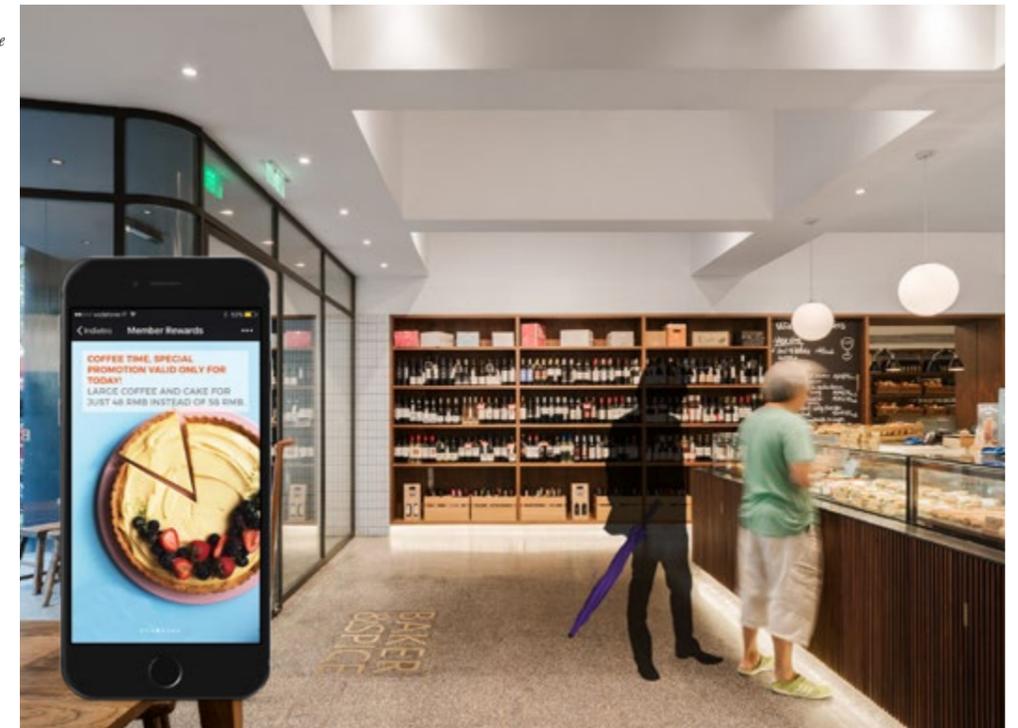
Fig 6.25
Enjoy SAAN
Source: The author

Fig 6.26
*Bring back the umbrella to
the metro station
Source: The author*
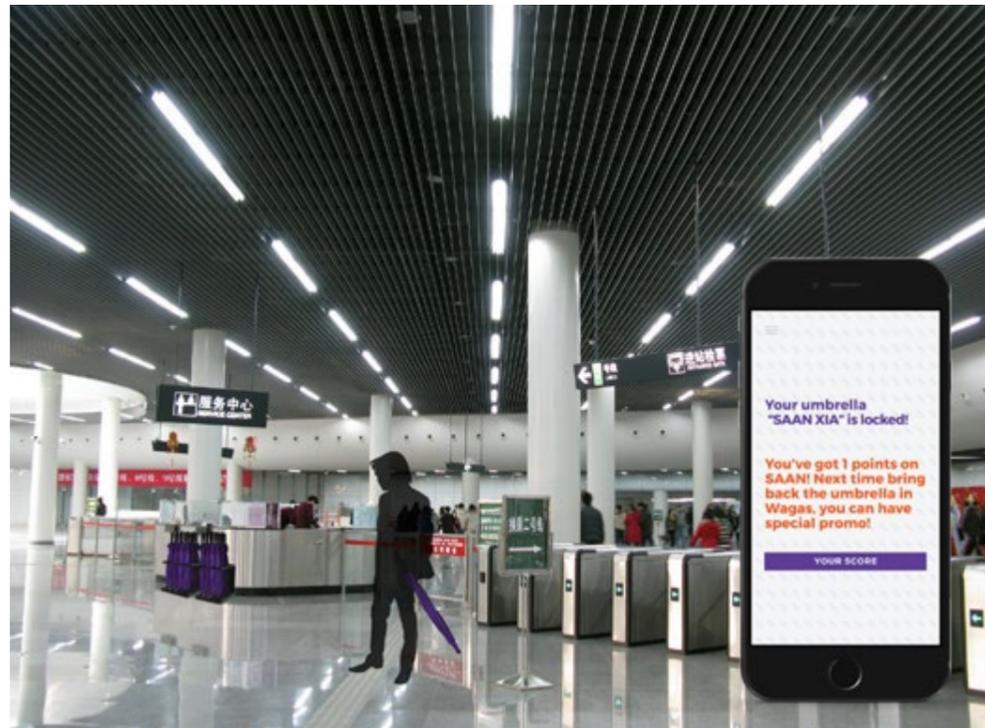
6.2.3   SYSTEM MAP

        Thanks to the system map we can have an overview on the entire system and its functionality. The flows are divided in money, information and materials. And the stakeholders are divided in main stakeholder (orange) and secondary stakeholders (purple). As we can see SAAN is referring to external suppliers to get the umbrella, umbrella stands and app. The partners that are Wagas, Baker & Spice and Shanghai metro give the space to SAAN. Wagas and Baker & Spice rent the umbrella and umbrella stand and SAAN give them redistribution system, more umbrella if need them and it brings more clients. Shanghai Metro give the space to SAAN. SAAN has to buy it and it gives a percentage of the profit per years to Shanghai Metro.

Fig 6.27
*Fig. System Map
Source: The author*

Main stakeholders
Secondary stakeholders

Material
Information
CNY
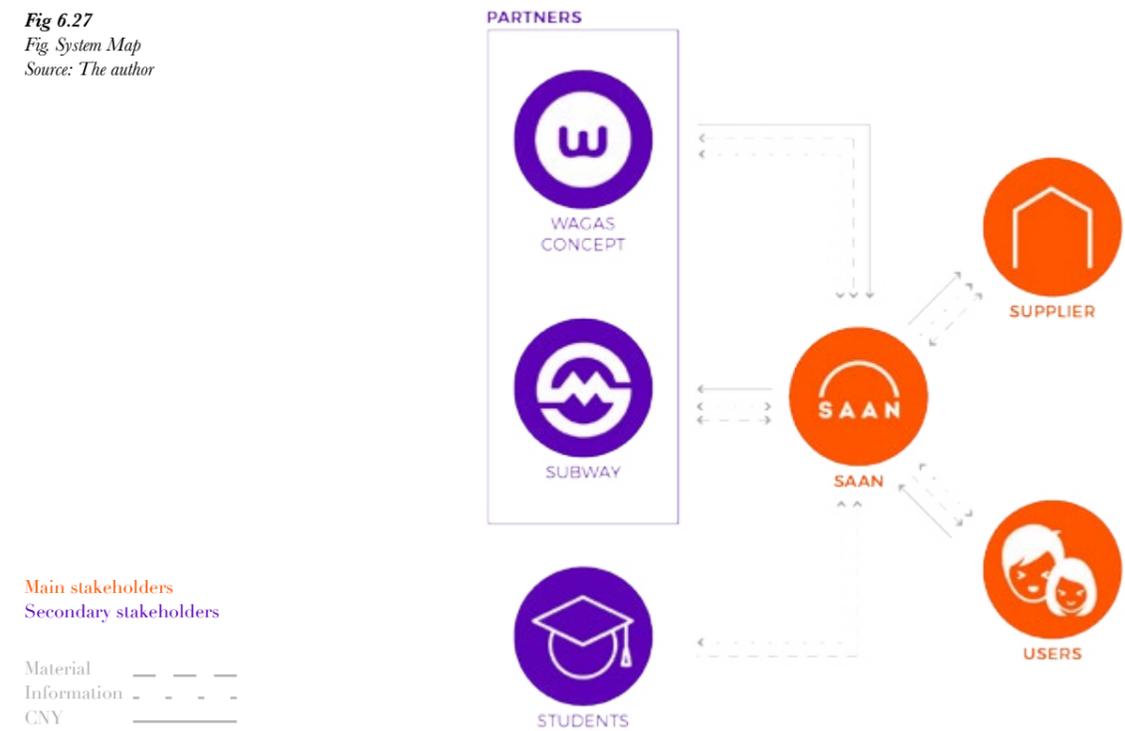
6.3   REDEFINING AND IMPLEMENTING

