# UNCOVERING THE POTENTIAL OF A MOBILE LOCKER SERVICE TO IMPROVE LAST MILE GOODS DELIVERY IN ASIA



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Master of Strategic Product Design



### **Master Thesis**

### Uncovering the potential of a mobile locker service to improve last mile goods delivery in Asia

This master thesis is a part of the graduation project for the Master Programme in Strategic Product Design at the Faculty of Industrial Design Engineering of Delft University of Technology

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# Our vision is to truly change how the world moves - again. we have an opportunity to revolutionize transportation once again, only this time we'll be

powered by the digital economy.

**Bill Ford** 





# **EXECUTIVE SUMMARY**

In 2016, Ford revealed its innovative concept 'Autolivery'. Nevertheless, the exact deployment conditions for the 'Autolivery' are not yet in place. In order to inhibit the collision space towards future implementation, a 'mobile locker' concept will come first, as seen in a roadmap. In this report, the potential of the 'mobile locker' service in the rapidly growing Chinese delivery market will be presented.

The research first drew attention to the Chinese parcel delivery market. The findings indicate that the delivery industry in China is driven by E-commerce and is characterized by surging parcel volumes, severe homogeneous competition and declining profitability. In the last mile stage, costs keep increasing, resulting in bottlenecks of low automation levels in local hubs and heavy reliance on couriers. In order to improve the last mile delivery efficiency, some package pick-up alternatives have emerged. In the services, community-shared lockers or convenience shops are used to receive packages from couriers on behalf of end users. Nevertheless, one more step was added in last mile delivery instead of fundamentally tackling the bottlenecks. Moreover, the new services suffer from either unsustainable business models or problematic service standards. Under the circumstances, more automatic and efficient package handling solutions in hubs as well as last mile delivery solutions are getting more desirable, which brings huge business opportunities to the 'mobile locker' concept.

While long distance E-commerce is steadily growing, local sellers are also striving to go online with the support

of different locally found consumer product platforms. Nevertheless, the platforms haven't been able to provide offline delivery solutions: There is no specialized service provider which has succeeded in managing local offline delivery either, which also brings business potential to the 'mobile locker' concept.

When it comes to end users, current user needs and future scenarios regarding last mile delivery were investigated. The results show that people living in old urban areas, especially in megacities, are suffering the most from package pick-ups. They have less access to delivery infrastructure and most of the time pick up packages elsewhere after back home commuting. The current services are not able to provide a reliable, convenient, and effortless experience in terms of receiving packages as well as returns.

Later on, market opportunities and user insights were synthesized to outline the blueprint of the 'mobile locker' service. It is positioned to first drastically improve the last mile delivery, from managing mass delivery at public transportation stops in megacities' old areas to other people-dense areas of other cities, while has a long term vision of diving into local O2O market.

In the last part of the report, a 5 years' roadmap is presented, supporting strategic planning and innovations to create a sustainable and promising business. Through 3 horizons in the roadmap, the business evolves from entering the last mile delivery market, to developing community-based offline delivery, and to provide a holistic self-owned O2O service. In horizon 1, it is recommended to collaborate with Hivebox, Cainiao logistics to help both Chinese leading express companies and end users, from efficiently sorting packages in hubs, safely delivering more packages, effortlessly picking up packages and improving after-sales services. In horizon 2, the service is expected to penetrate into local O2O markets by providing 'mobile locker transit' as a marketplace for local sellers to facilitate offline package deliveries. In horizon 3, a self-owned online platform will be built and orchestrates with 'mobile locker transit' to provide holistic O2O services to all residents, peer sellers, and local sellers.

As a project that focusses on the fuzzy front end innovation, these results lay a solid groundwork in terms of new product development suggestions, service design and business planning. However, there are still many elements to explore further, which are briefly touched upon in the limitations and recommendations chapter.

# TABLE OF CONTENT

#### **Project brief**

Project background	2
The company	3
'Autolivery'	6
Initial concept	7
Project objective	10

#### Market analysis

Global parcel delivery market	14
China's delivery industry	14
Last mile competiton	20
Chapter conclusion	28

#### **User research**

Qualitative method	
User Insights	32
Future urban life scenarios	36

#### Synthesis

Stakeholder analysis	
- End user	38
- Client	45
- Partner	46
Design challenge	
Long-term vision	

#### **Business model ideation**

Method	50
Preparation	52
Business model sessions	53
Results	56

#### Roadmap

Roadmap	60
Horizon 1	69
- Product design brief	71
- Service pathway	76
- Business model design	81
- Cost structure estimation	85
Horizon 2	89
- Service concept	89
- Business model design	90
Horizon 3	92
- Service concept	93
- Business model design	94

#### **Conclusion** Concept evaluation Recommendations

Conclusions	103
Limitations	103
Acknowledgements	104
Reference	105

98

101

#### Appendix

User interview guide	108
User research results	109
Future urban life scenarios	119
Business model session guide	123
Business model clusters	124
Questionnaire results	127

# **PROJECT BRIEF**

In this chapter, you will find information about the project background, the company, 'Autolivery', the initial concept and the project objective.



The company

**Initial concept** 

'Autolivery'

**Project objective** 

## **PROJECT BACKGROUND**

## A world of mobility

Unsurprisingly, 'mobility' became one of the most popular buzzwords in recent years. With the rapid developments of technology and user-centred design, more and more mobility solutions such as (e)bike sharing, electric vehicles, ride sharing, ride hailing and connected vehicles are continuing improving the quality of transportation.

#### Ford: The city of tomorrow



With over half of the world's population concentrated in cities, mobility has become increasingly more complicated due to rising gridlock, pollution, and ineffective mass transit plaguing people across the world. In the 'City of Tomorrow' vision, Ford examines how advancements in technology and mobility will interact with city's infrastructure to create a healthier and more efficient transportation ecosystem to help people move in a more convenient, flexible and smarter way.<sup>1</sup>



As 'moving in the world' gets easier, 'the world' is also moving to human beings as well, which means that everything you want is becoming more and more easily accessible. Except for all the mobility services for people, different companies are also striving to provide better delivery solutions for invididuals in the B2C market.

For the overall trend, the focus of all these companies is to do it faster and make it more convenient for people. Amazon is already doing one hour delivery in some cities. Also Walmart and Google are aiming to offer similar superfast delivery services. Besides these big companies, there are also many startups that want to increase the convenience of delivery services. Because these small companies could never have the same competences as the giants, they have a different strategy: peer-to-peer delivery services. Some startups even include individuals in their delivery network to serve as an "AirBnB for delivery".

## THE COMPANY

As one of the worldwide leaders in automotive and automotive-related products and services industry, Ford Motor Company's vision is people working together as a lean, global enterprise to make people's lives better through automotive and mobility leadership.<sup>2</sup> In order to achieve the great vision, Ford is striving itself in the following 3 aspects from the guidance of 'One Ford Strategy' <sup>3</sup>:

- **Great products** of 4 values: improving quality as daily priority, safer vehicles, sustainability in manufacturing and

smart technologies.

- **Strong business** from increasing capacity in the US to adding plants around the world.

- **Better world**: Ford doesn't stop with products and bottom line. With the global brand promise called 'Go Further', Ford is helping to solve global challenges linked to economic development, energy security and environmental sustainability.



#### Tangible resources

- Strong manufacturing capacity: 4 segments over the world, 10 vehicle assembly plants

- Standardized facilities and equipments

- Loyal employees, high cohesion from One Ford strategy

- Reliable and high quality products, especially truck/van

### Intangible resources

- Strong brand equity: 5th largest in the world
- High customer loyatly and satisfaction
- Trustful and respectful company culture
- Sustainable networks with suppliers and distributors

### organizational capabilities

- Low reliance on suppliers
- Flexible manufacturing
- High consolidation & reconstruction capability
- Profound innovation capacity(automated driving)
- Strong and independent finances
- One Ford strategy

In order to gain a deeper understanding of Ford, a list of its tangible resources, intangible resources and organizational capabilities was shown above. Further, a 'Collis analysis' <sup>4</sup> was performed to evaluate and define

the most competitve strengths. In the analysis, different items were evaluated by 5 criteria: Inimitablity, Durability, Appropriablity, Substitutability and Superiority.



#### **Competitive Advantages**

## **KEY STRENGTHS**



Consoliated manufacturing



Customer loyalty/satisfaction



One Ford strategy



Van of best performance



As a result, Ford has 5 key strengths that have competitive advantages in the automotive industry: manufacturing capability, loyal customers, van of best performance, finanical capability and One Ford strategy.

• **Manufacturing capability:** Significant progress continues to be made on consolidating platforms. From 2007 to 2016, Ford's 27 platforms were consolidated into 9 global platforms which to a large extent enhanced manufacturing capacity.<sup>5</sup>

• Loyal customers: Ford received the crown of customer loyalty and satisfaction in both 2014 and 2015.<sup>6</sup>

• Van of best performance: Ford transits and its pickup vans are widely accepted as the best performance vehicles in the product category.

• **Financial capability:** Ford has strong finanical capability in the automotive industry, it was the only

company survived from financail crisis in 2008 without relying on goverment bailout.

• **One Ford strategy:** As the most important resource of Ford, 'One Ford strategy' was adopted and guided the company from 2007 onwards, it functions effectively on encouraging focus, teamwork and a single global approach, aligning employee efforts toward a common definition of success, which is also measured by the satisfaction of our customers, employees and essential business partners.<sup>7</sup>

To conclude: Ford views itself not just as an auto manufacturing company anymore, but also as a mobility company. Ultimately, it is aiming at helping change the way the world moves again by tackling critical mobility challenges, whether in crowded cities or remote rural communities. On the way to the big mission, Ford is becoming more and more willing and open-minded to interact and cooperate with different stakeholders.

# 'AUTOLIVERY'

For more than half a century, vans have played a key role in deliveries. Drones are a modern phenomenon, but the two could work hand in hand to improve mobility in urban areas in one example of Ford's vision for the "City of Tomorrow".

At this year's Mobile World Congress in Barcelona, Ford revealed the innovative ideas called 'Autolivery'. Autolivery' is a self-driving van concept that could quickly and efficiently transport everything from groceries to urgently needed medical supplies on the ground, with drones potentially able to take to the air for the final leg of the journey. This way it is possible to reach destinations inaccessible by car, such as high up in a tower block – or where parking would be difficult, impractical, or unsafe.







# **INITIAL CONCEPT**

## 'Mobile locker'

COLCUTION

Currently, the exact deployment conditions for the 'Autolivery' service offering are not yet in place. Nevertheless, there are intermediate innovations that come first in a roadmap towards the implementation of 'Autolivery'.

One such innovation is a 'mobile locker', an automated package handling station that can be placed at different

CINIAL MALLIE

locations inside the city by means of a Ford commercial vehicle. The locker is preloaded in the logistics hub and is placed on a temporarily location close to the final destination of the packages. People get a notification and pass by to pick up packages from the locker or even deposit packages for delivery elsewhere. Afterwards, the locker is collected and transported to the logistics hub before reuse starts.



SPECIFICATION	FINAL VALUE		
PARCELS SIZE	A: 115x44x44 mm B: 180x180x180 mm C: 690x320x432 mm	COST (MAX.)	50000 €
DADCELS WEICHT	A: 1 kg	POWER CONSUMPTION (MAX.)	?
PARCELS WEIGHT	C: 30 kg	SINGLE PARCEL DELIVERY TIME (MAX.)	1 min
	A: 10%	SINGLE PARCEL DELIVERT TIME (MAA.)	1000
PARCELS DISTRIBUTION	B: 80% C: 10%	SINGLE PARCEL LOADING TIME (MAX.)	1 min
TRUCK PAYLOAD	1200 kg	FULL SYSTEM LOADING TIME (MAX.)	1 hour
SYSTEM VOLUME (MAX.)	2.05x2.11x3.08 m	DELIVERY DOORS NUMBER (MIN.)	1
SYSTEM WEIGHT (MAX.)	300 kg	DELIVERY DOORS NUMBER (MAX.)	2
VOLUME EFFICIENCY (MIN.)	13%		
STORAGE CAPACITY (MIN.)	A: 12 parcels B: 101 parcels C: 12 parcels	SYSTEM DURABILITY (MIN.)	?

## **Opportunities in China**

Originally, the trigger of developing the 'mobile locker' concept came from Ford Asian Pacific team in Shanghai



- Large volume of 2/3 wheelers running on pedestrian lane, sometimes motorized lane, cause significant safety concerns.

when they witnessed the following problems in China' last mile delviery market:



- Uncertainty of pick-up time causing long waiting time (12% first delivery failure rate).



- Chaotic parcel arrangements while waiting for pick up.



- Privacy or security concern challenges couriers (unattended delivery).

Despite this, there are a lot more business potentials and opportunities in this huge market:

- Growing trend of Urbanization and E-Commerce lead to great demands in last mile delivery.

- Emerging O2O business models create "Need For Speed" last 100 meter delivery demands, e.g. O2O food delivery.

- The time has come for advanced technologies and

innovative business models to emerge to improve efficiency and address the pain points in last 100 meter delivery.

In order to tackle the last mile delivery problem in China and also investigate future business opportuinities, Ford developed the technical part of such a concept internally. However, the business viability and user desirability remained to be investigated.

# **PROJECT OBJECTIVE**

The overall goal of the project is to investigate the consumer desirability and business viability of the mobile locker concept, mainly in the context of China. If the proposition doesn't responding to customer needs or the business part doesn't make sense, adjustments or improvements need to be made. Further, an appropriate 'mobile locker' concept also needs to be synthesized into a big service picture in which different stakeholders work together to complete the value chain.

As a result, the final goal is to create a detailed strategic planning which will be provided to Ford for (a) certain group(s). It is expected to create a long-term and sustainable parcel delivery business opportunity for Ford.

The following issues are expected to be addressed in the project:

- Evaluate the existing 'mobile locker' concept in aspects of product features, qualities and values and make improvements - Evaluate market potential and explore market opportunites of the 'mobile locker' concept.

- Further investigate users' latent needs, accordingly design a holistic 'mobile locker' service and formulate a detailed design brief.

- Business model design

- Identify all stakeholders and investigate their needs that are affected by the service, clearly define value propositions and value exchanges.

- Align different stakeholders through value chain, synthesize value exchanges with value propositions in order to create a long-term and sustainable business.

- Develop several business models.

- Create a roadmap to align different concepts and innovations.

## **Project framework**



The project framework derived from the Delft Innovation Method <sup>8</sup>. The project starts from the understanding of the challenge and analyze internal situation, external environment and user needs. After that a synthesis study was conducted to define market opportunities, design challenge and long-term vision. Subsequently, a business modeling study was conducted to explore the business potentials in China. The project concludes with the a roadmap in which strategic plannings and service/product concepts are well explained.