6.3.1   PROTOTYPING

As the author is following a design thinking approach, we are now arrived to the last step of the ideation phase, where the idea has to being tested. Prototyping is getting ideas and explorations out of our head, ready for the physical world. There are many ways that are good to test the service and the idea; both have to have lots of testable components. The prototyping has to be simple and focused on the critical elements of the service.

SAAN is a big and complex product service system and many aspects of the service could be testing them out, from the product itself, to the partnership. But for SAAN, the most important thing is the behavior of people, the reaction they have about the project. Sharing systems are quite news in the society and people are not used to use it, that's why is really important to test people's behavior.

The prototype the author decided to do was placed outside the metro station and outside a supermarket in the French Concession area. The test consists of a poster, which explains the project, and a spot where some umbrellas are placed. The poster invites people to take an umbrella. Within the Umbrella a tag was placed with a brief description of the project and the contact of the author so that you can have feedbacks.

Very important aspects of a prototype are observation, empathy and dialogue. As for the installation at the metro station I can say that people were very curious about the installation itself, but few of them stopped to understand better what it was, and if they stopped, there were a few people who they took an umbrella with him. Motivation can be varied, many people were going to work, so it was in a hurry, or they did not really need the umbrella because it was not yet raining. A very important remark was made at the beginning of the test. When a person approached the installation and spent more than 20 seconds to observe

and read the poster, the author approached to try to talk to him, and at that moment the interested people pulled back and left. The main target was Chinese people, and as we know, Asian culture is very different from the Western culture, which is why it was quite impossible to have a dialogue with someone, and the language barrier has undoubtedly hampered testing.

The test was divided into two parts. The first part took place at the Shanghai Library metro station. The installation was placed outside the metro. People seemed interested and many stopped to read what was written on the poster. Ten umbrellas were taken, and two of the people who passed by were dozens of scanners that scanned the QR code, but among them only one person sent telephonic feedback. When people stayed for more than 15 seconds in front of the installation, I tried to talk to them but, for linguistic or behavioural reasons, it was almost impossible to have a dialogue with people as they went away. Realizing that the dialogue approach did not work for me, I tried to do a second test at a different location.

The second test was done in front of a supermarket in Wulumuqi Lu. For this second text, what I decided to do was to give space and time to people. Therefore, unlike the first case, the same installation remained in front of the supermarket for an entire morning. By making the decision to leave room for people, I decided to move away from the installation and in the next thirty minutes the bad weather brought rain and the remaining eight umbrellas were taken by the people. The problem was that, although the test worked, just few people sent feedback through Wechat. We have an example above.

Fig 6.28
Poster for the prototyping day
Source: The author

148

Fig 6.29
*Work on the installation during the prototyping day*
Source: The author

Fig 6.31
Flyer under the umbrella (front)
Source: The author
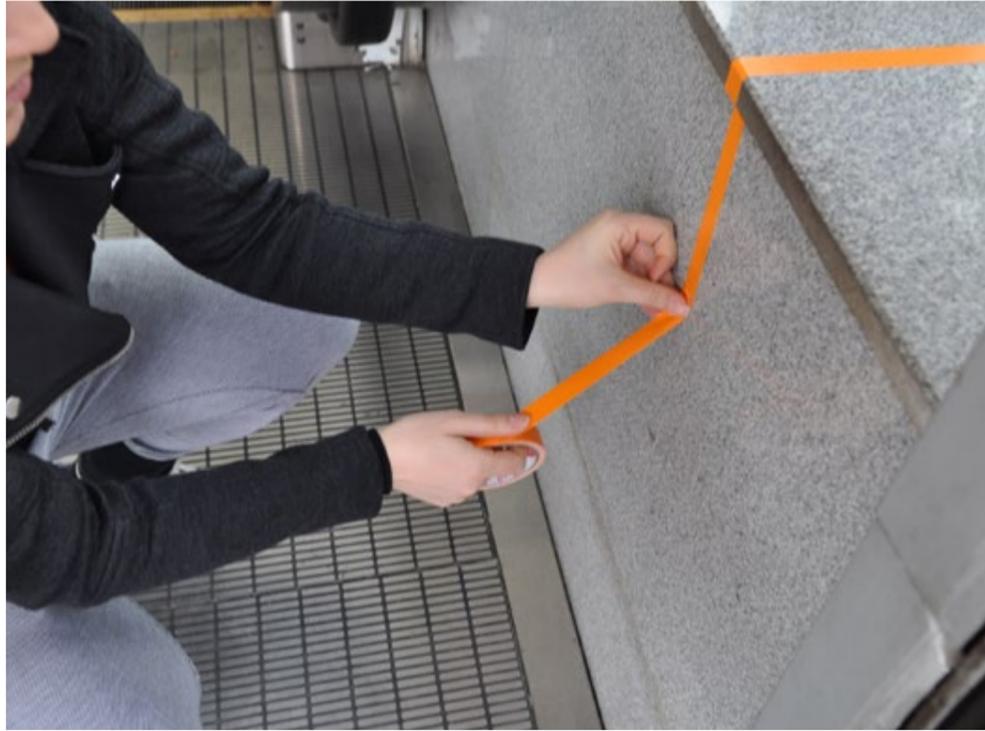
Fig 6.30
People attracted by the installation
Source: The author

Fig 6.32
Flyer under the umbrella (back)
Source: The author

Fig 6.33
*Person grabbed one um-
brella (1)*
Source: The author

**Fig 6.35**
*Second location of the
prototyping*
Source: The author

Fig 6.34
*Person grabbed one um-
brella (2)*
Source: The author

Fig 6.36
*Person grabbed an umbrella
in the second location*
Source: The author

6.3.1.1   Strategic Consideration

As mentioned earlier, cultural barrier is definitely an obstacle for this type of prototyping. Indeed, it is always helpful to talk to people, but if the language and culture become obstacles, the situation becomes complicated. If direct contact with people not working, you have to provide a secondary solution, which in this case is Wechat. The Wechat contact was made available specifically for people who do not speak English and for shy people who are not willing to speak in this manner has been given a second communication channel efficient and accessible to all. Despite the umbrellas they were taken by the people, the communication was poor, both written and vocal too.

Fig 6.37
Wechat feedbacks
Source: The author
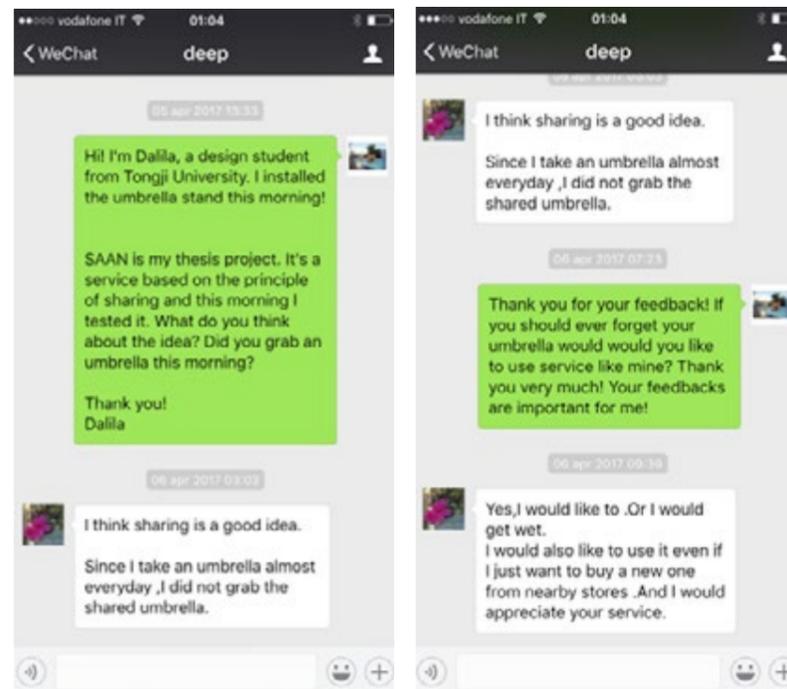
7. DESIGN OUTPUT

7.1   UMBRELLA

The umbrella, as part of the circle, has to be made by recycle material. Different Chinese design and art students design the canopy. The Umbrella is a concept but all the technologies and materials that the author though exists right now and applied on other service or product.

Strong and durable frame, covered by a good quality, ultra-thin canopy. For example the totes Eco 'brella has a canopy made of 100% recycled PET bottles, a frame made of 70% recycled steel and aluminium, and a handle made of bamboo and 70% recycled ABS plastic.

In the handle there are two technologies, the Bluetooth system and the NFC (Near Field Communication). The Bluetooth system allows tracking the umbrella when the user is not close to it. This technology is already on the market and it is Bluetooth Low Energy, a new wireless technology Apple baked into its smartphones starting with the iPhone 4S. This Bluetooth could work for a year on a single battery. The NFC is needed to identify the umbrella, this function is especially impotent to let the umbrella communicate with the umbrella stand. So when the umbrella stand lock and unlock, the umbrella can be recognized.

159

Fig 7.1
Umbrella in China is used
with sun and rain too
Source: http://edition.
cnn.com/2013/07/31/
world/asia/china-heat-
wave/index.html

Fig 7.2
Concept of the umbrella
Source: The author

Fig 7.3
*Umbrella concept (1)with*
Chinese modern patter
Source: The author

Made by recycled plastic

Used technology:
1. Bluetooth Module
2. NFC (Near Field Communication)

Fig 7.4
Umbrella concept (2)with
Chinese modern patter
Source: The author

Fig 7.5
Umbrella concept (3)with
Chinese modern patter
Source: The author

Fig 7.6
Umbrella concept (4)with
Chinese modern patter
Source: The author

7.1   UMBRELLA STAND

The umbrella stand is necessary because is the through link between the users and the umbrella. The umbrella is the main object that people use, so SAAN needs a big quantity of that, for this reason the umbrella can't cost too much. So, the umbrella stand welcomed more than one umbrella and the cost can be depreciated.

Inside the umbrella stand there are four technologies. The Wi-Fi system, the NFC, the luminesce sign and the lock and unlock system. The umbrella is recognized, locked and unlocked thanks to these technologies. It doesn't need a QR code because through the Bluetooth the umbrella recognized the user that is close to it and the user with the app allow the unlock system, so doing that, the umbrella stand unlock the umbrella from the base. To bring it back, is the same process, and the NFC recognized that the umbrella has been given back, so the operation was successful. The light system worked to let the users understand when the umbrella is booked or not. Red light means the umbrella is booked and locked, green light is unlocked and no lights mean the umbrella is available to be booked.

Fig 7.7
Umbrella stand expla-
*nation, technology part*
Source: The author

350 mm

350 mm

60 mm

30 mm

Used technology:
1. Central communication
system via wi-fi module;
2. Active NFC reading
system - able to read the
umbrella ID;
3. Light signals - green
means unlocked, red
instead locked, no light
waiting for reservation
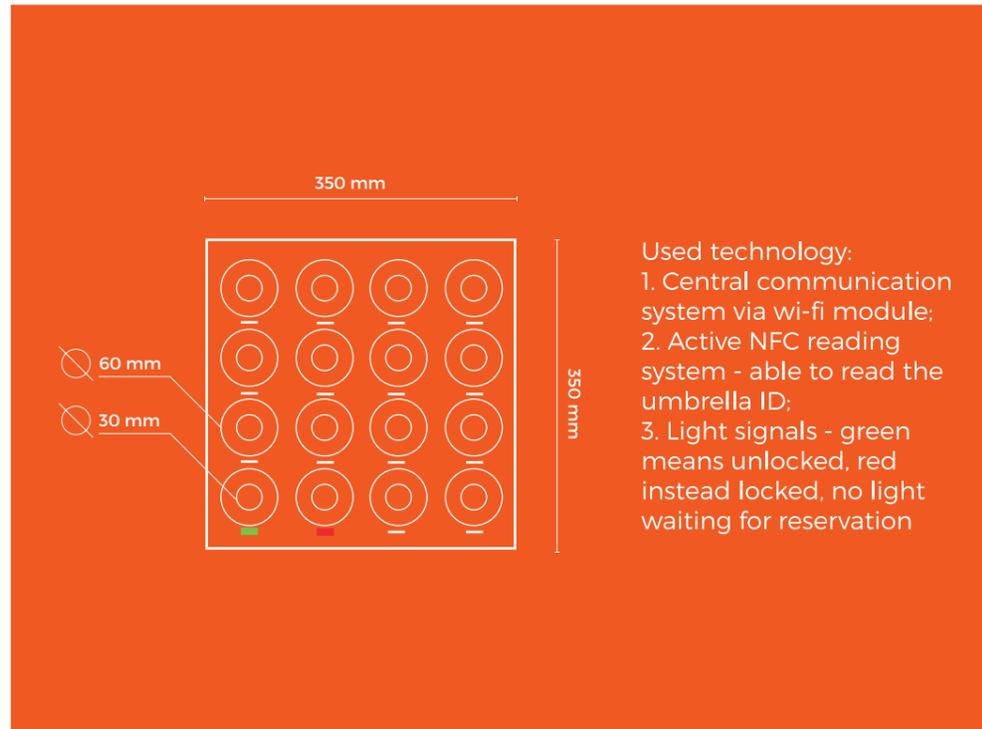
Fig 7.8
Umbrella stand,
mechanical part
Source: The author

550 mm

Used mechanics:
1. Single mechanical
umbrella lock / unlock
system

Fig 7.9
Umbrella stand and
umbrella with the light
Source: The author

7.3　APP

The App developed has different kind of functions. The users can check the weather and booked the closest umbrella. The App provides a map where you can check where the umbrellas are; moreover the user has his own profile and his own points.