This project is divided into three phases:

#### A. Context analysis & User research

- External analysis: Conduct a competitor/market analysis to investigate parcel delivery industry and clearly define competition rivalry. (1 week)
- External analysis: Conduct a trend analysis(DEPEST) to explore future opportunities and how are they related to 'mobile locker' concept. (1 week)
- Internal analysis: Reviewing existing 'mobile locker' concept and related research projects within Ford. Conduct a company analysis to clearly identify resources and capabilities. (1 week)
- User research: Conduct 8 interviews which cover different user groups to evaluate existing 'mobile locker' concept and gather user needs. (1 week)
- User data analysis: analyze the data gathered from interviews, define user needs and distill insights. (1 week)
- Delivery system mapping: investigate the entire process of delivery service , define problems in different stages in value chain, select relevant opportunities for developing design brief. (1 week)
- Potential business partner mapping: explore and define

possible business partners and evaluate the possibilities. (1 week)

#### **B.** Concept development

• Journey mapping: define several personas based on user research, further develop them into customer journey maps to explore design opportunities. (1 week)

- Product/service ideation: conduct a generative session (s) to ideate, develop it into a new 'mobile locker' (service) concept and an accompanying service blueprint. (2 weeks)
- Evaluate the product/service system and provide specifications/improvements for digital/physical touch points. (1 week)

• Design brief: make a clear positioning for the service and further develop into a design brief. (1 week)

#### C. Business modeling & Roadmapping

• Based on the service blueprint, distill different value propositions, stakeholders and search for revenue models and further develop a business modeling toolkit for later generative sessions. (1 week)

• Conduct 2 generative sessions with end users to cocreate business models. (2 weeks)

- Data analysis: synthesis previous data, define value trade exchanges between different stakeholders, align different stakeholders through value chain. (1 week)
- Develop several detailed business models. (2 weeks)
- Envision a long term roadmap to arrange developing programs. (2 weeks)
- Prepare presentation. (1 week)

# **CONTEXT ANALYSIS**

In this chapter, firstly an overview of the parcel delivery market and related trends in China can be found. Further, market players in China's last mile segment are categorized, explained and ends with conclusion.

Global parcel delivery market

China's delivery industry

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Last mile competition

## **GLOBAL PARCEL DELIVERY MARKET**

Parcel delivery is the delivery of shipping containers, parcels, or high value mail as single shipments. The service is provided by most postal systems, express mail, private courier companies, and less than truckload shipping carriers.<sup>9</sup>

The parcels market was almost \$300 billion in 2016, up from just over \$270 billion in 2015. North America is the largest regional parcels market by value, worth just under \$100 billion in 2015, making it slightly larger than Asia-Pacific. However, Asia-Pacific is growing faster and it is expected to surpass North America by 2017. Double-digit growth in Asia-Pacific has been driven by China, which accounts for 47% of the regional total.<sup>10</sup>

shifted market share from the B2B to the B2C segment. B2C once made up ~ 40 percent of the market, but has since exceeded 50 percent in a number of countries, including Germany.<sup>11</sup> Besides, with the rapid development of digital technologies and e-commerce, traditional ways of shopping have been drastically changed by integration of the convenience of online retail with the immediacy of bricks-and-mortar stores. Nowadays, consumers have greater choices, low switching costs and the power to write reviews about different kinds of product and services, all of these have stronger impact on every company.

E-commerce in B2C market

Not surprisingly, E-commerce growth is the largest driver in the growth of parcel market volumes, which has

#### To conclude, bargaining power has been starting to shift towards consumers, they are now demanding faster, cheaper, more convenient, transparent, holistic and seamless delivery experience in terms of collecting their parcels as well as returns.



# CHINA'S DELIVERY INDUSTRY

## **Market size**

The volume of business of express delivery in China increased from 1.2 billion parcels in 2007 to 31.3 billion in 2016. In 2016, the revenue of China's express delivery industry exceeded CNY 400 billion, with a CAGR of 44.6%.<sup>12</sup>

Regionally, China's eastern area constitutes the mainstay

of the express delivery industry, with the business volume accounting for 82%, central and western area shares 11.2% and 6.8% respectively. By provinces, the top 5 ones in terms of express delivery business are Guangdong, Zhejiang, Jiangsu, Shanghai, and Beijing respectively, altogether hold a combined share of 69% in the total business volume.<sup>13</sup>



## **Driven by E-commerce**

Obiviously, the fast growth of delivery industry in China was driven and brought about by the booming E-commerce, the online shopping habits of the Chinese consumers have been gradually developed and deepened. In 2016, the online shopping market sales in China reached RMB 5.2 trillion, with a CAGR of 50% over the past six years. Among all the goods sold online, physical goods was CNY 4.2 trillion, with food, clothing and daily goods increased by 28.5%, 18.1% and 28.8% respectively, accounting for 12.6% of total retail sales of consumer goods.<sup>12</sup>



### Parcel journey in E-commerce delivery



Currenlty, the typical parcel journey in China's E-commerce delivery is:

Firstly consumers make orders on E-platform, after being informed, sellers prepare packages and inform express companies for first mile collecting. Subsquently, a courier starts collecting packages from different sellers, mostly in the morning. After that, all the packages collected by couriers will be sorted and consolidated in local hub, transported to local distribution center, destination center and arrive at destination hub. In the end, couriers in destination hub need to sort packages and deliver the packages which belong to his delivery area.

In terms of last mile delivery, normally packages need to be received and confirmed by consumers. However, sometimes consumers are not present. Therefore, packages will be delivered to community lockers or convenience shops after getting permission from consumers. Later on, consumers need to walk a certain distance and pick up their packages.

## **Trends in E-commerce segment**



pick-up shops

# The boundary between national E-commerce and regional E-commerce is diminished.

Currently, more and more E-sellers joined 'Cainiao' logistics system by stocking up in its different regional warehouses. In this way, half of the entire logistics process is saved, it starts directly from preparing packages in destination central distribution after confirming customer orders.

Stocking up in warehouses in different regions in advance does diminish the boundary between national E-commerce and regional E-commerce. However, there's still an inevitable journey for packages to travel in cities. It is predictable that the future delivery competition will take place intensively in local areas. At the same time, a local hub will still be needed for further sorting packages before last mile delivery, which will bring a huge opportunity for automatic sorting and delivery solutions.

## **Trends in local areas**



#### **Emerging local Offline-to-Online services**

O2O has been one of the main buzzwords talked about during 2016 in China. For a quick definition, O2O is anything digital which brings local offline shops online and deliver products/services offline to consumers.

While online sellers are developing faster delivery solutions and trying to diminish the distance boundaries, it graudally poses a threat to local sellers. Besides, the cost of running a physical store keeps increasing. Under the circumstance, attracting and serving customers in an 'O2O' way will be more efficient and cost-effective Therefore, more and more offline sellers are entering local O2O market and striving to utilize local resources to offer better services.

The O2O market was initiated from on-demand service categories like prepared food. For example, a lot of

restaurants joined the Chinese leading locally found consumer product platform 'Meituan.com', providing the possibility for customers to make online orders and later get their food delivered. Currently, the local O2O categories were stretched to other non on-demand markets, like brick-and-mortar stores and convenience shops, they are also starting to go online to sell products.

Despite this, most of the O2O local sellers are still relying heavily on courier delivery. It can be predicted that the O2O market will keep growing and volume of packages will surge in the coming years. Compared with E-commerce, the package traveling distance in O2O category is definitely within local areas, which is matched with the value of transit delivery. Therefore, it brings a huge opportunity to the 'mobile locker transit' concept.

# Integrating Online sales and Offline delivery

In recent years, different locally-based online platforms emerged and connected a lot local sellers with local online shoppers. However, currently there is still no player in O2O market which has succeeded in integrating online sales and offline delivery to provide a holistic experience to consumers. It is predicted that more O2O online platform giants will gradually develop offline delivery solutions and more offline seller giants will also develop online platforms in the future.

## LAST MILE COMPETITION

Last mile, which holds key to the consumer experience in parcel delivery, is where the competition is taking place right now."

In recent years, all the companies worldwide have started piloting and operating new models to make delivery faster and faster, including legacy express companies such as DHL, DPD, FedEx and UPS. At the same time, many startups have also taken on the challenge and started creating networks for peer-to-peer fast delivery, most of the them are web-based or work on mobile technology for its logistics.

Besides, for most retailers, it is not viable to build and maintain a delivery fleet since they do not have sufficient purchases. However, some large retailers do have enough online volume to justify the investment, particularly in grocery segment. Amazon has chosen to build up a fleet for its e-grocery pilot AmazonFresh and Amazon Prime Fresh.

### The market profile in China

In general, strategies of Chinese delivery companies are very unique and different from western countries. Compared with the United States, sending and receiving parcels within China can be quicker and less expensive. With the developed E-commerce and data networks in China, online orders often arrive within 2 days, even on weekends. It's also possible to send parcels across province for same-day delivery in very low cost. Many of the business models depend on partners and a large fleet of couriers who rush packages through the country and across cities, by such modes as bike, moped, subway or truck.

China's express delivery industry is characterized by extensive development mode, severe homogeneous competition, declining profitability and huge infrastructure investment.<sup>14</sup> In terms of competitive landscape, competition between major players pricks up, including EMS, SF Express, STO, YTO, ZTO, Best Express and Yunda. At present, the first echelon of the delivery industry is SF + EMS, accounting for 16% of the market share. When it comes to the second echelon, STO, YTO, ZTO, Best Express and Yunda take about 54% of the market share collectively.<sup>12</sup>

The year 2016 also witnessed the most dynamic capital activities in China's express delivery industry. A lot of those companies which find it hard to borrow money from banks turned to going public to raise funds so as to cope with challenges. For example, ZTO was listed on NYSE; YTO, SF Express, STO and Yunda Express were listed on A-share market through back-door listings utilizing Dalian Dayang Trands, Dingtai Rare Earth & New Materials, IDC Fluid Control and Xinhai Electric, respectively; Best Express and Deppon are also planning to go public.

Apart from traditional express delivery companies, a lot of big self-owned E-commerce players also developed their logistic systems and deliver their packages by themselves, like JD established its logistics company last year, Vip.com and Suning.com also operate their own fleet to deliver packages. Besides, although the biggest E-commerce giant Alibaba announced it would never enter delivery market, it still created a logistics information platform 'Cainiao' which is aiming at leveraging technologies to make package deliveries faster and more efficient.

Obviously, the fast and cheap courier delivery leaves almost no market space for platform-based peer-to-peer delivery start-ups to emerge in China. However, recent years witnessed the trend that more and more last mile package pick-up alternatives emerged in order to help non-present delivery, such as mobile locker companies and 'Cainiao' posthouse service that partnered convenience shops to help collect packages for consumers. Apart from that some consumers also negotiate later pick-ups with shops in person.

To conclude, three categories of market players have been identified in the China's last mile delivery context: express companies, package pick-up alternatives and large E-commerce players. An overview of the categories and typical market players can be found below.



### **Express companies**

In general, express companies are companies that provide domestic express delivery solutions to a wide array of customers. When it comes to last mile delivery in B2C segment, the package delivery journey starts from a certain company's local hub to end users. Normally, the last mile step is completed by couriers in China, but if end users are not present, sometimes they also get packages later on from 3rd parties.

In this category, there are two types of express companies categorized by operation models:

- Centralized model represented by SF express
- Franchise model represented by 4T1D

# Centralized model representative: SF express



SF express is a Chinese delivery service company based in Shenzhen, Guangdong Province. Since it inception, SF has continued improving its service quality, investing in facilities and vigorously developing and introducing IT technologies and equipment to realize automatic operations.<sup>15</sup> Currently, SF is the leading private express company in China, it has a fleet of 31 cargo aircraft, of which 13 are owned by its subsidiary SF Airlines.

#### **Centralized model**

SF Express operates a centralized management model and manages all streams of its value chain. It has set up over 6000 service centers covering 31 major provinces, more than 300 large and medium-sized cities and over 1900 country-level cities or districts. All of these service centers are affiliated to SF headquarter, which enables SF headquarter to manage an efficient and seamless process of warehousing, sorting and delivering.

#### **High standard service**

In most of the major Chinese cities, SF Express guarantees packages to be delivered within 24 hours. Based on its highly organized flight schedule, the company provides diversified service to customers such as "morning arrival over-night mail", "afternoon arrival over-night mail", "same day mail", etc.

SF's vision is to be the most trustworthy logistics-based business partner.<sup>15</sup> Under the guidance, SF express trains its employees in the same way in order to deliver a trustworthy service. In terms of last mile delivery, SF's service is more standardized in its 'trustworthy' couriers and symbolized fleet & wheelers. The 'trustworthy' service helped SF yield the best reviews from end users among all the private express companies in last mile delivery market, which also contribute a lot in enhancing SF's brand equity.

#### Investments on innovation

SF Express have been constantly making investments to innovate on technologies, data analytics, infrastructure, warehousing and new methods of delivery. For example, the company tested drone delivery in remote areas last year, the drone is able to hit a maximum altitude of 100 meters and deliver parcels within two meters of target destination. Besides, SF is trying to develop a longdistance flight dispatching system in order to plan and control drone's routes in a centralized approach.

#### Franchise model representative: '4T1D'

4T1D is used as a popular term to summarize another 5



big private express companies in China's delivery market which have similar business models: STO, YTO, ZTO, Best Express and YUNDA. In 2012, the five companies have 21.6 million employees in total, with annual sales of nearly 300 billion RMB, accounting for more than half of China's express market revenue.<sup>16</sup>

#### **Franchise model**

Compared with SF's centralized model, the five companies of 4T1D outsource regional business to different franchisees, and then provide assistance in personnel training programs, organizational structure management and different resources. These companies expand rapidly at an early stage, including build wide networks within the country, provide higher flexibility at lower cost, effectively manage the process and control the cost.

#### **Price competition**

Obviously, low price has always been the most competitive advantages of adopting a franchise model. Nevertheless, those companies are currently keeping fighting in an intense price competition. As a result, the average price for nationwide express has dropped significantly. The fiercest battle for orders happens in cities where the big e-commerce platforms are located. For example in Zhejiang, express companies tend to cut the prices extremely. Surprisingly, this kind of extremely homogenous and unsustainable business model is still happening, the margins did drop, but increasing business volume compensates the profit.

#### **Downsides of 4T1D**

With the rapid growth in scalability, downsides of the franchise model are getting more and more obvious: chaotic management, conflict between headquarter and franchisee, worse service standard and inconsistent infrastructure in different regions. When it comes to last mile delivery, couriers from 4T1D are recruited by franchisee and normally not being treated as official employees. They need to rush packages through different places and across areas mostly by bikes and scooters. The more packages they deliver, the more salaries they will get. Under this circumstances, it is very difficult to ensure the quality of service and security issues. As a result, the end user experience is way worse than those companies which are running a centralized model.

### Package pick-up alternatives

Due to the increasing non-present scenarios of end users which result in delivery failures, some package pick-up alternatives emerged in order to bring convenience to both couriers and end users. In essence, those alternatives are not able to eliminate couriers in last mile delivery. Instead, it serves as one more step in which couriers leave packages somewhere and end users pick up their packages later. In this category, there are 2 main types of service:

- Locker station companies which provide temporary package storage solutions to both couriers and end users by operating a network of self-service 24/7 locker stations.

- Posthouse services which build partnerships with different convenience shops to help end users collect their packages from couriers and waiting for later pick-up.

#### Locker station company representative:



Sposter, established in 2012, was currently the market leader in the locker service segment by volume. It has built up 56000 sets of locker stations, including 2.62 million of locker boxes spread out 79 cities nationwide. In 2016, the package volumes that Sposter operated exceed 1 trillion, taking more than 40% market share in the locker service market.<sup>17</sup> The estimated value of Sposter has reached 8.1 billion RMB. Nevertheless, the net profit of Sposter was -500 million RMB.<sup>18</sup> Compared with Sposter, Hivebox was established 3 years later in 2015. However, the company has been developing rapidly and the main shareholders behind are leading express companies SF express, STO express, ZTO express and Yunda express. Morever, Hivebox also joined Cainiao logistics platform and got more involved with the entire E-commerce logistics. Until now, Hivebox has built up more than 50000 sets of locker stations in more than 70 cities nationwide,<sup>17</sup> however it is also running at a heavy loss during the past 2 years.