MENU HOME SET UP

BOOK OPEN NOTES

ADV WAGAS

PROFILE PROMO SCORE INVITE FRIENDS

WEATHER

PARTNERS WAGAS SHANGHAI METRO

ABOUT US HELP

STUDENT FILL FORM
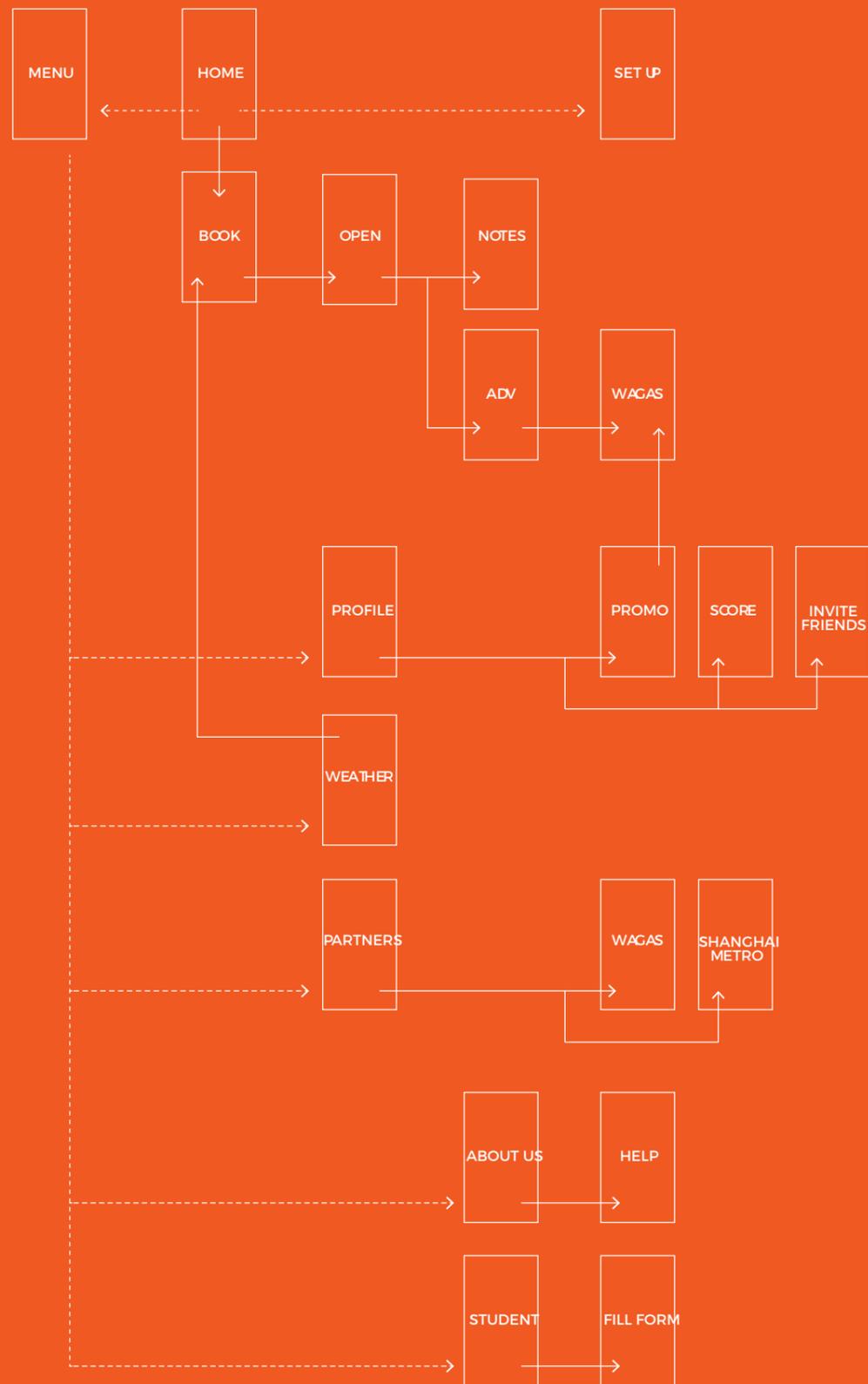
Fig 7.10
Download the app and set up
Source: The author
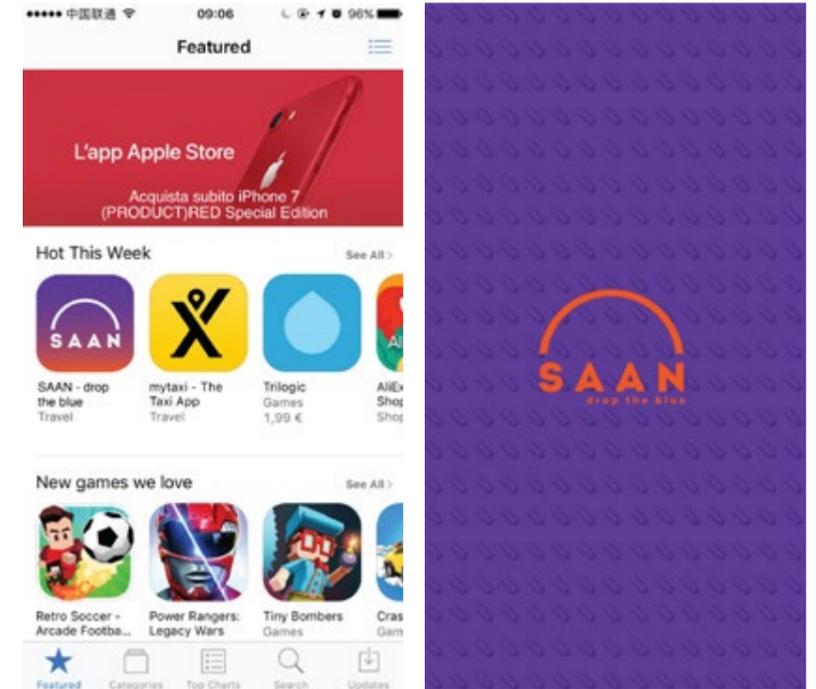
Fig 7.11
Screenshot of the registration system, pay the deposit via Wechat or Alipay
Source: The author

**Fig 7.12**
Blueprint of the App
*Source: The author*
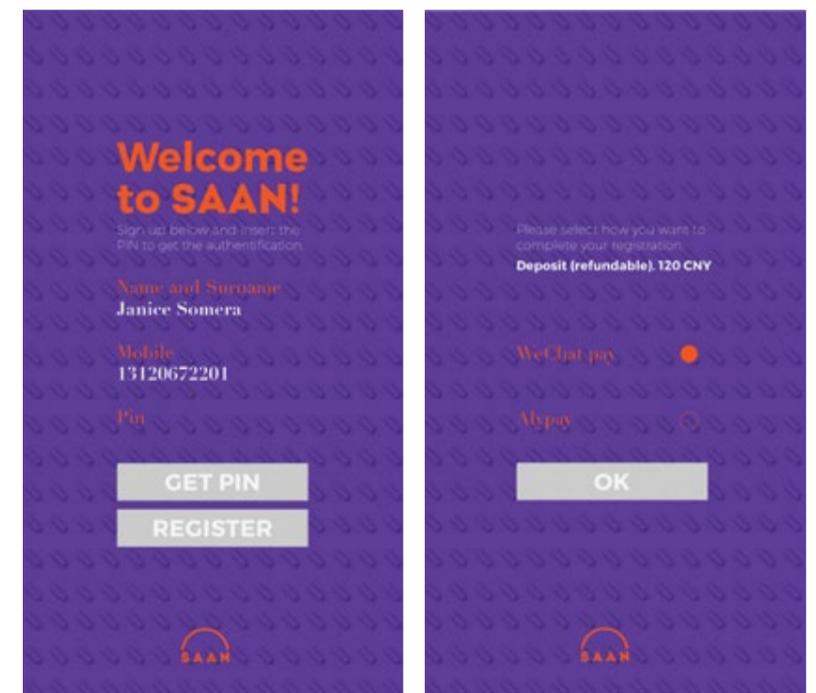
Fig 7.13
*Menu and Home with the map*
Source: The author
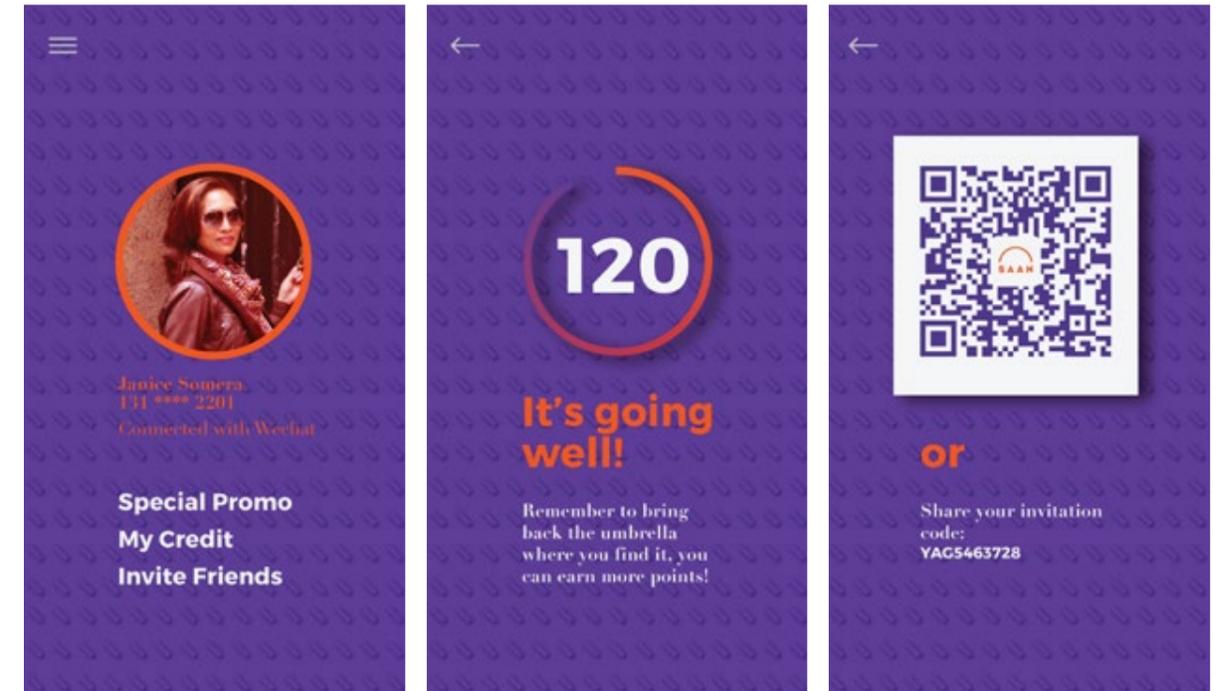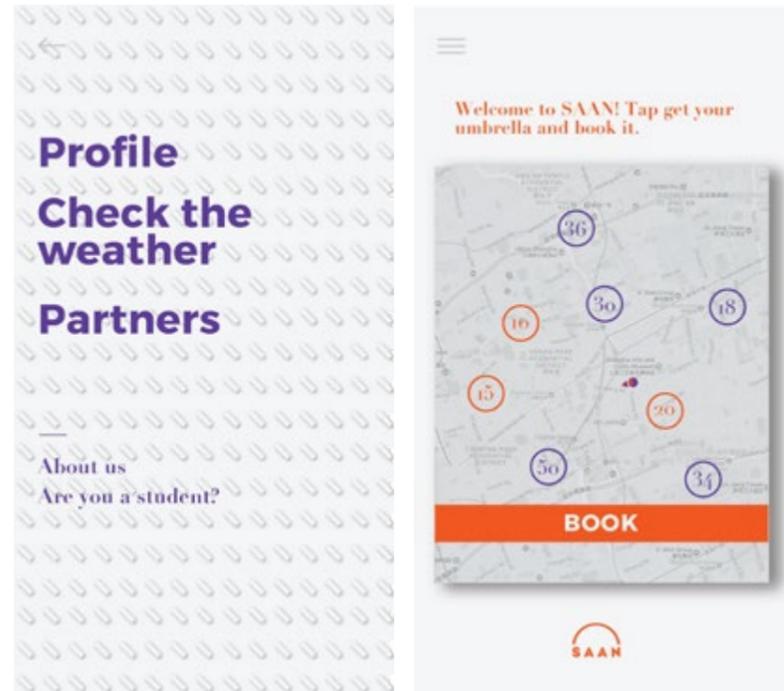
Fig 7.14
Book the umbrell, reach the location and nlock the umbrella
*Source: The author*
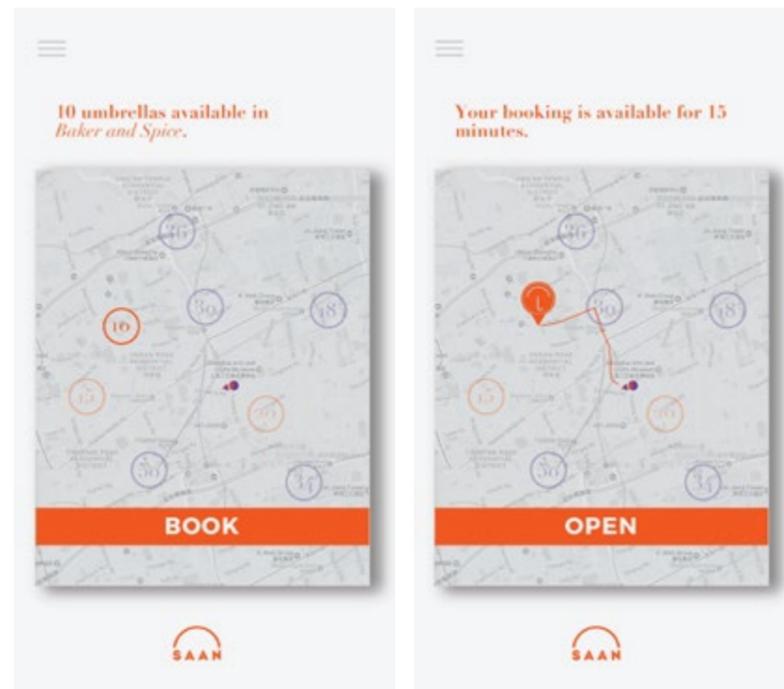
Fig 7.15
Profile where user can access to her promo, credits and invite friends
Source: The author