To conclude, the locker station service market is currently under the 'investment stage' and all the companies are still relying heavily on investors. There are only 2 revenue streams which are generated from couriers and very few advertisements. On the contrary, the costs of locker stations and the operation are way more than the money charged. Indeed, the market is definitly promising in the long term but the business models are not clear and sustainable, there's still a long way to start making profit.

# Posthouse service representative: Cainiao posthouse



The service is also used for tackling the non-present delivery problems. The most typical player in this market segment is Cainiao logistics's posthouse service.

Cainiao logistics, an Alibaba affiliate, was found in 2013 to create a logistics information platform that covers express delivery, warehouse fulfillment, last-mile delivery, rural logistics and cross-border logistics to make package deliveries faster and more efficient. One of its key business 'Cainiao posthouse' is to support pick-up and return goods services for online shoppers at physical Cainiao terminals and local partnered shops. Until now 'Cainiao posthouse' service has built partnerships with all companies of 4T1D and 40,000 local stores nationwide. Apart from it, a lot of individuals also negotiate with shops in person and let them collect packages from couriers.

## A comparison of last mile solutions



To summarize, currently there are 3 main last mile delivery solutions for end users to get packages from couriers: courier home delivery, 24/7 locker service and posthouse service.

Obviously, the fastest and most convenient solution is that end users get packages directly from couriers, at the same time it is also possible to check packages before confirmation. However, delivering a huge volume of packages one by one is really of low efficiency for couriers, the failure delivery rate is also getting higher and higher since most of time end users are at home, the labor cost is high and it's hard to ensure the service standard.

For 24/7 locker service, it is highly appreciated by end users in terms of late pick-up. However, the size and volume of locker box are limited. Moreover, building up the infrastruture is limited in spacial conditions. Currently locker stations are mostly available in communities. When it comes to the business feasibility, the investments and operation costs are far surpass the revenue generated, there is no clear further value creation possibility as well.

Compared with locker service, posthouse service has a lot of more business potentials. The investment is really light and operation cost is low, those parnerted convenience shops only need to simply collect packages for end users. Furthermore, end users might make some purchases in convenience shops when they come and pick up packages. The attractiveness for convenience shops is very high which further contribute to the fast expansion of the service. However, the problems of the service are obivious. Firstly, managing different shops is hard and it's almost impossible to standardize the service quality. For end users, the walking distance to get packages is uncertain and the pick-up time is limited, sometimes the packages are randomly or even chaotically piled. The possibility of losing or damaged packages is also higher.

## Large E-commerce players

In China, most of the E-commerce players, like Taobao from Alibaba, are aiming at providing a platform to facilitate online transaction between E-shoppers and E-sellers. However, some large players also owns self online retailers and fully operate the entire E-commerce logistics. All the packages purchased in its platform are delivered through it's own logistic system. The most successful player in this category is JD.com.

#### JD.com: a holistic and efficient ecosystem

JD is currently the second-largest E-commerce company after Alibaba in China. Currently JD established a new business group called JD Logistics which took over JD's existing delivery and warehouse infrastructure while Alibaba still relies chiefly on third-party providers in logistics. Compared with traditional third party express companies which are making profit by continuously transporting packages, JD logistics is aimed at optimizing supply chain by reducing the number of delivery frequency. Currently JD logistics operates the entire process of E-commerce from sales, delivery and after-sales services, it owns 256 large warehouses, 6906 distribution stations in China. Its self-delivery service covers 98% of China's population, the cost of transporting flow decreased by 70% and logistics efficiency increased by 2 times.<sup>19</sup>

In the future, JD Logistics will focus on providing better supply chain solutions in four main sectors: (automated) warehousing, delivery, distribution and after-sale services to e-commerce sellers and other companies. The profound vertical integration of the supply chain system will allow JD.com to provide better service experiences to individuals and also attract more business partners.



## **CHAPTER CONCLUSION**

#### Time for new delivery giant to emerge

As a whole, the delivery market is China has developed drastically with a CAGR of 50% over the past six years. It is estimated that the volume of package will grow to 100 brillion in 2020.<sup>20</sup> Despite the volume of packages are surging, price per package delivery continues to fall, the sales growth of traditional franchise express companies, represented by 4T1D, started to slow down. Besides, more E-commerce giants, presented by JD.com, are graduating entering delivery market. These companies have more capabilities in integrating resources and further provide a holistic and seamless experience or building partnerships to formulate stronger networks.

In the future, it is expected that China's express industry will keep growing. State Post Bureau issued Thirteenth Five-Year Plan for Express Delivery Industry (2016-2020) in which six development targets were raised for China's express delivery industry from 2016 to 2020, one of which is to build flagship express delivery enterprises and to form three to four leaders by 2020.<sup>21</sup>

# More market space for non-courier last mile delivery

With the rapid growth of package volumes, it will become more and more difficult for couriers handle. Taking STO for example, STO employs more than 10,000 couriers and operated around 3.3 trillion packages in 2016.<sup>22</sup> The expected volume of packages to be delivered per courier is around 100 per day. As a result, human errors occur ed more and service standard undoubtedly decreased, which further resulted in bad user reviews. Indeed, couriers will continue to play a significant role, but the need for innovative last mile delivery solution, like automated delivery, is becoming increasingly demanding. Increasing labor costs will also push express companies to make more investments on innovation.

#### Demand for smarter later pick-up alternatives , but accordingly sustainable business models for longterm development lacks

In the past few years, non-present delivery drove the rapid growth of locker station service and posthouse services. Nevertheless, the potential scalability for locker station is limited by on-the-spot conditions. Besides, locker stations in communities are not enough for numerous packages either, this shared infrastructure already resulted in cutthroat competition among different couriers. Furthermore, all the companies in this market are still relying heavily on capital investments, numerous infrastructure and operation expenditures are way surpasses the small amount of money that end users willing to pay, the business model is too unsustainable to making profit. Compared with that, pick-up point solution has a lot more potential business scalability. However, due to Chinese people are already used to convenient and cheap doordoor delivery, it's extremely hard to let them accept any alternative which has limited pick-up time or inconvenient walking distance.

To conclude, providing convenience and flexibility for end users should still be the priorities in terms of innovative later pick-up solutions, but it is the business model that determines the long-term development for any company to survive in the extremely competitive delivery market.

# **USER RESEARCH**

In order to create accurate value propositions to end user, a good understanding of the complete last mile delivery context, their preferences and needs need to be further investigated. The chapter shows the insights gathered from a qualitative user research and a scenario study of future urban life.



**User insights** 

Future urban life scenarios
# **QUALITATIVE METHOD**

In order to gather both rich and detailed information from interviewees, a focussed and in-depth interview guide is of importance. In this research, the semi-structured interview approach was used, and open-ended and exploratory questions were used to gather a deeper understanding of Chinese people's perception towards last mile delivery and their future needs. A quantitative survey was not chosen for the research since this survey will not provide the rich data needed. Furthermore, the research will take a more exploratory approach, therefore a quantitative survey will not be suitable.

## **Research question**



Based on the main research question, different specific questions centre on the 3 defined sub themes were asked.

Firstly, general questions were asked in order to get broad information on how participants perceive delivery services under the E-commerce context. Further, more detailed questions about experiences on delivery services were answered by participants, including the frequency of using delivery services, general perception on delivery services, current pick-up scenarios and considerations etc. In the end, the current 'mobile locker' concept was introduced and participants were asked to make evaluations on it. The interview guide can be found in the appendix 1.

## **Participant recruitment**

When it comes to participant recruitment, online shoppers became the target group. According to statistics<sup>23</sup>, the most active online shopper groups in 2016 are people under 45 years old. Based on that, 4 groups of participant were defined and a short description of each group is shown beow:

- University students, including masters and bachelors, most of them were born from 1992 - 1999.

- Young employees who worked within 5 years old, mostly they were born from the end of 1980s to early 1990s, aging from 22 to 28, haven't got married and working hard to make a living. - Generation Y (similar to 1980s), mostly they've already settled down, got married and even have babies. Their purchasing power is high and care about product/service qualities.

- Generation X (similar to 1990s), mostly they are not very familiar with the newest E-commerce development, but still gradually getting used to and enjoy shopping online.

As a result, a total of 8 participants that currently living in tier 1 & 2 cities were recruited. An overview of participants' basic information is shown below.



# **USER INSIGHTS**



Based on the interviews, 8 summaires were made to describe each participant's e-shopping product categories, last mile package up scenario, considerations behind delivery and evaluation on ' mobile locker '. The complete results can be found in the appendix 2 and main insights will be explained in this section. Among all the general considerations about last mile delivery, package safety and completeness are perceive as basis requirements from all the participants. Apart from that the top 3 mentioned needs are speed, distance and flexibility: • **Speed:** Faster, the key of user experience in last mile delivery is the top 1 consideration on average. When it comes to generation difference, Speed is the priority for younger generations while older generations are more in favor of service quality.

• **Distance:** Distance refers to how long users need to walk to pick up their packages. The ideal situation of getting packages is door-to-door delivery, but currenlty most users need to walk a certain distance eslewhere to pick up their packages.

• Flexibility: Flexibility reflects the degree of convenience

for users to pick up packages later on, that's also the reason why a lot of later pick-up alternatives emerged. Beside, almost no partcipant accept next day delivery.

There are also some other needs mentioned during interviews, for example some participants want to get access to more processing information of delivery. A lot of participants also care about the service standard of couriers, some of them don't like to get calls from couriers when they are working busily. Another interesting insight is that ladies prefer not to meet a courier for personal safety, especially when packages are being delivered home in the evening.



When it comes to E-shopping product category, the most popular ones are daily goods, takeaway food and electronics. There are also some products that participants are not likely to purchase online: mostly for the reason of delivery speed and package safety concern.

For the clothing category, generation X & Y are more likely to make purchases online while younger generations think it troublesome to refund clothing if the size is not suitable. Another interesting insight is that young employees made a lot of more online purchases because their long working time, which makes them too busy to shop offine.



Currently, most packages are chosen to be delivered home. However, a lot of packages are delivered during daytime by couriers when users are not present. Therefore, a lot of later pick-up alternatives emerged. The most commonly used solutions are community-based 24/7 lockers and posthouse services. Based on the interviews, 3 typical package pick-up scenarios and user groups were defined:

#### **University students:**

University students are the main group which almost doesn't use later pick-up alternatives. Normally they walk for 200m to 1000m to get their packages in a service point in campus during lunch break of off hours. During the interview, both participants states that the package delivery time is appropriate. Couriers will also sort packages based on telephone number, which makes it effortless in finding their own packages.

#### **Community residents:**

For this type of user group, their packages will be delivered to community property office or locker stations, they can simply pick up their packages after daily working

### Problems in tier 1 cities' old urban areas

According to user interview, currently residents living in old urban areas, especially in megacities, suffer the most from package pick-up problems. The reasons are as follows:

Firstly, there are a lot of more separate buildings located densely in old urban areas, which makes it impossible for building delivery infrastructure like locker stations. Secondly, even for some communities, the spacial which is more convenient and safer than posthouse services, but there are still some problems about locker stations:

• locker stations: Currently, locker stations are more available in some communities and sometimes the locker volumes fall short of demand. Furthermore, sometimes couriers just drop packages in locker stations without getting permission from end users, sometimes even without sending a notification.

#### Non-community residents:

For this type of user, mostly their packages are chosen to be delivered to convenience shops, after daily works they need to walk for an uncertain distance to pick up packages, the problems of such a service are:

• **Posthouse services:** Firstly, the opening time of convenience shop is uncertain. Furthermore, those shops don't have the responsibility to take care of packages, resulting in customers feeling unsure. Moreover, sometimes customers also need to search for their own package in piles of packages.

conditions are also limited and daily operation cost are very high as well.

Another interesting insight is that the most active online shopper generation, which is young employees, prefer to live in megacities' old urban areas. They made a lot of online purchases but they are still suffering from inconvenient package pick-up problems.

# **FUTURE URBAN LIFE SCENARIOS**

Taking one step further, it is also beneficial to envision the future urban life scenarios on the revolutionary mobility context. During urban life, where, how and in what way urbanists will get their packages in the future will definitely capture opportunities for 'mobile locker' service and even 'Autolivery'.

#### Methods:

In this section, 4 scenarios of ubran life were portrayed. In each scenario, firstly a living situation was briefly

### Conclusion

With the evolution of new technologies and social trends, people are getting more and more used to shared transportation system. There will be more shared ondemand solutions provided to fulfil their mobility needs. In terms of delivery, there will also be 2 main trends:

#### Shared delivery infrastructure

Undoubtedly, people will be more conscious of sustainability issue, this is also one of the core values of sharing economy which makes full use of resources. Therefore, more and more shared infrastructure will be built.

#### Customized but efficient on-demand delivery

For on-demand delivery, new technologies like drone delivery will be able to fulfill people's personal and customized needs. Nevetheless, it would still be complemented with more effcient delivery infrastructure. A good example is exactly the 'Autolivery' concept, which is automated vehicle used for mass delivery and a drone completes final leg of last mile delivery. introduced. After that, an envisioned one-day journey includes a series of activities starts from getting up to going to bed was shown. During every activity, different user needs and values which are relevant to mobility or delivery were marked with a red dot. For any of them which will potentially bring opportunities to the 'mobile locker' concept, a green dot was also marked. Also, blue dots were used to mark the potential locations where a mobile locker is needed. The 4 scenarios can be found in the appendix 3.

#### For mobile locker service

Normally, users only need their packages after daily working, so it makes no difference whether the packages to be delivered in the morning or afternoon. As a result, the most appropriate package pick-up scenario is that users get their packages right before backing home. Therefore, the smartest solution for mobile locker service is to choose a public site which is close to their living places, for example:

- Metro station, bus stop
- Other public transferring sites

Apart from that, there are some other sites that people frequently stay or appear for mobility/travel reasons could also be the possible locations for building locker stations:

- Teaching building, office building
- Other public sites with large people flow
- Train station, airport

# SYNTHESIS

In this chapter, you will find a detailed explaination of different stakeholders of Ford towards the mobile locker service. The chapter concludes with a design challenge and a long-term vision that will serve as the guidance for the design phase.

> Stakeholder analysis

# Design challenge

Long term vision

auzab.

House parking is exp

# STAKEHOLDER ANALYSIS

Based on the previous market analysis and user research, a stakeholder analysis was conducted to define different stakeholders and their needs in the potential mobile locker service picture. As a result, there are 3 main categories of stakeholders of Ford: end user, client and partner.

# **END USER**

According to the user research, I found that people living in the old urban areas, especially in megacities, are suffering the most from inconvenient package pickup solutions. The separate buildings are densely located and there are very little spacial and financial conditions to build permenant locker stations. As a result, most of the end users have no option but to use the posthouse service to get their packages later, even if they are actually quite skeptical of the it. Besides, another fact is that a lot of young employees living in old urban areas made numerous online purchases, which even makes the market more promising.

Therefore, the definition of target end user for the potential mobile locker service is:



Urbanists, especially young employees who live in (megacites)'s old urban areas and suffer from inconvenient package pick-up alternatives.

## **User needs refinement**

In order to find out unique values of the 'mobile locker service' for end users, an evaluation of how user needs are fulfilled by different package pick-up alternatives was conducted to explore design opportunities.

In the evaluation form, all the user needs gathered from previous user research are listed on the left column. Next to it are four pick-up solutions:

- pick up from couriers
- community locker
- initial mobile locker concept
- convenience shops (posthouse service)

In the process, 4 criteria(fulfiled, halfway fulfiled, not fulfiled and not relevant) were used to evaluate the extent of how each specific need is fulfilled. In the end, key insights were drawn below:

	To what extent are	To what extent are user needs fulfilled by different pick-up solutions ?				
	User needs	Courier	Community locker	Mobile locker	Convenience s	hops
	Faster delivery	?	?	?	?	Fulfiled
How to	Flexible pick-up time		<ul> <li>Image: A second s</li></ul>	×	<b>A</b>	
differentiate	Less walk, shorter dis- tance	~	<b>*</b>	~	*	St.
<b>'Ford</b>	Door-door delivery	× .				Halfway fulfiled
mobile	Package completeness/ safety	<b>A</b>	•	<ul> <li>Image: A second s</li></ul>	*	
locker	Possibility of inspection	× .	×	×	×	X Not fulfiled
service'	Precise arrival/pick up time	×	×	<ul> <li></li> </ul>	×	
from other	Easy pick up: no waiting, no chaotic package	× .	<ul> <li>Image: A second s</li></ul>	<ul> <li>Image: A second s</li></ul>	<b>*</b>	?
last mile	Don't like next day deliv- ery		×	×	×	Not relevant
delivery	Polite service in picking up	×	?	?	*	
services?	Personal safety	<b>A</b>	<ul> <li>Image: A second s</li></ul>	<ul> <li>Image: A second s</li></ul>	<ul> <li>Image: A second s</li></ul>	Distinctive quality
	Precise tracking	×	×	×	×	
	Transparent processing: es- timated info, where&when	×	×	×	×	
	Cheaper delivery	?	?	?	?	Opportunity



### Distinctive values of mobile locker service

#### **Definition:**

Distinctive values reflects mobile locker's potential competitive advantages which are expected to differentiate it with other 2 later pick-up solutions.

#### • Effortless on your route:

As the walking distance of getting packages holds the key of user experience, the service points of Ford mobile lockers have to be appropriately chosen to fit end users' daily journey. In this way, a real pass-by and effortless pick-up experience will be achieved. From the previous research, there are some possible locations to choose: metro stations and bus stops.

#### • Worry free: safer packages:

Currently, couriers need to sort packages, load them into wheelers or transits and do last mile delivery one by one, the possibility of losing packages is high. When it comes to mobile locker service, if packages could be directly loaded into transit at hub, package safety and completeness will be significantly enhanced. Also, human errors will be decreased significantly as well.

#### • Feeling in control: pre-decided time & location

As one participant mentioned in the interview, he was annoyed by courier's call during busy working hours.

# Possible values of mobile locker service

#### **Definition:**

Possible values stand for the user needs that haven't been fulfilled by any later pick-up solutions, they could be added values of mobile lockers service but not priorities.

#### • Possibility of package inspection:

Currently most end users do not have the possibility of inspecting packages because of later pick-up. Indeed, damaging problem doesn't happen very often, but once it happens, it's really complicated for end users to claim the possibility, which potentially result in a huge user insatisfaction or even bad social influence. Besides, this is also the biggest reason why very few consumers are willing to purchase expensive products online.

#### • Better interaction in package pick-up

Compared with courier delivery, the service of automatically picking up packages from lockers is more standardized, but the interaction could be optimized to make it more user-friendly.

#### Access to more processing information

The value is cohesively connected to the need of feeling in control. End user not only hope to pre-decide the package arrival time, sometimes they also want to get more access to delivery processing information. Indeed, last mile delivery is just one part of the entire E-commerce delivery, but it is suggested mobile locker service can orchestrate with the whole system and altogether create a holistic and transparent information flow for end users.

Users care about what time and location their packages will be delivered but don't want to be bothered. Therefore, pre-decide solution is of great value in providing the incontrol feeling.

# PERSONAS

Based on the user research, a total of 3 personas were portrayed. In each persona, firstly a short description of the personal profile and living situation are introduced, then the current package pick-up situation was explained. Subsequently, a scenario of the daily journey is shown below. Besides, some possible locations for them to get packages are marked with asterisk.



Ming

Accounting consultant Age: 24 City: Beijing Ming received his bachelor degree in Peking university and got his job in Beijing in 2015. In order to live closer to the company he is working for, he rent a shared-house with another two graduates in the old areas of Beijing. Living in this tier 1 city gives a lot pressure to young employees and everything is quite expensive. Ming works very hard and long everyday. Every morning he walks 500m to the nearest metro station before 9 am and spends another 30 minutes to work. Normally he finishes working at 7 pm and take the same route back home at 8 pm, sometimes even work overtime untill 10 pm.

Ming almost buys everything online, when his packages are being delivered home in the afternoon, he always gets a call when he is busy working, he needs to explain to the courier to give the package to the staff at community parking lot. After a tiring working day, he will walk 200m extra to get his package and pay 2 RMB temporary storage fee to the parking lot staff, sometimes he also get his package next day if he doesn't need it at once.





**Tingting** Civil servant

Age: 43 City: Beijing

Tingting has been working for the government for over 20 years. She's already quite used to living in the crowded old urban areas of Beijing with her husband, even if the separate apartment they're living is quite old and the environment is quite noisy, but there're a lot shops which makes daily life quite convenient. Tingting has a very regular life, every morning at 8 am, she only needs to walk 2 minutes to take the metro and transfer to take bus to work. She takes the same route back home after working at 5 pm. When she gets home, she can simply do groceries downstairs and prepare dinner for her family.

Tingting always tell couriers to temporarily store her package in the restaurant downstairs her living building, but lately she is getting more and more unhappy about it. Since the volume of packages is surging, she needs to spend some time searching in piles of packages when the restaurant is busy during dinner time. Sometime her package is a little damaged, even with some oil on it. She also heard that one of her neighbors lost his package and got no compensation, because both the restaurant and courier shirked responsibilites.





**Jlali** Bank clerk Age: 32 City: Shanghai

Jiali is currently working for an international bank company in Shanghai. As one member of the real white-collar class, she lives in a very nice community and works in a big office building. Everyday she only needs to go downstairs at 9 am and take 10 minutes bus to work, sometimes she uses the shared-bike system and cycling to work. Normally she finishes working at 6 pm and have dinner with friends in some nice restaurants or have fun activities in plaza.

She buys a lot of stuff online, such as high-end cosmetics and electronics. Normally her packages are delivered to community property department/locker stations, sometimes to office building desk as well. However some problems still occured. When the locker is full, couriers sometimes leave her package on the ground which is very rude and unsafe. There was one time that the courier just directly put her packages into lockers without getting her permission and forgot to send her a notification, she found nowhere to get her package. She really cares about service quality, but the service operation is getting a bit chaotic.



# CLIENT

As explained in the previous market anlaysis chapter, '4T1D' companies altogether take more that half of the market share. However, those companies are highly homogenous and still relying heavily on labors. The margins actually dropped and the profit were compensated from increasing parcel volumes. Therefore, 4T1D companies will be the client of the potential mobile locker service. The definition of client and a detailed summary of the bottlenecks in last mile delivery are shown below:

4T1D companies which rely heavily on overloaded couriers in last mile delivery.



#### More automation

Currently, couriers are fully responsible for the last mile delivery from hub sorting, unloading and delivering. With the labors costs are keep increasing, automatic solutions are getting more and more demanding.

#### Deliver more packages efficiently

In 2016, parcel volumes reached 31.3 million.<sup>24</sup> Delivering packages one by one by tons of couriers will become more and more unrealistic. How to deliver more packges efficienlty becomes one of the most thorny issues.

Obviously, most of the problematic packages in last mile delivery resulted from overloaded couriers. The expected volume of packages to be delivered per courier is around 100 per day, it's evitable that sometimes they lose or damage packages.

#### Improvement on after-sales service

Bad customer reviews often come from problematic after-sales service. Most of the time, end users find it hard and complicated to claim the responsibility and interact express companies to tackle problems.

# PARTNER

Firstly, as one of the leaders in automotive industry, Ford's main strength is still developing and manufacturing vehicles instead of providing services. Moreover, as China's last mile delivery market is too competitive and unfamiliar for Ford, it is not advisable to directly enter. Therefore, buiding partnerships with experienced domestic market players and altogether provide the service would be a smart solution.

Obviously, mobile locker and current 24/7 locker fall into the same service category. Nevertheless, the market of the 2 service is actually complementing each other instead of contracdicting. For the 24/7 locker service, currently a lot of locker companies are striving to build locker stations in different communities, but there are still a lot of existing sites where no conditions for building locker stations, for example the previously mentioned old urban areas. Undoubtedly, locker station companies are extremely interested in this untapped market segment but they are not capable of. Under the circumstances, mobile locker transit will be the perfect solution to bridge the gap by making the locker station mobile. Therefore, it brings huge potentials for Ford to build partnerships with locker station companies.

The definition of partner is:

Locker companies which are interested in the untapped old urban areas in last mile delivery market.

# **DESIGN CHALLENGE**

Based on the stakeholder analysis, the design challenge is formulated:

We want to collaborate with locker companies to provide a more efficient, effective and automated last mile delivery solution for Chinese express companies to deliver more packages to urbanists, especially young employees who live in (megacites)'s old urban areas and suffer from inconvenient package pick-up alternatives.

# LONG TERM VISION



### From E-commerce last mile delivery to local O2O service

Indeed, entering the E-commerce last mile delivery market should definitely be the first step, but the local market still has a lot of more untapped value in future urban life. With the cost of running physical store is increasing year by year, the willingness for local shops to enter the O2O market will also increase. At the same time, currently there are already some successful locally-based online service platforms which help local shops sell products online, but there is still no corresponding local delivery service provider succeeded yet. For mobile locker transit itself, firstly it is capable of managing short distance fast delivery within urban areas. Moreover, it can even serve as a retailer which entains warehousing, promoting, selling, experiencing and other functionalities. Therefore, it is highly recommended to have a vision of diving deep into local offline delivery market. Furthermore, it would be the best if a self-owned online platform could be developed to complement online part and altogether create a holistic O2O service

# **BUSINESS MODEL IDEATION**

In this chapter, 2 creative sessions which are focussed on business modeling were conducted to explore the business potential of the mobile locker service.



# METHOD

Based on the design challenge, a business model ideation study was conducted in order to investigate innovative and disruptive business models that justify the feasibility of implementation on China's business context. The starting point of the study is to investigate revenue streams and relevant stakeholders meanwhile also radiating on exploring innovative propositions for the future.

In the study, two generative sessions were conducted guided by a combination of 'iCPS" theory and 'business modeling triangle' theory. The session guide can be found in the appendix 4.

# iCPS theory: integrated creative problem solving

iCPS is a Delft-Faculty of Industrial Design Engineering based approach introduced by Jan Buijs, Frido Smulders and Marc Tassoul. It is seen at its best in the organized and smooth running of creative sessions. The organizer, a specialist whom we call the creative facilitator, uses creativity techniques with a group of professional volunteers immersed in a process of generating new and original ideas and to transform them into implemented solutions of a serious problem.<sup>25</sup>

The basic iCPS module can be seen with a short explanation of each step.

- Task appraisal: investigate what the task is, how is it related to other tasks, what needs to be changed to the task and when the task is complete.

- Divergence: generate ideas as many as possible required to deliver the task.

- Clustering: categorize different ideas into a small number of coherent groups and give those clusters inspiring names.

- Convergence: evaluate, judge, select and develop the most original ideas.

- Reflection: reflection on the quality of the execution of this task at the result, the process, the presentation and the personal side of all.



#### **Business modeling theory**

The definition of a business model is "an overarching concept that takes notice of the different components a business is constituted of and puts them together as a whole." It serves as a blueprint of how a company creates and captures value.<sup>26</sup>

A business model is the magic of how a business works,

based on its individual bits and pieces. A business model must answer four associated questions: (1) who is the target customer (2) what do you offer to the customer (3) the value chain behind the value proposition (4) the revenue model behind. These four associated questions are combined and form the business model triangle.<sup>26</sup>



### Combination

When it comes to the two generative session I conducted, iCPS module was selected to be the basic running process with 16 selected business model pattern cards used as designated stimulus. During the process, some steps were customized in order to better fit the focussed objective of business modeling. The main changes are shown below:

• Instead of solving a problem, the theme of my session is focussed on exploring business opportunities of the mobile locker concept which has clear target users and user value propositions.

• Before starting generative sessions, the business model

theory, a successful business model example, current China's delivery business model and context behind were briefly explained.

#### • Task appraisal:

- The task of problem re-construction and re-definition was mainly finished by facilitator in preparation stage.

- For participants, task appraisal is transformed into task sensitizing. More specifically, sensitizing was used to help participants to get the first understanding of the 2 associated questions of business model triangle for the concept:

- How: possible value chain behind the value proposition

- Value: possible revenue models behind

#### Divergence

In the diverging phase, 8 business model pattern cards were used as stimulus to spark out-of-box idea generation. Adopting business model pattern cards is similar to using random stimulus in traditional creative facilitation session, but the difference is that those cards were carefully preselected.

#### Convergence

Compared with traditional converging phase, one more task was added, participants were asked to complete the 4 four elements of a consistent business model after idea elaboration.

#### • Iterations & Synthesis

Iterations were made by myself after conducting two generative sessions. Later on, I synthesized all the relevant ideas and further developed them into business models.

# PREPARTION

#### **Business model pattern cards**

Re-combining existing concepts is a powerful tool to break out of the box and generate ideas for new business models.<sup>26</sup> To ease this process, Gassman condensed 55 patterns of successful business models. Firstly, I reviewed all the patterns from Gassman and also investigated other 48 business model defined by 'Business Makeover'<sup>27</sup>. Furthermore, based on all the patterns, I filtered the overlapping patterns and combined similar patterns. Lastly, 16 pattern cards were carefully selected and made for my sessions. Each pattern card contains the essential information of a specific business model and a concrete example of a company successfully implementing it. One example of business pattern card is shown below.



#### • Principles of card selection:

#### - Similar to the current delivery industry logic

This type of business model pattern has high level of feasibility to be implemented, but details need to be elaborated, especially in user perspective.

#### - Confrontations and more distant patterns

At first glance the cards might seem unrelated to the problem, however, asking participants how the pattern would change the delivery business business might cause innovative ideas to emerge. Besides, there is another possibility that participants might come up with new needs and value propositions inspired by confrontations.

#### - Revenue oriented

Since value propositions and target user of my concept were defined in advance, exploring more on potential revenue streams and accordingly stakeholders accounts more, this was also being taken into consideration when selecting pattern cards.

#### **Participant recruiting**

In order to overcome the dominant industry logic and spark out-of-box thinking, the main principle of participant recruitment is involving open-minded team members that are outsiders from delivery industry. The second principle is that participants need to have some experiences of China's last mile delivery. In other words, they should be online E-shoppers in China. In the end, 4 Chinese 1990s that are currently living in the Netherlands were recruited for each generative session, they were previously living in tier 1&2 cities in China, currently ranging from 22 years old to 27 years old.

# **BUSINESS MODELING SESSIONS**

## Context introduction: (10 min)

#### • Introduction of Business model triangle (3 min)



An successful example: Expresso (2 min)



• Introduce current delivery business model in China: 4T1D companies (2 min)

### Task sensitizing: Flower association (10 min)

• Firstly, 'Stakeholders' and 'Make money' were selected and written on 2 separate A0 sheet as the

theme for participants to think about associated roles and ideas.



• Ford mobile locker sevice concept: description (3 min)

- Who: people living in old urban areas where no locker stations were built and posthouse service is inconvenient

#### - What:

- Effortless pass-by package pick-up
- -Safe and complete package during delivery
- Feeling in control: customers decide arrival time and location
  - Inspection and directly return problematic packages

#### • Make money: (5 min)

- How and to whom charge money? (5 minutes brainstorming, post- it)

- Who will be likely to fund the service?