Fig 7.16
*Three kind of promotion shared by Wagas and SAAN*
Source: The author
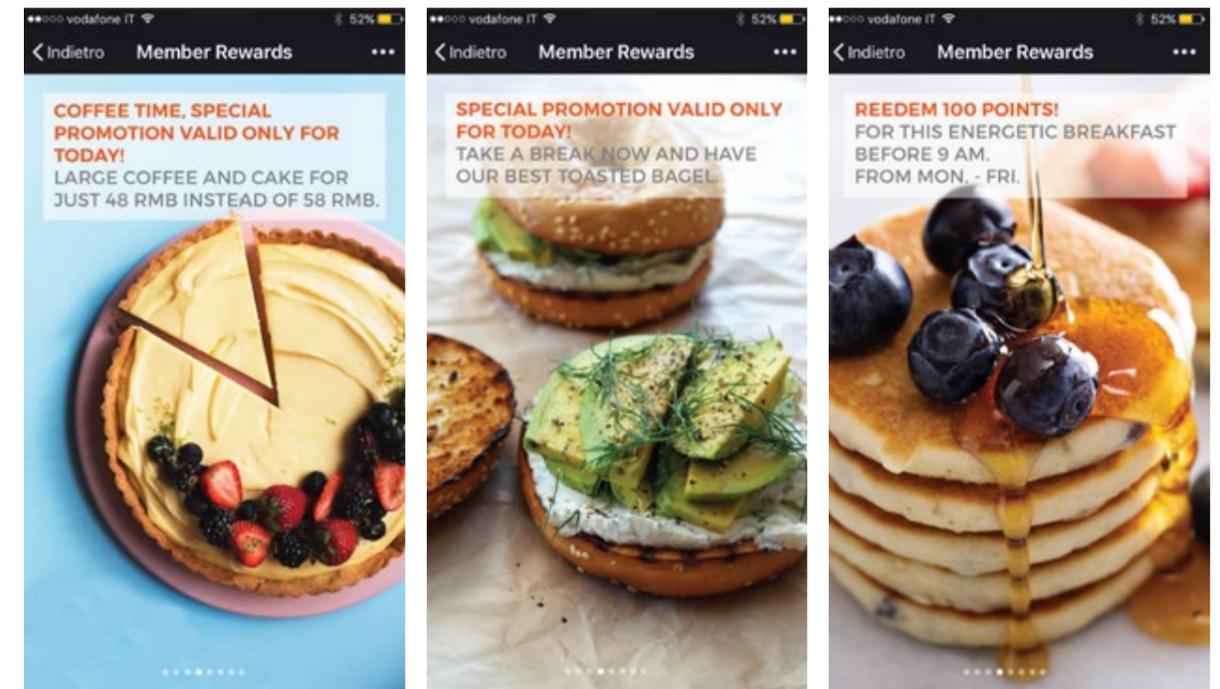
Fig 7.17
Weather informations
Source: The author
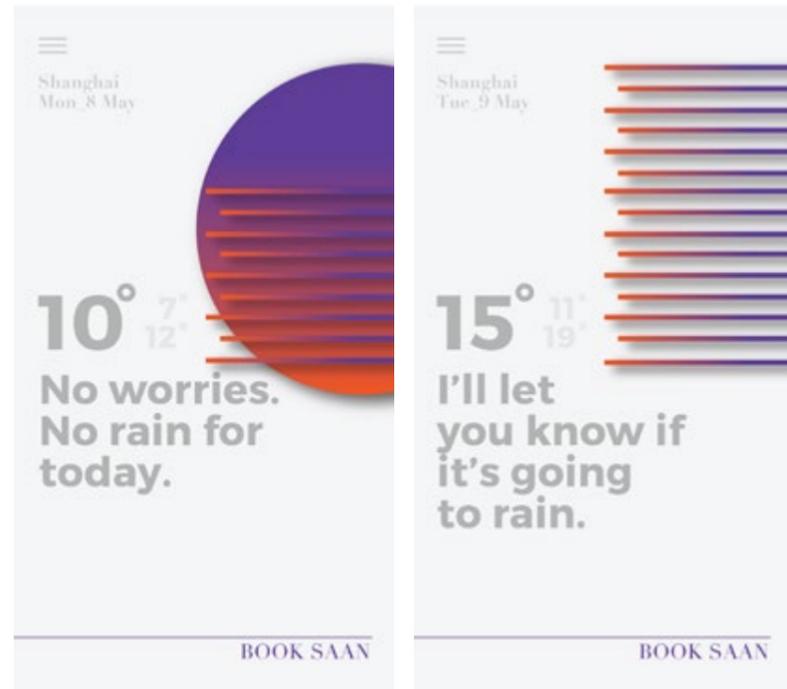
Fig 7.18
Weather informations
*Source: The author*
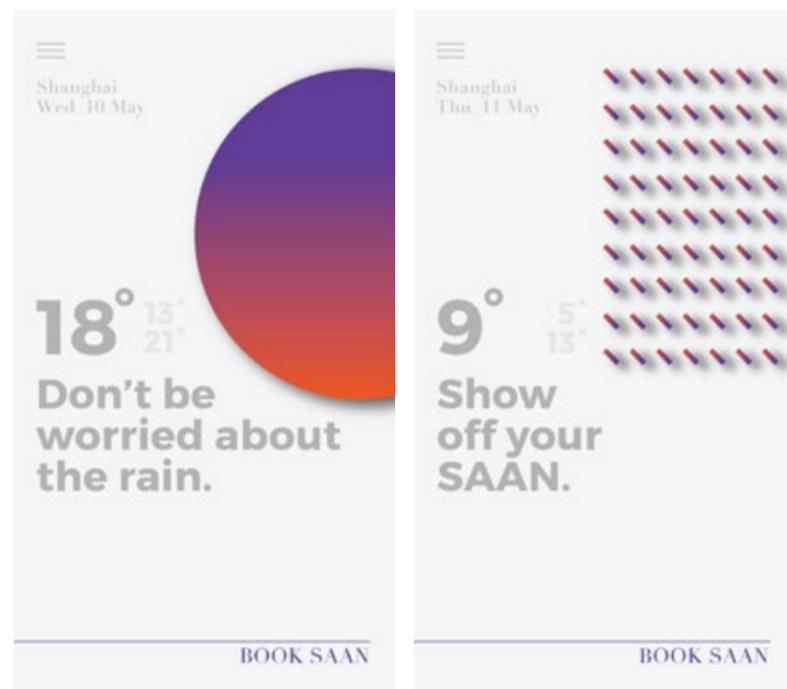
Fig 7.19
Pertners informations
*Source: The author*