#### Stakeholders: (5 min)

- Who and which companies or organizations will potentially or possibly be involved in the big service system?

- Who and which companies or organizations will potentially or possibly influence the big service system?



### Divergence: (40 min)

In this phase, a brainstorm method was used to encourage participants to generate ideas as many as possible. There were 8 rounds and each round lasted 5 minutes. During each round, a business model pattern was handed out to participants and they were asked to write down ideas on post-its.

- First minute: participants read the pattern card
- 2rd 3th minutes: Ideation on similarities:

- If you are asked to apply this pattern to the mobile locker concept, what will you do?

#### • 4th - 5th minutes: Ideation on confrontations

- If it's totally different, How to translate it or will the difference spark you to overcome the problem?



### Clustering: (10 min)

In this phase, all the post-its were mapped and clustered. After that each participant was asked to select 2 ideas: one for business feasibility and another one for novelty. Further, 8 ideas were clustered and combined. In the end, 4 clusters were selected for further development.



#### Convergence: (10 min)

In this phase, firstly 4 participants were divided 2 sub groups. Each sub group was asked to detail 2 concepts and then complete business triangle. During the process, the internal & external consistency among 4 business triangle elements were treated as guiding principle.



#### Evaluation (15 min)

In this phase, each sub group got 5 minutes for presenting their final concepts in a business story-telling way. After that 2 rounds of Q&A completed the session.



# RESULTS

In total, 16 different business pattern cards were used in 2 generative sessions. In the end, 8 complete concepts were generated by 8 participants. Afterwards, I did self-Iterations by putting together all the raw data gathered from the 2 sessions for synthesis.

Firstly, I listed all the 'stakeholders' and ways of 'make money'' that were written by different participants.

Subsequently, I mapped all the ideas, re-did the clustering phase and converging phase. In the end, more concepts were generated by myself in a more business model expert perspective.

Based on the synthesis from participant input and self iterations I found a lot of new insights. In this section the main results and categories were explained.



### **Revenue models**

A revenue model is a framework for generating revenues. It identifies which revenue source to pursue, what value to offer, how to price the value, and who pays for the value. Based on previous clusters, payer and revenue media were defined.

#### Payer



The definition of 'Payer' is individuals or organizations that will possibly fund the 'mobile locker' service and contribute to revenues. There are 3 main types of payers: End customers, Companies and Public-related organizations.

**Locker boxes** 

**Locker stations** 

The definition of 'revenue media' is the physical carrier of possible revenues. Each 'revenue media' is an object which has different functions and qualities that supports delivering value propositions, it also further contributes to revenue generation directly.

### (Unloaded) transit itself

There are 3 main categories of revenue media: locker boxes, locker stations, (unloaded) transit itself. For each revenue media, an overview of what value propositions it entails was explained subsequently.

## Value propositions

• Value propositions of locker boxes:



- Storage: locker box functions as a space for temporary storage to generate revenues, for example end customers pay for last mile delivery storage and companies pay for distributing promotional samples/ads into locker boxes.

- Exchange/Share/Sell: Apart from traditional last mile

delivery storage use, locker box also functions as a small marketplace for individuals to exchange/rent/sell their stuff, for example peer-peer stuff sharing in communities.

#### • Value propositions of locker stations:



- Mobile retailer: Instead of simply composed of different units of locker boxes, the interior space of locker station could be somehow customizable. In this way, it could function as a mobile retailer which enables the possibilities of display, promotion, experiences and sales for different companies.

- Surface promotion: Locker stations are supposed to be exposed in public whenever it stays at service points or the transit is running on the streets. In this way, the surface

## Conclusion

In the end, several possible business models were generated based on different value propositions, payers and related stakeholders. The complete business model clusters can be found in the appendix 5. However, not all of them are appropriate for mobile locker service and some of them even generated learnings for future business. In the end, 3 main categories of business model were selected for the 'mobile locker' service:

• Provide locker boxes to end users, revenues are generated in the way of 'pay per use' and 'subscription'.

of locker station could be used for promotions.

#### • Value propositions of (Unloaded) transit itself:



- Transporting: When locker stations have been unloaded, the back of transit could be used for other transporting use.

-Back promotion: the back side of transit could be used for promotion when it's running on the streets, for example with a big screen serves as a moving cinema.

- Carry people: The back of transit could also be used for carrying people, for example tourists city tour, school bus or commuting transit.

• Make full use of transit by sharing it with 3rd parties or functioning as a mobile promotion carrier.

• Collect end user data through locker boxes and prepare it for interested 3rd party companies.

In the next chapter, appropriate business models with detailed descriptions will be shown in a roadmap to explain business opportunities of different services.

# ROADMAP

In this chapter, a detailed roadmap was developed to make strategic plannings for the 'mobile locker service' to evolve from E-commerce delivery market to local O2O market. An elaborated service brief and 2 service concepts will be explained step by step through 3 horizons.

Roadmap

Horizon 3

Horizon 1

Horizon 2

# ROADMAP

In order to create a sustainable and promising business based on 'mobile locker transit' for Ford to enter China's delivery related market, a roadmap was used to support integrated strategic planning and innovation. In the roadmap framework, a coherent and holistic structure (a common language) within which the development and evolution of the business or system and its components were explored, mapped and communicated.<sup>28</sup>

The roadmap framework is comprised of two key dimensions:

#### • Timeframes: the horizonal axis

It the roadmap, the 'Three Horzons model' <sup>29</sup> was used to capture potential opportunities and link futures-thinking to processes of change for growth in the short-, mediumand long-term perspectives.

When creating a roadmap, for most firms a horizon of 10 years is appropriate.<sup>28</sup> However, since the delivery market is China is evolving extremely fast, the timeframe is created with 5 years and up to 2022. This is also in line with what Ford self wants, which initiates from a frugal 'mobile locker transit' version to quickly enter the market. At the moment Ford aims to tackle the last mile problem in China but the roadmap also shows the road towards the transition from E-commerce last mile delivery market to the more promising local Offline-to-online & Peer-to-peer market in the future.

In the 5 years' timeframe, the diagram models three separate "horizons" of growth, with time along the x-axis, and fit for purpose along the y. By using it as an analytical tool for understanding how change could happen, a holistic view of the present moment, upcoming propositions, the preferred future, and how we might facilitate movement from one to the other were shown in the Three Horizons format.<sup>30</sup>

#### • Layers: the vertical axis

It represents by a system-based hierarchical taxonomy, which includes different levels of details

- Market
- Business model
- Product/Serivce
- Technology
- Resource









#### Horizon 1: E-commerce last mile delivery

Horizon 1 in this model is characterized by the dominant mode of the prevailing system - it is the world of 'business as usual' <sup>29</sup>.

According to the initial ojective of developing mobile locker concept, the service in horizon 1 will be the frugal version for Ford to quickly enter the delivery market in China. By collaborating with locker station company Hivebox and Logistics platform Cainiao, it is expected to drastically improve the last mile package pick-up situations for urbanists.

# Horizon 3: Self-owned cross community local O2O services

Horizon 3 represents ideas of transformative change that are emergent but marginalized in the present, and hold the potential to displace the current paradigm of the First Horizon.<sup>30</sup>

As time progress and the external environment evolves, local O2O market will be the dominant market. Eventually, mobile locker transit will orchestrate with a self-built online platfrom to provide a holistic O2O service for both local residents and local shop & peer sellers.

# Horizon 2: Community-based offline delivery

In order to achieve the goal of horizon 3, horizon 2 will be used to inhabits the collision space between Horizon 1 and Horizon 3. When the E-commerce last mile delivery service of Horizon 1 has been proved successfully, a large amount of community-based users will be accumulated. Consequently, a community-based offline delivery service will be developed as an intermediate step to make transitions from E-commerce market to local O2O market, it bridges the present and the future. By using mobile locker transit as an offline moving marketplace, it facilitate stransactions between residents with shops that are in the same community.

### Expected change of public acceptance

Throughtout the 3 horizons, a few steps will be taken to guide both end users and sellers to accept, get used to and adhere to the new 'mobile locker service'.

In horizon 1, as a 'new to the world' concept, the priority for mobile locker service is to create public awareness and attention by placing locker stations at different public service points. During off hours, end users(online shoppers) pass by service point and pick up their packages. In this way, a new way of later pick-up habit will be cultivated. From horizon 2 onwards, the service starts to establish linkages with local shops and new end users(local residents) and cultivate the same habit as well. After that the market is expected to continously grow. Thanks to the previously built customer relationships and gathered data from both end users and local shops, a new online platform will be eligible to be built. Ultimately, self-owned integrated O2O services will be developed to retain customers, attract new customers and build more cohesive customer relationships.

#### • E-commerce delivery

The E-commerce last mile delivery market will fully be the target market and grows significanlty in horizon 1. Before launching the service in 2018, several preparations need to be made in advance, for example build partnerships and manufacture mobile locker transits. At the beginning of 2018, it is recommended for Ford Shanghai APA team to start piloting the service. After that the service is expected to be implemented in the old urban living areas of the 4 main cities: Shanghai, Beijing, Guangzhou and Hangzhou. According to statisics, these 4 cities are ranked in the top 5 cities by yearly parcle volume. Another city Shenzhen, which is also ranked in the top 5 cities, is excluded due to almost no old ubran living areas.



From horizon 2 & 3, the service coverage in the 4 cities will be continuously and steadily expanded to other living

areas and other people densed areas. At the same time, the service will penetrate to other tier 2 cities as well, starting from old urban living areas and expand to other living areas as long as the pacel volume for each transit is able to justify financial feasibility.

#### Local O2O market

From horizon 2 onwards, the target market will be immigrated to local O2O market and significant growth will be made. By building partnership with the locally found consumer products platfrom 'Meituan', a community-based offline delivery service will be launched which connects consumers with shops nearby. Compared with horizon 1, all the residents will benefit from the service instead of only online shoppers be the target end user.

After the community-based O2O service in horizon 2 is proved successfully, the service coverage will be expanded to more local areas in horizon 3. In order to provide greater purchase choices for end users, a self-owned online platfrom will be built and all the users and seller will be immigrated from 'Meituan'. As a result, the boundaries between different areas will be erased. In addition, peer to peer sharing/purchase will be launched in horizon 3, being another important part of local O2O services.
## **Business model**

For the last mile delivery market, 'pay per use direct selling' business model will exist for the whole 5 years to generate revenue from E-shoppers. 'Public promotion' business model will be implemented from the beginning to create social awareness, but it will gradually fade away and vanish at the end of horizon 1. 'Shared bike coopreation' business will also be implemented from horizon 1 and vanish at the end of horizon 2.

For the local O2O market, 'two-sided market' business model will be implemented from horizon 2 and increasingly generate revenues from local residents and sellers. From horizon 3, 'subscription & freedmium model' will be implemented to create a more stable revenue stream from local residents.

With more and more customer data being gathered from both E-commerce segment and O2O segment, 'leverage customer data' business model will play a vital role in generating the largest part of revenue from 3rd parties.

The details of business model will be well explained in the next sections horizon 1, horizon 2 and horizon 3.

### Resource

#### Ford APA team & Ford plants in China

In terms of the NPD In the upcoming 5 years, Ford APA team will be important human resources and fully responsible for the growth of mobile locker service. To make the right decisions as to the choice of necessary expertise and resource priority in the future, Ford APA team can make use of the flexibility within the roadmap and the fact that it is an iterative process. When it comes to transit development, Ford already operates some transmission and assembly plants in China, which will make it viable for mass manufacturing and assembling locker stations. market, it's essential to build partnership with Cianiao logistics. In 2016, Cainiao logistics formed an alliance with delivery-related companies, for example the the 5 biggest express companies '4T1D' and locker station company 'Hivebox'. At the moment, more than 70 percentage of E-commerce delivery data are controlled by Cainiao logistics.





In order to enter the E-commerce last mile delivery

In the mobile locker service, Cainiao will be responsible for analyzing and deploying data, for both improving the entire E-commerce delivery process and leveraging customer data for revenue generation.



#### Hivebox: service operator

When it comes to service operater, as mentioned in previous chapter, building strategic partnership with locker companies would be the best option, not only because they have already had a lot of experiences in operating community locker stations, but also old urban areas are the market they're interested but not capable of.

Among all the locker companies in the market, Hivebox will be the perfect partner since it is indeed founded by the client of the mobile locker service, which are some leading express companies. Being the service operator, Hivebox will be responsible for driving transits to collect packages, unloading locker stations to service points and collect them back to fleet center.

# Technology

#### Ford consolidated manufacturing

Before launching the service, firstly the new designed tranist needs to be manufactured. Thanks to the significant progress made on consolidating platforms. Currenlty Ford's 27 platforms were consolidated into 9 global platforms which to a large extent enhanced manufacturing capacity.

#### Data analysis by Cainiao

In terms of the mobile locker service of horizon 1, before packages depart, firstly data statistics about package sizes and volumes will be firstly put into Cainiao's database, further be analyzed in order to provide estimated

#### Customer data gathered

In horizon 1, data of online shoppers will be gathered. In horizon 2, data of residents will be gathered and relationships with shops will be built. All the data will be used to develop a self-owned online platform.

#### Investment on self-owned local distribution center

As the coverage of the service will be expanded to all local areas, transactions and delivery between different areas will become reality. Therefore, a self-owned local distribution center needs to be built. It will be used for sorting packages from different areas, consolidate and ultimately deliver to different destination service points.

information for different stakeholders. For end users, realtime package tracking information will be prepared and accessible. When it comes to last mile delivery stage, package statistics will be used for making flexible transit arrangements to collect packages from different hubs. The details of this part will be well explained in the service pathway of horizon 1 section.

#### Smart scanning system & Advanced load analytics

The smart scanning technology supported by Cainiao will be used to measure sizes and weights of different packages before departure. In the last mile delivery stage, advanced load analytics will be used to make maximum volume arrangement of packages. When the analysis is finished, the system will match each package with an appropriate sized modular locker box. In the end, different locker boxes will be assembled into a locker location, which to the largetest extent enhance the transit volume efficiency.

#### • Locker station management & Transit maintenance

When it comes to mobile locker transit, Hivebox will be more responsible for the locker station management, especially in terms of digital system service interface with end users, while Ford will be more responsible at maintaining transit and distribution system.

#### • Data anlaysis & Mobile payment by Meituan

In horizon 2, 'mobile locker' delivery will become the new delivery option for community-based service on Meituan's platform. Meituan's data analysis and mobile payment help in connecting end users with local shops.

#### • Platform development

In order to provide self-owned O2O services, a new online platfrom, including self mobile payment needs to be developed by Ford and Hivebox. Based on all customer data gathered from previous horizons, it would become easier to make customer immigrations.



# **HORIZON 1**

' Mass delivery with little effort '

' Ford mobile locker service ' is an effortless package pick-up service in last mile delivery that powered by the alliance consists of Ford, Hivebox and Cainiao logistics. It manages to help China's express companies to deliver more packages in a more automatic, efficient, effective, and safer way to end users who suffer from inconvenient package pick-up situations.

The service will firstly be launched in megacities' old urban areas where less delivery infrastructure were built.



# **Product design brief**

In this section, a product design brief will be well explained to guide the new transit development. To summarize, all the needs of both users and clients that gathered from previous research were categorized into 3 categories for provding design suggestions: mobile locker transit, digital system, the whole system.



# USER NEEDS

# Mobile locker transit

Currently, a lot of locker stations have already been built up and put into use in different communities. In the previous mobile locker transit design brief, the main task is to design locker station with automatic vending machine functionality. In this part, an initial study was conducted to analyze the differences and added values.

?	Current ordinary locker for last mile delivery ?	Locker with vending machine functionality ?	
Developing cost	Low	Link	
Developing cost	LOW	nign	
Operation cost	High	Low	
Volume efficiency	Low	Low	
Who will benefit from it?	End-users	Not acceptable for end	
	Express companies	users	
		Express companies	
Single package delivery time	< 3 seconds	60 seconds	
Package pick-up doors	1 package with 1 door	1 - 2	
	Contradicting to user needs		

• Current ordinary locker:



As one kind of complementary alternative for courier delivery, the mainly used locker station is a 'real minimal viable product', the only functionality is to temporarily store packages. However, the advantages are obvious, the investment of the locker station is not high. For users, normally both couriers and users only need to fill in a passcode on the screen panel to unload or get packages. Moreover, the waiting time is also very friendly because each package is been stored in specific locker box.

The disadvantages are also obvious, the operation cost of locker stations is high, firslty locker station companies need to build partnerships with communities and find a room to place locker stations. Once a locker station doesn't work properly, it's also complicated to do the maintenance. Besides, there are only 2 or 3 types of locker boxes, most of time the volume efficiency utilization is really low.

#### • Locker station with vending machine functionality:

If Ford decides to develop the whole locker station with vending machine functionality, the developing cost will be much higher than current ordinary locker station. When it comes to volume efficiency, there wouldn't be obvious improvements since there are still 3 types of locker box sizes. Last and the most important is that the mechanism of the vending machine functionality is contracting to user needs. The single package delivery time is too long to be accepted by end users. Besides, single or double package pick-up doors take a huge amount of time for hundreds of packages to come out which will potentially results in a long waiting line.

#### Conclusion

To conclude, a combination of current locker station with distribution system would be the perfect solution.

# **Design suggestions**

As a result, there will be 2 main hardwares to be developed for each Ford transit:

- Integrated distribution system
- 2 modular locker stations

It is expected to help the entire last mile stage, from hub packages unloading, sorting to last mile delivery, being able to fully eliminate the need of couriers and 24/7 locker stations.

For end users, the waiting time will be much more userfriendly than a 'vending machine'. For express companies, the distribution system is expected to highly enhance the automation level in hubs. In terms of locker station volume efficiencey, it could also be enhanced, one possible solution is to develop a locker station with modular guality, which matchs different packages with different sized locker boxs to make optimal use of space.



## Integrated distribution system

Function:

- Package intake
- Package distribution

In the hypothesized mechanism, a forklift and conveyor belt will be used to receive and distribute packages. The mechanism works like this, after packages are sorted in hub, the backside of transit will be docked with a conveyor belt on which packages are placed. Firstly, a forklift conveyor that comes from the distribution system will receive packages one by one. Subsequently each package will be first removed on vertical plane. In the end, the conveyor underneath the package starts to work and displace it into a specific locker box horizontally. In this way, packages are distributed and safely stored in locker boxes.



## Locker station

**Essential function:** 

- Store packages
- Package output

These 2 items mentioned above are essential functions that are already existed in current ordinary locker stations.

#### Important function:

• Receive refunded packages

It would be a distinctive added value if end users could refund problematic packages immediately. Also, it is relatively easier for 'mobile locker service' to achieve. Compared with permenant built locker station, transit is able to serve as 'automatic courier' to bring problematic packages back to hub.

#### Essential quality:

- Easy to unload
- Easy to disassemble
- Self-locking
- Self electricity supplyment



It should be easy for transit driver to assemble and unload locker stations at service point. Therefore, built-in wheels and a handle is needed to pull locker station and let it slide down from the slope. Besides, the wheels should be equipped with self-locking functionality and stable on the ground. When locker station is working independently in the evening, it should be supplied with enough electricity, therefore a built-in battery is also needed.

#### Important quality:

#### Consist of modular locker boxes

Currently, advanced load analytics is being used in the logistics process. It is an optimal solution for making full use of truck storage capacity by packing algorithms analysis.



When it comes to last mile delivery, the way of thinking can also be used to impove the low utilization efficiency problem of locker station. The premium solution of it is to

### develop modular boxes that could be assembled to meet on-demand package needs. In this way, each package will be assigned with a matched size locker box, different locker boxes will be assembled into a locker location and manage to deliver as many packages as possible.



# **Digital system**

At the back side of the physical touchpoints, a large digital system is needed to support smooth user experience and communications. There are 2 main digital touchpoints on which suggestions are provided: user application, locker station user interface.

#### **User application**

**Essential function:** 

- Pre-decide delivery location & time
- More delivery processing information

At the last step of confirming orders on E-commerce platfrom Taobao/Tmall, the new delivery option of 'mobile locker' service needs to be added. Information of different service points will be provided customers and enable them to choose a specific point where they will pass by during daily back-home journey. Besides, more delivery processing information are expected to be provided to customers, currenlty Cainiao logistics already launched a track & trace application 'Ciaoniaoguoguo' to solve the problem.

#### Locker station user interface

Currently there are 2 main methods for users to get packages from locker stations:

• Fill in passcode: When packages are put to lockers, users will receive a notification with passcode. After filling in passcode and the locker box will automatically open.

• Scan QR code: For some locker suppliers, users need to bind personal information with the locker system phone application. In the application, each package is provided with a QR code. Users need to put the digital QR code on the panel screen of locker station and wait it to be recognized, after that the locker box will open.

#### Face recognition

In terms of other ways of getting packages, face recognition will be a more convenient method. Alibaba's "Pay with Your Face" allows user to authenticate payments with a selfie, or the more recent sneak peek of the BUY+ virtual store which Alibaba showcased during Singles Day.

# Service pathway

## Make orders

At the last step of confirming orders on E-commerce platform Taobao/Tmall, there will be another delivery option for end users. For example, Lei, who is living in the old urban areas of Beijing, will be able to choose his packages to be delivered to the metro station that is nearest to his apartment after 5 pm. Detailed delivery information including the estimated package departure time and arrival time will be provided by Cainiao's data center.



# Halfway delivery

After seller prepares the package, firstly it will be collected and brought back to local hub. Later on, packages will be consolidated, transported to central distribution and arrive at destination distribution center.



Package transporting process

# Package scanning

At distribution center, packages will be measured and weigted. After that the statistics and overall package volume will be sent to Cainiao's data center and different hubs will be informed. Based on the package final destinations, advanced load analytics will be used to flexibly make arrangements for each tranist to delivery packages as many as possible.



- Take measurements of packages - Volume & size Volume & size Center

# **Flexible Assembing**

After being informed from Cainiao, transit fleet center will assemble modular locker boxes into 2 locker stations for each transit and further assemble them with the distribution system which is at the back of transit.



# **Hub sorting**

When packages are being sorted and transported from destination distribution center to different destination hubs, an area based final sorting process will be finished before 8 am to categorize packages of different areas. Besides, a notification of precise package arrival time and location will be sent to end users.

boxes until users pick up.



Area 1 Area 2 Area 3

O

- Final package sorting



The mechanism works like this, firstly packages which belongs to one area will be placed on a conveyor belt and the back of transit will be docked with the conveyor belt. Then a forklift conveyor from the distribution system at the back of transit will receive packages one by one. Subsequently each package will be first removed on vertical plane, then be horizontally displaced into a specific locker box by the folklift conveyor underneath. In this way, Ford transits manage to highly improve the hub working efficiency.

#### At hub



## Package arrival

Collecting all the packages from different hubs will be finished by 4 pm, after that drivers will drive transits to different service points and unload locker stations. The locations might be a bus stop, metro stop, big office building or any other public sites as long as it covers a lot of 'pass-by' users in the final leg of their back home journies. The unloading process will be finished before 5 pm.

#### before 5 pm



- Transit parks & unloads at service points

# Customer pick-up

From 5pm onwards, the rush hour is coming and people gradually finish their day works. When they arrive at their destination public transportation stops,

they can simply pass by locker stations, pick up packages and walk a bit home. For example, when Lei walks out his destination metro stop, he find the locker station is just placed at the entrance, he fills in the passcode and get the complete package.



# Inspection

When the locker box opens, users have the possibility of inspecting packages. If there is any problem happened to the packages, no matter the package is incomplete or damaged, users are allowed to reject it and return the packages to the box. After that they can write feedback or claim on the problematic package to the express company through phone apps.



Package

Return packages to lockers there's any problem

# **Collect lockers**

At 11 pm, transit drivers go through different service points to collect locker stations and back to fleet center. For the remained few packages that haven't been picked up, they will still be stored in locker boxes and delivered next day.



- Transit collects lockers at different points and back to fleet center



For problematic packages, they will be returned to the hub next day before collecting new packages. After that, hub staff from customer service department will check it and contact users to solve the problem.



Solve problems with express companies

# **Benefits**

WIth Ford mobile locker service, all the benefits of different

stakeholders are shown below.

## **USERS**

- Safer and complete packages
- Less walk on pick-up route
- Convenient pick-up: no chaoic packages
- Feeling in control: pre-decide time & location
- Package inspection & rejection

## **EXPRESS COMPANIES**

- Offer better service to customers
- Reduce last mile delivery cost
- More efficient in last mile delivery
- Delivery more packages
- Emancipate couriers
- Reduce human errors

#### FORD

- Build partnerships with China's delivery-related companies
- Enter China's delivery market
- Accumulate users in Chia
- Get prepared for developing local O2O services
- Generate learnings for future 'Autolivery'

## **HIVEBOX**

- Enter untapped market
- Expand service coverage
- Yield more customers
- More revenue generations

#### SOCIETY

- Less infrastructure needs to be build
- Fully and flexibly utilize resources
- Less traffic congestion

# **Business model design**

Based on previous business model ideation, 2 categories of business models based on different revenue medias were developed for 'mobile locker service'. Firstly, all the business models of category 1 are proposed to be implemented immediately. The principle behind it will

**Category 1** 

Pay per use direct selling:

Target customer: online shoppers

Revenue media: locker boxes

Value propositions: packages are safely stored in locker boxes, end users can also refund packages to locker boxes to express companies () if there's any problem.

**Revenue model:** express companies pay for the last mile delivery fee of each package.

**Value chain:** online shoppers pay for the entire package delivery to express companies, the part of last mile delivery fee will be extracted to pay for 'mobile locker' service and shared with Ford and Hivebox.

#### • Public promotion:

#### Target customer: government

Revenue media: locker station & backside of transit

Value propositions: The surface of locker station or transit backside can be decorated by government to build city

be solving the problem of last mile delivery and foster a good social image of the service. After social awareness is cultivated and a large number of users are accumulated, other business models of category 2 are proposed to be implemented to generate more revenue from 3rd parties.

image, promote public events and charity issues. Besides, if there is a panel screen on locker station, it can also be used for promotion towards end users.

Revenue model: goverment funds.

#### • Shared bike co-opreation:

Target customer: shared bike companies: Mobike, OfO

Revenue media: unloaded transit

**Value propositions:** Mobike or OfO uses transits to operate and balance shared bikes between different service points.

**Revenue model:** Revenue stream will be created by sharing transits with Mobike and OfO. When the locker stations are unloaded, transits will be used for operating shared bikes in the evening.

Besides, due to the service points of 'mobile locker service' will be located at public transportation stops where bikes are also densely parked. Therefore, it would be a perfect win-win operation solution for both parties.



### **Category 2**

### • Leverage customer data 1:

Target customer: 3rd party companies

Revenue media: locker boxes

**Value propositions:** 3rd party companies distribute product samples, ads or coupons by either attaching them on packages or putting into locker boxes to their target customers.

**Revenue model:** Revenue stream will be created by collecting customer data and preparing it for interested 3rd party companies, they pay for the use of data for promotion.

**Value chain:** Since Cainiao controls and monitors the E-shopping data flow, all the data about customers' frequently purchase products, preferences and hobbies could be shared with Hivebox and further sell to 3rd parties. For example, an interested cosmetics company buys the data and distribute its new product samples to

specifical locker boxs which stores packages of young ladies. As a result, it promotes the cosmetics company and customers will be potentially encouraged to purchase its products.

#### • Leverage customer data 2:

Target customer: 3rd party companies

Revenue media: backside of transit

**Value propositions:** A big screen could be installed on the surface of transit backside. When transit is running on the streets, it serves as a moving cinema. Besides, different videos could be customized based on different routes to better target groups of people.

**Revenue model:** The revenue will come from 3rd party companies that use the backside of transit to promote videos, movies and dynamic ads.



# **Cost structure estimation**

In this section, a cost structure estimation analysis was conducted in order to compare the cost of single package last mile delivery between courier delivery and mobile locker concept. In the end, the new mobile locker concept is proved profitable, with the cost 2 to 3 times less than the current courier delivery.

# **Current courier delivery**

Currently in China's express delivery industry, the basis salary for courier is 3000 RMB on average. Normally couriers work for more than 26 days monthly and half of the working hours is used for last mile delivery. Apart from that, 1 - 1.5 RMB commission will be compensated to couriers for last mile delivery, which means that the more packages they deliver, the higher the salary they will get. According to online research, the maximum package volume a courier is able to deliver per day is 100. As a result, the cost of single package last mile delivery is between 1.58 to 2.08 RMB. Besides, the operation fees, for example gasline and vehicle depreciation were excluded in the calculation.

Operatioanl expenses: courier delivery	
commission per package for couriers	1-1.5
monthly salary for courier (tier 1 city)	3000
working days	26
percentage of time used for delivery	0.5
volume of delivered packages/ per day per courier	
operation fee (gasoline & vehicle depreciation): excluded	
Delivery price per package	1.58 - 2.08

# New mobile locker concept

In the new mobile locker concept, couriers are not needed anymore. Instead, a driver will be needed to drive Ford transit to different hubs, unload locker stations at service points and collect locker stations back to fleet center. The estimated monthly salary for a driver is 4000 RMB and the time used will be the same as couriers.

As explained in the previous design brief, 2 mobile locker stations and distribution system need to be developed for each transit. For locker station, taking the current Hivebox's locker station for example. a standardized one costs 20000 to 30000 RMB, which includes 1 main carbinet and 4 auxiliar locker units. However, due to the size of standarized locker station doesn't fit Ford transit, it needs to be customized with only 3 auxiliary locker units. Besides, since more modules, for example handles and wheels need to be added to make the new locker station easily moveable, the estimated cost was chosen as 30000 RMB in the calculation. For distribution system, the cost was estimated as 50000 RMB. Both locker stations and distribution system are expected to expire in 5 years.

As a result, it is estimated that each transit will be able to deliver 132 packages per time. The cost of single package last mile delivery is 0.56 RMB. Besides, the operation fees were excluded in the calculation as well.





Operatioanl expenses: new mobile locker concept	
monthly salary for transit driver: estimated (tier 1 city)	4000
working days	26
percentage of time used for delivery	0.5
operation fee (gasoline & vehicle depreciation): excluded	
mobile locker power consumption: excluded	
mobile locker maintenance: excluded	
Mobile locker trasnit expenses	
2 mobile locker station (RMB: 30000 per )	
distribution system (rough estimation, really have no clue)	
estimated lifetime (5 years=1825 days)	
Hivebox locker: 1 main carbinet(for screen e.g.) + 4 auxiliary locker units	
Hivebox locker unit parameters: 1.5-1.8m×0.68-0.8m×0.5m (height*lenth*width)	
For Ford transit: each side contains 3 locker units (estimated)	6
volume per unit: 12 * A + 8 * B + 2 * C	22
locker box size(mm): A: 340×80×450 B: 340×190×450 C: 340×240×450	
Estimated parcel volume	132
operational cost per package	0.1
cost of per locker box (per day, including distribution system depreciation)	0.46
Delivery price per package	0.56

# Initial mobile locker concept

Apart from the previous 2 cost structure estimations, another one which is based on the initial mobile locker concept was also conducted. The biggest difference is that the locker sizes are generally smaller than the locker stations that are currently using in Chinese market, which makes the maximum package volumes much larger. The estimated cost of single package last mile delivery is indeed cheaper at 0.27 RMB, but it's meaningless to compare.