Fig 7.20
Procedure for students application
Source: The author
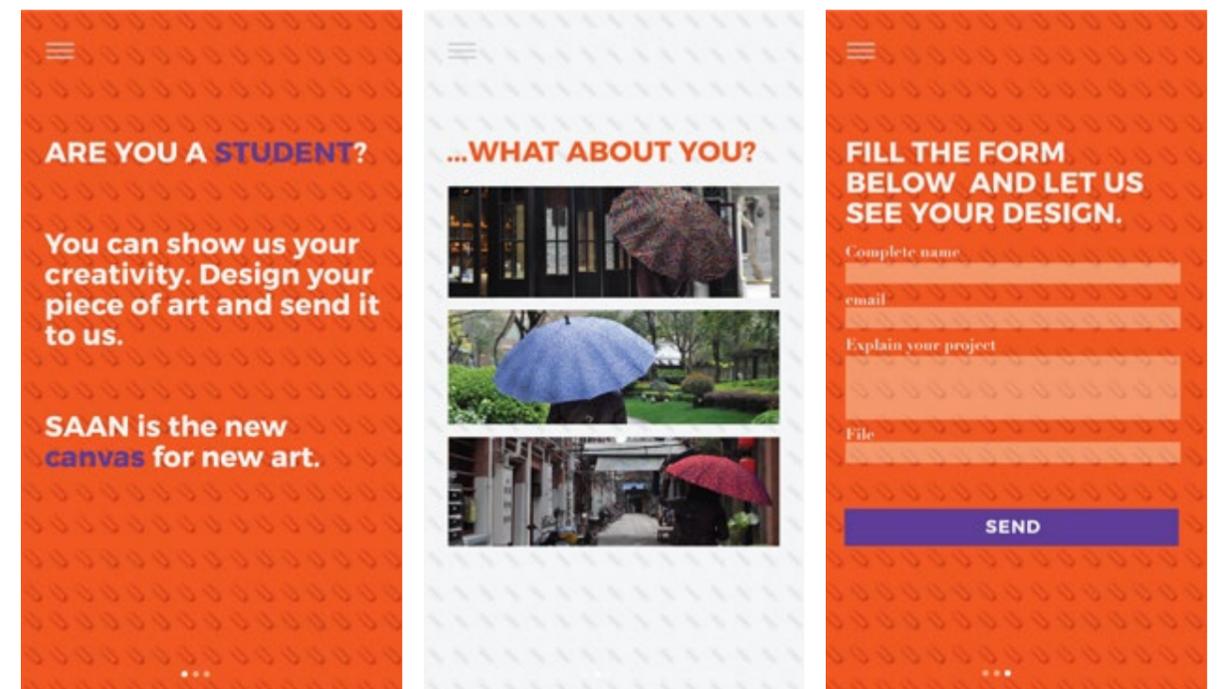
7.4 ADVERTISING

These following pictures are mock up of advertising that people can find around the city, in order to get access easily to the app.
Users can find the QR code and information of SAAN in the partners café So if it is raining users know how and where to get access to the service. Posters and advertising will be placed outside bar and restaurants partners too. Moreover, in the apposite place around the city will take places other advertising.

Fig 7.21
Advertising in a bar
partners
Source: The author

Fig 7.23
Advertising outside a mall
Source: The author

Fig 7.22
Advertising outside the bar
partners
Source: The author
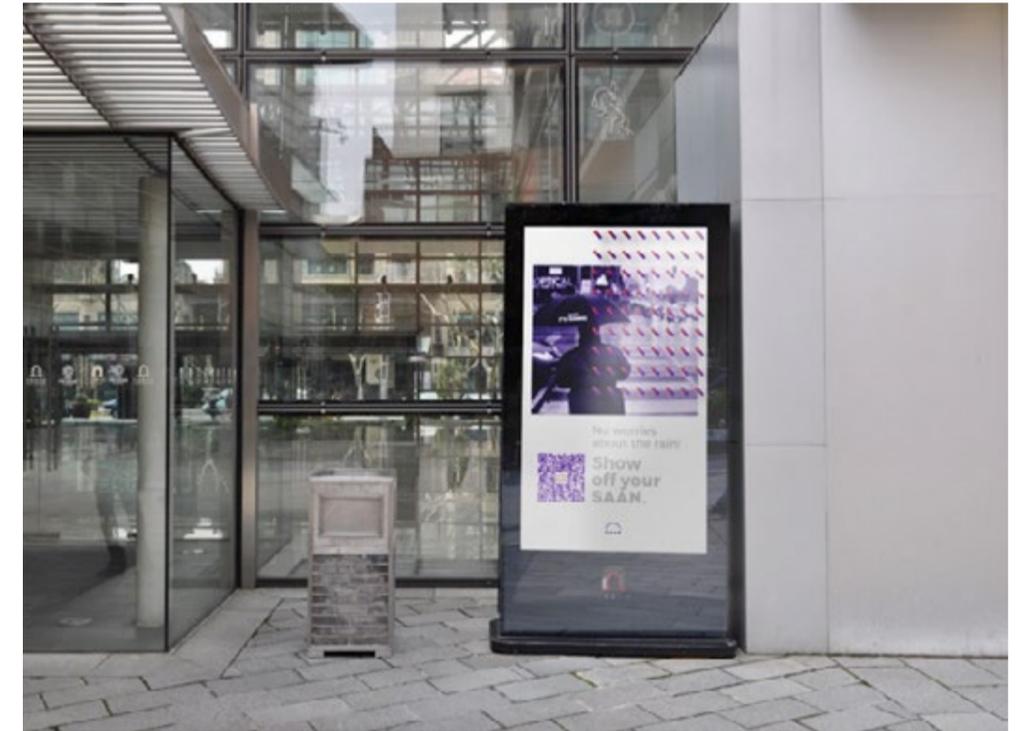
8.   FINAL CONSIDERATION

8.1   WEAKNESSES

8.1.1   SAAN

The main weakness of the service lies in the fact of being able to reach a large number of umbrellas around the city, in order to guarantee the service to a large number of users. SAAN could lose followers if users can't get an umbrella for several times consecutively.

When the service reaches the number of users in which it can be considered self-sustainable, another problem appears, the competition. China, as mentioned earlier, is the number one manufacturer of umbrellas in the world and they sell a large number of umbrella in China and abroad. Therefore, if people start to not buy more umbrellas but to join SAAN, the sale of umbrellas would drop and I would not know what kind of reaction to expect from retailers and street vendors. We should also consider that umbrellas are often considered as disposable objects and people do not give much value to them. For this reason another difficulty of the project is to change their mind about this conception. All this leads to a result, which is the umbrella carelessly. As in the case of Mobike, many users do not give the right value to the bike, so often the bikes are stolen or damaged. And this is what I predict will happen to umbrellas too.

Another weakness relates to the distribution service of umbrellas during bad weather. The partners have the option of requesting umbrellas when they need it, therefore, it is expected that the number of required umbrellas, increase during bad weather. For this reason, I suppose that this step of the service may be weak. Speed, efficiency and reliability are qualities that might be difficult to maintain if the umbrella demands are high and in different location of the city, distant form each other.

8.1.2   PARTNERS

Regarding the metro stations we can say that a weakness is the visibility. The stations of the metro in Shanghai are really big and with multiple exits, from two exits to more than twenty exits per metro. So visibility is definitely a problem. Users risk not find the booked umbrella, or as in the case of prototyping not to notice them. Indeed, what emerged during the prototyping was that people did not notice the umbrella stand, but not because it was not visible, but because they were all in a hurry and busy watching their own self phone.

8.2   NEXT STEPS

If the project was to be taken forward, the following recommendations should be considered.

_Product development. In order to go ahead with the project we must surely prototype umbrella itself, both to understand the cost and to decide what kind of technologies should be included. This type of umbrella is not a difficult product to be made, because all the technologies needed are on the market for some time and used in other types of products and services.

_Monetization of the project. The author's skills do not allow establishing a service fee, especially because the author is not aware of how much it could cost the production of umbrellas. For this reason the business model of the project should be developed more in depth, so to understand the actual cost of the service and to establish the cost for the user too. To do this, the author needs to external support, such as engineers and business developer. For now the author just supposed the price comparing SAAN with existing technology price and services, such as bike sharing in Shanghai.