Operatioanl expenses: initial mobile locker concept	
monthly salary for transit driver: estimated (tier 1 city)	4000
working days	26
percentage of time used for delivery	0.5
operation fee (gasoline & vehicle depreciation): excluded	
mobile locker power consumption: excluded	
mobile locker maintenance: excluded	
Mobile locker trasnit expenses	
mobile locker station (euro: 50000, exchange rate: 7.9)	
estimated lifetime (5 years=1825 days)	1827
locker units: 76 (maximal mass efficiency)	76
volume per unit: 1 * A + 8 * B + 1 * C = 10	10
locker box size(mm): A: 115×44×44 B: 180×180×180 C: 690×320×432	
maximum parcel volume (seems not realistic)	760
operational cost per package	0.1

# Discussion

As an automated solution which is expected to highly improve the efficiency in last mile delivery, the competitive advantage of the mobile locker concept is to deliver more packages than labors. However, the estimated parcel volume each transit manages is still relatively low. Definitly, the more packages a transit unloads, the less the cost of cost single package last mile delivery will be. In order to optimize the situation, there are 2 possibilities. The first possibility is that more locker stations could be unloaded, for example add a trailer at the back of transit. The second solution is the premium 'modular boxes' idea mentioned in previous design brief. However, the cost cannot be estimated. Besides, it is predicted that more revenue will be generated from new business models, but this cannot be calculated as well.



# **HORIZON 2**

' Community shops at hand '

The service in horizon 2 is a community-based offline delivery service that powered by the alliance consist of Ford, Hivebox and Meituan waimai. It is aiming at better connecting shops with residents that are in the same community and stimulate more purchases from local shops. In the service, online orders will be delivered successfully through mobile locker stations.

#### • The platform: Meituan waimai

Meituan waimai will be the platform for local shop sellers to display their product categories and enable online orders from end users. Currenlty, orders made from Meituan platform are delivered either by sellers or crowdsouring. With more and more purchases being made, a more efficient and mass delivery becomes increasingly demanding.

Meituan waimai, an affiliate of Meituan.com, is an online

# **Business model design**

The preivous business models will be retained in horizon 2 except 'Public promotion'. In addition, with more residents using the service, local sellers will be more interested to promote their products through lockers. As a result, it is predicted that more and more revenue will be generated from 'Leverage customer data' model.

#### Two-sided market

Apart from previous business models, a 'two-sided market' model will be introduced.

Target customer: residents & local sellers

plaftform for locally found consumer products and retail services. The platform was initially targeting at takeaway food market. Recently, increasing amount of local businesses from different categories are joining Meituan waimai, ranging from local supermarket, convenience shops, groceries, fruit stores and even pharmacy. Until August of 2016, average daily orders made on the platfrom reached 3 million nationwide.

#### How does it work?

The service will share locker stations with the 'mobile locker service' of horizon 1, but the difference is that deliveries in the service will not need to be transported. As the mobile locker station will still stay at service points from the afternoon to the evening, shop sellers nearby can prepare packages in advance, go to service points to unload packages into locker boxes until end users pick up.

Revenue media: locker boxes

**Value propositions:** The products residents purchase from 'Meituan waimai' will be delivered through locker boxes.

**Revenue model:** A two-sided market facilitates interactions between multiple interdependent groups. In the service, a delivery fee will be charged from community shops once it is completed.

**Value chain:** A deposit will firstly be charged by 'Meituan waimai', after the order has been received by end users, a commission will be charged and delivery fee will be shared with Ford and Hivbox.





# **HORIZON 3**

' All your want moves to you '

Undoubtedly, end user data and customer relationships with local shops act as the most important roles in running local O2O services. In horizon 1, data of online shoppers was gathered. In horizon 2, data of residents was gathered and relationships with shops were built. Now the time has come for Ford and Hivebox to leverage all of the data and develop a self-owned platform to integrate online and offline services.

The service in horizon 3 is a local-based O2O and P2P service that powered by the alliance consist of Ford and Hivebox. It is aiming at providing an integrated and holistic service from online orders to offline delivery, the community-based service of horizon 2 will be upgrated and immigrated to the service.

In the service, end users will have the greatest amount of products to get from peer sellers and shop sellers within the entire local areas. Orders will be purchased on the self-owned online platform and then be delivered through mobile locker transit.

## How does it work?

• Self-distribution center

In order to operate local O2O services, a sorting process needs to be organized. Therefore, a self-owned local distribution center needs to be built. After packages are being unloaded into mobile locker transit at service points, all the packages from different service points will be consolidated in the distribution center, in the end packages will be sorted and unloaded to different transits, transported to destination service points and picked up by end users.

#### • Collect packages from sellers

In the service, more flexible choices of sending packages will be provided to sellers. Apart from unloading packages to locker boxes by themselves, there will be another option that transit collects packages from them before daily sorting process.

#### Subscription model

For end users, there will be different kinds of susbcription model provided to them, they can pay a fixed monthly subscription fee to get a personal owned locker box for unlimited purchases.

# **Business model design**

The preivous business models will be retained in horizon 3 except 'Shared bike co-operation'. Due to the fact that the transit fleet will be fully devoted in collecting packages, sorting and delivering, there will not be unused time for sharing.

In addition, as the service will make a opening for all the urban areas and attract more users, it will become even more attractive for local companies to promote their products and services. Futhermore, the new subscription service offered to end users will also help those companies to precisely do targeted promotion. Therefore, it is predicted that even more revenue will be generated from 'Leverage customer data' model.

#### • Subscription & Premium

In horizon 3, a 'Subcription & Premium' model will be introduced to generate more revenues from end users.

Target customer: residents

Revenue media: locker boxes

Value propositions: There will be a subscription possibility for residents to subscribe for a personal locker box during a period. Besides, there could be different kinds of premium locker boxes, for example large size or even with cooling system. Users can pay for their favorite ones and enjoy corresponding services.

**Revenue model:** A subcription model makes the delivery fee fixed during one period. In this way, a more stable revenue stream will be generated from end users. Moreover, users who subscribe will also be encouraged to make more purchases, which further contribute to more revenue generation from 'two-sided market' model. The more purchases users make, more commissions will be charged by sellers from each transaction.

**Value chain:** End users subscribed for the service pay the subscription fee. During the period, a personal owned locker box will be assigned to them, they can feel free to more purchases from different shops that joined the O2O service platform, packages will be prepared and delivered to their locker boxes every day in the afternoon.



# CONCLUSION

In the chapter, a concept evaluation conducted with end users and a summary of recommendations will be explained to give an overview of the further opportunites regarding the business and the service. After that, you will find a general conclusion, limitations and acknowledgements.



# **CONCEPT EVALUATION**

The goal of the concept evaluation is to know how end users think about the E-commerce last mile delivery service and local O2O delivery service. To what extent is each service useful? To what extent are they willing to use each service? What concerns and suggestions do they have regarding each service?

In the concept evaluation. a quantitative questionnaire study was conducted. In total, 34 participants completed

the form. Among the participants, 59 percent of them are living in new urban areas and 26 percent of them are living in old urban areas. In terms of the current package pick-up situations, 56 percent of them have access to community locker station services, which to a large extent reduce the ratings of the mobile locker solution. The main findings are shown below, categorized by different services. The complete questionnaire results can be found in the appendix 6.

# E-commerce last mile delivery service (Horizon 1)



For both questions, more than half of the participants gave higher ratings than 4. For all the ratings lower than 4, only one of each question was given by participants that are currently using posthouse services.

#### Comments

' Convenient and fast, I can combine commuting with package pick-up.'

It's nice that I don't need to get in touch with couriers.'

'The packages pick up time and location is more flexible, my personal privacy will be well protected since the package will be delivered home.'

'No more fees will be charged by posthouse services.'

' The service coverage might be a little bit not enough, maybe far from my home.'

' Might cause traffic congestion. there is a big people flow at metro stop.'

Not suitable for heavy packages."

# To what extent do you think the improvement on package safety in the service?



#### Comments

The safety level of packages have improved a lot.'

Now I dare more to buy expensive products online.

' Very convenient for rejecting packages, no need to send it and fill in refund form by myself.'

In terms of the 2 qualities in the service, 56 and 74 percent of participants gave higher ratings than 4 respectively. For the latter one, it yielded the highest rating among all the questions in the questionnaire.

# Conclusion

To conclude, most of the participants gave positive feedback. The open-question comments are also in accordance with the previous user research. In general, the design makes sense and the service is attractive for them, especially for people who are using posthouse services. Also, the instant package rejection solution is perceived as a prominent added value. However, some participants are concerning about the operation efficiency in public transportation stops. Furthermore, the walking distance from service point to home still influences a lot on the willingness of using the service.

# Local O2O offline delivery service



#### Conclusion:

Generally, participants gave higher ratings to the service than the previous E-commerce last mile delivery service.

# Locker box subscription service



Furthermore, for both questions, less than 10 percent of participants gave ratings that are lower than 4.

To conclude, participants showed more inclination and willingness in using mobile locker service in local O2O segment, which is accordance with the previous research result that the local O2O delivery market has more potential to enter.

Furthermore, meituan was illustrated as the online platform in the service. However, one participant mentioned that she rarely use Meituan and local O2O platforms haven't provided enough product categories to fulfill her shopping needs, this also implies that the local O2O is still a blue sea market compared with the highly homogeneous E-commerce market.

#### The maximum accepatable monthly susbcription fee is:

1	30以下	20 / <b>59%</b>
2	30-60	11 / <b>32%</b>
3	60 - 100	3 / <b>9%</b>
4	100以上	0 / 0%

#### **Conclusion**:

In general, participants are interested in the subscription service. However, more than 90 percent of participants are only willing to pay less than 60 RMB for the subscription. The subscription fee is highly influenced by use frequency and reliability.

# RECOMMENDATIONS

## About the business

#### • Legitimate problem:

Due to the fact that the service points of the mobile locker service will be located at different public sites, the legitimization of placing locker stations or parking Ford transits becomes the prerequisite of the service. Therefore, negotiating with government to get permission is essential. Currently, more and more shared infrastructure, for example, shared bikes and self-service vending machines appear in public, which validated the possibility of operate similar services.

#### Build partnerships

For streamlining of the service in the competitive delivery market in China, the Alibaba affiliate Cainiao logistics, is the irreplaceable business partner since it possesses the greatest amount of E-commerce data and data analytics capabilities. Moreover, Cainiao logistics already formed an alliance with main express companies and locker company Hivebox in 2016, which makes it easier for other partnerings.

When it comes to partnerships in O2O market, currently

Meituan is the biggest player by market share and user volume. Nevertheless, the market for non-takeaway food segments are still under developing, with different platform services keep emerging. Ford could think about making more partnerships with different platforms and collect different data for the future self-developed O2O service.

In the business, express companies are supposed to be the direct beneficiary. Therefore, how the mobile locker transit could help in sorting packages in hub and eliminating the use of couriers should be clearly communicated. The more express companies are partnered, the more efficient the service will be.

#### • Business model: iterative

In this project, a lot of business models were generated and some of them were selected for different horizons. Indeed, they describe the rationale of how Ford and its partners potentially creates, delivers, and captures value through different services. However, adjustments and iterations need to be made on the real business context before, during and after implementations.
## About the service

#### • Pilot in big cities

The best way to test the effectiveness of the service is to pilot in megacities' old urban areas. Therefore, it is recommended for Ford to run a trial in Shanghai, where there are a lot of old urban areas. Based on user feedback and client feedback, iterations can be made to consistently improve the service.

#### Conduct a quantitative study on service points

A quantitative study is needed to precisely define service point locations and locker station staying time in order to create a real 'pass by' pick up solution. In the previous concepts, public transportation stops were proposed to be the service points. However, the service points could even be next to different communities as long as the parcel volume justifies financial feasibility.

#### Service operation

For operation in service points, it is predicted that package pick-up will break out in peak hours. it is important to think about how to better arrange locker station, dredge the flow of people and ensure the convenience of picking up packages.

#### Working conditions of locker station

In the previous design brief, locker stations are designed to be able to modular and work independently during service hours. However, it might be expensive or difficult to develop such a locker station with self-electricity supplement and network access. Therefore, the minimal viable version is that transit with locker stations loaded stays at service point during service hours.

## CONCLUSIONS

This report describes the entire stages of the project in cooperation with Ford to create a sustainable and promising business to enter China's delivery-related market.

The project started with research into the context and trends of delivery market and users in China, then underwent multiple synthesis and business model sessions and ended the project with a 5 years' strategic roadmap in which the development and components of 1 detailed service brief and 2 service concepts were explored, mapped and communicated. It may sound like a linear process, but many times I had to take steps back and reevaluate decisions in order to continue forward.

As seen in the recommendations, I acknowledge that there are still many elements to explore further before different services are finalized and ready for launch, yet I firmly believe a solid groundwork was laid with which Ford can build upon and hope Ford got inspired with my ideas and develop this concept further. Thank you for this opportunity Ford, let's shape the future delivery together!

## LIMITATIONS

#### Deviated research method

Due to the limited time and budget of the project, the study was conducted based on long-distance research throughout the project. The student was not able to conduct face-to-face user study and on-the-spot investigation. Therefore, the research results are inevitably more or less deviated from the real situations.

#### • Less access to business stakeholders

In essence, there are different business stakeholders in the big delivery picture. The client of Ford, which is locker station company and the client of mobile locker service, which is express companies are both shaping the service design. However, interviews and concept evaluation were only conducted with end users throughout the project. In the future study, it is highly recommended to validate the concepts with more business stakeholders and make corresponding adjustments.

#### Unclear data description

Undoubtedly, data plays as the most important role in initiating and developing a new business. In the report, when, why and what kind of data needs to be gathered were described. However, how to gather and deploy the data remains as a question for further study.

## ACKNOWLEDGEMENTS

I would like to firstly thank Nicole Eikelenberg and Mark Gijbels for giving me the opportunity to work on this project, which could potentially have a real-life impact on China's delivery industry. I hope to have given something Ford can really work with.

Furthermore, I would like to thank my friendly company supervisor Mark Gijbels and Vincent Zou from Ford shanghai team. Throughout the project, both of you encouraged me and provided me with invaluable information and grounded feedback every step of the way!

And last, but certainly not least, I express our deepest gratitude to my chair and mentor, Marc Tassoul and Lianne Simonse, who guided me throughout the process. Thank you for being tough when you needed to, and for your tips, inspiration and friendliness! I firmly believe that all the knowledge, creativity, passion and mindset I learned from you will be extremely beneficial for my further career and the rest of my life.