8.3   CONCLUSION

The main purpose of the research study was to evidenced and analysed the shift that a common object as umbrella had during Centuries. From being a traditional object, fashionable and cultural, to being a disposable object. Obviously usage was different. The first was used more as a sunshade, object of Chinese tradition that was being used by people of a certain rank. Later the same umbrella became rain cover and with industrialization was moved in the umbrella that we know today. Then analyse how the product accessibility has changed over the years.

Therefore more specifically to understand: (1) how to give value to a common product as the umbrella. (2) How to create a sustainable service, from beginning to end, and then starting from the choice of recycled materials to produce the umbrella until you reach the sharing umbrella. (3) Than, how to apply and adapt service design tools to develop SAAN.

The result of this study was the development of a product service system based on the principles of sharing. So a link between umbrella and the collaborative consumption revolution. From questionnaires and interviews it seems that the problem is real. People lose, break and steal umbrellas all the time. These are not problems of the umbrella itself, but it's a problem of the behavior of the people. Indeed aesthetically speaking, the design of the umbrella is good because executes its function, what is wrong is instead the behavior of people, so the usage of the umbrella. Thus the author's aim was to highlight how the use of the umbrella can be transitioned to the new era of collaborative consumption, highlighting the change that underlies the concept of accessibility of the products. During the study what the author has noticed is that people are willing

to use sharing services, such as Mobike. The people interviewed had totally positive feedbacks towards the SAAN project. And as we can see fro these last weeks in Shanghai we know that this product service system could work in Shanghai. As the author mention at the beginning more than one umbrella sharing born in these last three weeks in China. But despite this, umbrella is really seen as disposable object, so the author is conscious about a possible problem related to this issue.

8.3.1   DISCUSSION

The service proposed is aligned with the current shifts we are living in the context of the sharing economy. Proposing an alternative way about the usage of common object in a collaborative way. SAAN also answers the growing need and expectation of sustainable service, thinking that sustainability is a system that starts from the production and continues after the usage of the service, it is a loop that never ends. The partnerships studied aim to be an inspiration of future projects, demonstrating how young generation can be included in the system. Moreover, the technology and the features proposed are representing a synthesis of the shift that we are living, from what we consumed to how we consumed.
The author believes that many issues developed in this work hold a good base to the new way we look at the consumption. "We're sharing and collaborating again in ways that I believe are more hip than hippie." Rachel Botsman

<BIBLIOGRAPHY>

BOOKS

Rachel Botsman and Roo Rogers, What's Mine Is Yours: How Collaborative Consumption is Changing the Way We Live, February 10, 2011.

Marc Stickdorn, Jacob Schneider. This is Service Design Thinking. Wiley, 2011.

Cass R. Sunstein and Richard Tahler, Nudge: Improving Decisions About Health, Wealth and Happiness, Penguin Putnam Inc, 2009

Dr. Artur Borcuch, The Sharing Economy: Understanding and Challenges, International Journal of Humanities & Social Science Studies, Volume-II, Issue-V, March 2016, Page No. 77-85.

Diana Scearce, Gabriel Kasper, & Heather McLeod Grant, Working Wikily, Stanford Social Innovation Review, Summer 2010

Business Journal of the German Chamber of Commerce in China, Feb/Mar 2016. http://china.ahk.de/fileadmin/ahk_china/GC_Ticker_Landingpage/GC_Ticker_PDF_Versionen/GCT_201601_print.pdf

Tim Brown & Jocelyn Wyatt. Design Thinking for Social Innovation. Stanford Social Innovation Review, Winter 2010.

ONLINE RESOURCES

Aas, C.; Ladkin, A.; Fletcher, J. Stakeholder collaboration and heritage management. Annals of Tourism Research 32 (1). Print.

Blanchard, B. China's Xi orders better protection of cultural heritage. Thomson Reuters, 12 April 2016. Web. April 2016.
    http://www.reuters.com/article/us-china-art-idUSKCN0X9164

Bow-Bertrand, A. Brandon Stanton: The Man Behind Humans of New York. The Culture Trip. January 2016. Web. April 2016.

Susan Orlean. Thinking in the rain. february 2008
http://www.newyorker.com/magazine/2008/02/11/thinking-in-the-rain

Josh Petru. Why your umbrella sucks and what to do about it. April 2014
http://digg.com/2014/umbrellas-break-why-and-get-the-best-one

Richard Brubaker. China and sustainability: connecting the dots between economy and ecology. September 2012
https://www.theguardian.com/sustainable-business/blog/china-sustainability-economy-environment-ecology

Selling service as a sustainability strategy.
https://www.liveworkstudio.com/articles/selling-service-as-a-sustainability-strategy/

Richard Brubaker.The Next Big Thing For Entrepreneurs: Sustainability. September 2015. https://www.forbes.com/sites/ceibs/2015/09/09/the-next-big-thing-for-entrepreneurs-sustainability/#196c09635aa9

Richard Brubaker.Reframing Sustainability For China, And Future Cities. June 2015
https://www.forbes.com/sites/ceibs/2015/06/02/reframing-sustainability-for-china-and-future-cities/#514c001f697a

Made how, Umbrella.
http://www.madehow.com/Volume-1/Umbrella.html

Songxia Umbrella Industry in China.
http://jhumbrellamanufacturers.com/html_news/Songxia-Umbrella-Industry-in-China-33.html

Celine Roque.The Astonishing "Lost and Found" Culture of Japan. August 2013
http://www.attendly.com/the-astonishing-lost-and-found-culture-of-japan/

Census Report 2015.
https://www.accessoriesmagazine.com/wp-content/uploads/2016/02/2015-Census-report.pdf

A Brief history of design thinking: how design thinking came to "be". June 2012
https://ithinkidesign.wordpress.com/2012/06/08/a-brief-history-of-design-thinking-how-design-thinking-came-to-be/

Kaan Turnali. What Is Design Thinking? May 2015.
https://www.forbes.com/sites/sap/2015/05/10/what-is-design-thinking/#8f96d4d471f9

Dave Thomsen. Why human-centered design matters.
https://www.wired.com/insights/2013/12/human-centered-design-matters/#article-comments

Design thinking or user centred design? Same? August 2014
http://www.worldusabilitycongress.com/design-thinking-a-new-way-for-a-user-centred-design-process/

Davide Fassi. 002 pssd system and definition pssd. November 2015
https://issuu.com/davidefassi2/docs/002_pssd_system_and_definition_pssd/49
Un ombrello migliore è possibile?. October 2016
http://www.ilpost.it/2016/10/10/un-ombrello-migliore-e-possibile/

Bi Liufu, an inheritor of oil paper umbrella craftsmanship. December 2016
http://www.china.org.cn/travel/Wild_Sichuan/2016-12/19/content_39903235_7.htm

Dajian Zhu, China's policies and instruments for developing the circular economy, JUNE 2014

http://europesworld.org/2014/06/15/chinas-policies-and-instruments-for-developing-the-circular-economy/#.WVbhS8ZaaZV

China encourages car-sharing: Ministry of Transport, June 2017
http://www.china.org.cn/business/2017-06/03/content_40957932.htm

THESIS

Matteo Remondini. Understanding the role of product-service system designers within service design agency in London, Master's Degree in Product Service System Design, Politecnico di Milano.

WEBSITE

http://umbracity.com
http://www.brellaboxnyc.com
http://umbrellahere.com
http://mobike.com/sg/
http://methodhome.com
https://www.peerby.com/dashboard
http://www.chinahighlights.com/travelguide/culture/paper-umbrella.htm