## REFERENCE

1. Fordcom. (2017). Ford Corporate. Retrieved14 September, 2017, from https://corporate.ford.com/ innovation/city-of-tomorrow.html

2. Fordcom. (2017). Ford Corporate. Retrieved14 June, 2017, from https://corporate.ford.com/company.html

3. Fordcom. (2017). Fordcom. Retrieved 14 June, 2017, from http://corporate.ford.com/microsites/ sustainability-report-2013-14/blueprint-strategy.html

4. Collis, D. J., & Montgomery, C. A. (1995). Competing on Resources: Strategy in the 1990s.

5. Detroitnewscom. (2017). Detroit News. Retrieved 14 September, 2017, from http://www.detroitnews.com/ story/business/autos/detroit-auto-show/2015/01/13/forddecrease-global-platforms/21730991/

6. Autonewscom. (2017). Automotive News. Retrieved 14 June, 2017, from http://www.autonews.com/ article/20150126/RETAIL/150129919/ford-again-winscustomer-loyalty-title

7. Fordcom. (2017). Fordcom. Retrieved 14 June, 2017, from http://corporate.ford.com/microsites/ sustainability-report-2013-14/blueprint-strategy.html

8. Buijs, J.A. (2012). The Delft innovation method: A design thinker's guide to innovation, Eleven International Publishing.

9. Dennis, W. T. (2011). Parcel and small package delivery industry. William Dennis.

10. Apex-insightcom. (2017). Apex-insightcom. Retrieved 14 June, 2017, from https://www.apex-insight. com/ product/global-parcel-delivery-market-insightreport-2017/

11. Parcel delivery The future of last mile. (2016). Mckinsy&Company.

12. Giiresearchcom. (2017). Giiresearchcom. Retrieved 14 June, 2017, from https://www.giiresearch.com/report/ cri485635-research-report-on-china-express-deliveryindustry.html

13. Reportbuyer. (2017). Prnewswirecom. Retrieved 14 June, 2017, from http://www.prnewswire.com/newsreeases/ china-express-delivery-industry-report-2016-300387729. html

14. Ecommercenewseu. (2015). Ecommerce News. Retrieved 14 June, 2017, from https://ecommercenews.eu/ ecommerce-europe-wants-to-improve-parcel-deliverymarket/

15. Sf-expresscom. (2017). Sf-expresscom. Retrieved 14 June, 2017, from http://www.sf-express.com/cn/en/ about\_us/about\_sf/company\_introduction/

16. Baiducom. (2017). Baiducom. Retrieved 14 June, 2017, from http://baike.baidu.com/item/ 四通一达

17. Cnfolcom. (2017). Cnfolcom. Retrieved 14 September, 2017, from http://news.cnfol.com/ shangyeyaowen/20170607/24806703.shtml 18. 36krcom. (2017). 36krcom. Retrieved 14 June, 2017, from http://36kr.com/p/5068745.html

19. lrjdcom. (2017). lrjdcom. Retrieved 14 June, 2017, from http://ir.jd.com/phoenix.zhtml?c=253315

20. Reportbuyer. (2017). Prnewswirecom. Retrieved 14 September, 2017, from http://www.prnewswire. com/news-releases/china-express-delivery-industryreport-2016-300387729.html

21. Kenresearchcom. (2017). Kenresearchcom. Retrieved 14 September, 2017, from https://www.kenresearch. com/automotive-transportation-and-warehousing/ logistics-and-shipping/research-report-chinexpressdelivery/95971-100.html

22. Baiducom. (2017). Baiducom. Retrieved 14 September, 2017, from https://baijiahao.baidu.com/ s?id=1565370853983586

23. Sinacomcn. (2017). Sinacomcn. Retrieved14 June, 2017, from http://blog.sina.com.cn/s/ blog\_14507515e0102x0og. html

24. Askcicom. (2017). Askcicom. Retrieved 14

September, 2017, from http://www.askci.com/news/ chanye/20161028/14575073252\_2.shtml

25. Buijs, J & Van der meer, H. (2013). Integrated creative problem solving.

26. Gassmann, O., Frankenberger, K., & Csik, M. (2013). The St. Gallen business model navigator.

27. Businessmakeovereu. (2017). Businessmakeovereu. Retrieved 14 September, 2017, from https://www. businessmakeover.eu/platform/home/

28. Phaal, R., & Muller, G. (2009). An architectural framework for roadmapping: Towards visual strategy. Technological Forecasting and Social Change, 76(1), 39-49.

29. Curry, A., & Hodgson, A. (2008). Seeing in multiple horizons: connecting futures to strategy. Journal of Futures Studies, 13(1), 1-20.

30. Fashionforafiniteplanetcom. (2017). Fashionforafiniteplanetcom. Retrieved 14 September, 2017, from http://www.fashionforafiniteplanet.com/projectframework/

# **APPENDIX**

## **USER INTERVIEW GUIDE**

#### **Research question**

What will be the ideal last mile delivery services for Chinese urbanists in the future? (How Chinese urbanists pick up their packages in the last mile delivery)

#### Sub research questions

Current E-shopping experience Current delivery service experience Ideal package pick-up experience Concept evaluation

#### Start:

#### Current E-shopping experience

How often do you shop online?

What kinds of product do you normally purchase online?

- Probe: clothing, food, what are the different considerations?

- What are your top 3 considerations behind E-shopping these products? Why?

What kinds of product do you normally not purchase online?

- Why? considerations

Please describe an ideal E-shopping experience in the future

#### • Experiences on delivery service

Do you often use delivery service?

- Are you receiver or sender?

- In terms of receiving, what categories are the goods you receive? size?

- What do them come from? E-shopping? order food?
- Do you also send packages?

What do you think of delivery services in general?

- Please describe the current scenario(s) of receiving your package
  - When do you normally get it?
  - How? locker? hand delivery?
  - Price

If not present, any different ways of picking up?

- e.g. 24/7 locker, how's it?
- Any bad delivery experience you encountered? What pain points?

What aspects in delivery service are the most important in you opinion?

- Top 3 and why?

- Do they various in different product categories? For example

- What won't you buy due to delivery problems?

- What will be a nice delivery experience? you already experienced or ideal one

#### • Concept evaluation: explain the idea

What do you think about it?

- pros & cons compared with your current ways
- 'pass by' aspect, time window
- What will be maximum distance for walking?
- Will you use if for sending? is the usage practical?

#### • Participant recruitment:

Living in China urban areas, mostly in mega cities (population > 10 million)

Active online shoppers

- University students in big cities: 2
- Young employees in big cities: 2
- Millennials in big cities: 2
- Generation X: 2

## **USER RESEARCH RESULTS**



## **Qin He** Master student City: Beijing

Qin he is currenlty pursuing her master study in Beijing, her campus is in inner area of Beijing, which makes her daily life convenient. Sometimes she purchase daily goods from Taobao.

She always pick up the packages in a very close open-air pick-up point inside the campus from 12:30 -13:30 or 17:00 - 18:00. She thinks the current delivery services are fast, convenient and professional in general.





### Xin Qian **Master student City: Shanghai**

Xin Qian is currenlty pursuing his master study in Shanghai, his campus is very large and in suburb area, which makes his daily life inconvenient. The nearest supermarket is a bit far and he almost buys every online from Tmall market.

Normally he needs to walk for 10-15 minutes to pick up packages in a storage room inside campus during 12:30 -13:00 or 17:00 - 18:00. There is a locker station next to the storage room but it's only avaliable for JD's customers. He thinks students have less timing restrictions towards last mile delivery receiving.



#### **Pick-up scenario**







- 2. Students are more flexible for pick-up time
- 3. Safety issue is better for students

**Evaluation on 'locker concept'** 





### Xin Zhang Young employees Age: 26 City: Shanghai

Xin zhang is currently working as a marketer in Shanghai. She lives in a community which equipped with property department. Normally her packages are delivered to property office and she just needs to pick up after working, she thinks it's convenient and handy.

Due to intense working conditions, She is extremly busy and almost has no time for cooking and shopping. She is very satistfied with current delivery patterns and doesn't like face-face pick up with couriers.





## Haotian Liu Young employees Age: 25 City: Beijing

Haotian Liu is currently working as an accoounter in a business consultancy. He lives in an apartment of Beijing's old urban area where buildings are densely located. He often shops online but there is almost no delivery infrastructure. Normally the nearest shop receive packages on behalf of him and he picks up at night when arrives home.

Sometimes it's burdensome for him to pick up packages if he arrive home very late. He's in favor of convenient door-door delivery but actually most of the time he won't be at home.





## Meng huang Generation Y Age: 31 City: Chengdu

Meng Huang is a high school teacher and a mom of 2 babies. Currently She lives in a large 'teacher community' which equipped with property department and locker station. Normally her packages are delivered to either place and she just needs to pick up after working.

She has high expections about delivery quality if she purchase goods for babies, esepcially in hot summer. Besides, sometimes it's troublesome to search for her packages in property department but it happens very rare.







## **Yi Chen** Generation Y Age: 34 City: Ningbo

Yi Chen is working for a leading cooking appliance company in Ningbo. Currently he lives with his families in a nice community which well equipped with delivery infrastucture. He occasionally shops online and packages are delivered to community property office or locker room.

He really likes locker station solution but sometimes the volume of lockers are not enough. For example single day, it's a little bit troublesome to find his package in community property, but it happens very rare.





### Jin Chen Generation X Age: 40 City: Beijing

Jin Chen started her new job in Beijing 6 months ago, currenly she lives in a separate building of Beijing's old urban are. The buildings are densely located and almost no delivery infrastructure. Sometime she shops online, normally the nearest shop (restaurant) receive packages on behalf of her and she picks up after working hours.

She thinks on-behalf collect with later pick-up is convenient, but it still gives her an unsafe and uncertain feeling because those shops don't have to be fully responsible for her packages.





## Xiaoying Chen

#### Generation X Age: 47 City: Mianyang

Xiaoying Chen has been working for the government for over 25 years, currently she lives with her families in a nice community which well equipped with delivery infrastucture. Normally her packages are delivered to community property office or locker room. It almost has no drawbacks and she is quite flexible in pick-up.

In her opinion, the only possible dissatisfaction comes from service interaction with couriers, and she also doesn't want them to come to her door.



## **Results overview**

### **Pick-up scenario**



## **City difference**



## **Results overview**

### **Genenal considerations**

Safe delivery Package completeness Fast delivery Handy pick-up Flexible pick-up time Service quality(polite courier e.g.)

### **Generation differences**

### **Concept evaluation**

Not flexible enough Not willing to walk Not pick-up on purpose Concern about traffic problems Safer than on-half collecting In favor of automation

#### **Students** Young employees **Generation X&Y** Flexible in pick-up Extremely busy More emphasis on Feeling in control High E-shopping frequency service quality High level of safety Inconvenient pick-up More E-grocery needs Faster demand Feeling of not in-control Less faster demand Faster demand

## **Gender differences**

Less demand Prefer door-door delivery

Male

Female

Meet couriers less, escpecially at night/at home alone Focus on service quality & personal safety

#### **Goods statistics**

#### Popular

Daily goods Prepared food FGCC Electronics

#### Less purchase

Clothing Expensive products Fragile/leaking products Fresh products

### Sending packages

#### Working documents

Fast demand Safety demand Office door service Always choose SF express

#### To friends/relatives

More casual in delivery as long as it is door pick-up Safe delivery Basis demand for speed

## FUTURE UBRAN LIFE SCENARIOS

Group	University Students (1995s) Age: 17-25	Young employees ( post 1980s - 1995 ) worked within 5 years	
Living situation	<ul> <li>Living in shared domitory</li> <li>Campus not located in city center</li> <li>Better infrastructure inside campus (dormitory locker&amp; storage)</li> </ul>	- Living in shared apartment - Less self-owned space - More common space - Working intensely	
Before sleep	Dormitory- Check next day's scheduleFood delivery- Order food for next moring (from restaurant or dining hall)	<ul> <li>Plan for next day commuting</li> <li>Reserve a shuttle bus</li> </ul>	
Morning routine	- Have breakfast in common room Grocery delivery - Cook it yourself in common kitchen	- Get up late - Quick brush & wash (Track shuttle/metro)	
Commuting	<ul> <li>Walk</li> <li>Take shuttle bus</li> <li>Grab a bike downstairs (bike sharing system)</li> <li>No need to go to the lecture: (online lecture room in dormitory)</li> </ul>	In-vehicle locker/service - Get on shuttle bus downstairs Food delivery - Breakfast already delivered on your seat - Comfortable in-vehicle feeling	
Arrival	- Park the bike anywhere	- Arrive at company downstair	
Morning activities	<ul> <li>Interactive lectures (VR &amp; AR)</li> <li>Relaxing room, drink coffee with friends, greeting people (lecture intervals)</li> </ul>	<ul> <li>- Working intensely</li> <li>Business          <ul> <li>- Send business documents (Drone pickup - Fast delivery vehicle - Drone last mile delivery)</li> </ul> </li> <li>Fast moving in local areas</li> <li>Balcony</li> </ul>	



Lunch	Grocery delivery Teaching building	<ul> <li>Fresh groceries deliverd to lunching room, DIY with friends</li> <li>Go to dining hall</li> <li>Online order, delivered and eat in lunching room</li> </ul>	Company downstairs Food delivery	- Company located in shopping plaza, go to restaurant - Online order, delivered and eat in company
Lunch break	•	- Nap room - Self-study room - Campus plaza: play & eat & Relax	Company downstairs	- Relax in shopping plaza - Nap room - Shopping in plaza
Afternoon activities		- Sports center: gym (shuttle deliver your equipments from dormitory lockers)	Company downstairs	- Working intensely
	Hard-to- carry stuff	-Culture center: play music, arts (shuttle delivery your instruments or)	Food 🔵 🔴 delivery	- Order snacks/drinks, delivered to company
	delivery Moving in campus	- Experience room: E-shopping with AR&VR, try out, make purchase (delivered to dormitory)	E-shop- ping delivery In-vehicle	- Order daily goods, delivered to company downstairs( mobile locker stays from 5pm - 10pm)
Commuting	•	- Walk - Take shuttle bus - Grab a bike downstairs (bike sharing system)	locker/service E-shopping delivery Stations: metro, bus, etc	- Take shuttle bus (packages already delivered on your seat ) - Metro/public transportation: pick up packages
Dinner	Dormitory Food odlivery	- Fresh groceries deliverd to lunching room / dormitory, DIY - Go to dining hall Co - Online order, delivered to lunching room / dormitory	Food delivery ompany downstairs E-shop- ping delivery	- Overtime work, online order and being delivered - Pick up packages near apart- ment
Evening activities	Dormitory E-shop- O ping delivery	- Relax/Study in dormitory - Have fun with roommates and neighbors in dormitory common space - Pick packages in dormitory's property room/lockers	Living areas CIrculate delivery Stations: metro, bus, etc	- Relax at home - Check packages, if not suitable, refund it next morning - Go to gym (deliver equipments)



## **BUSINESS MODEL SESSION GUIDE**

### Introduction of Business model triangle (5min)

What is a business model: 4 consistent elements An successful example: Expresso

### Context introduction: (5 min)

Introduce current delivery business model in China: 4T1D (2 min)

My concept: Ford mobile locker service description (3 min)

- Who: people living in old urban areas where no locker stations were built and on-behalf shop pick-up solution is inconvenient

- What:

- Effortless pass-by pick up packages
- Super safe delivery
- Feeling in control
- Inspection

#### Task sensitizing: flower association (10 min)

Stakeholders: (5 min)

- Who and which companies or organizations will potentially or possibly be involved in the big service system?

- Who and which companies or organizations will potentially or possibly influence the big service system?

- Who will be the service provider?

- What are the stakeholder? (5 minutes brainstroming, post-it)

- other stakeholders?

Make money: (5 min)

- How and to whom charge money? (5 minutes brainstorming, post- it)

- Who will be likely to fund the service?

#### Divergence: (40 min)

Business model pattern cards: (8\*5 min)

- How does the pattern conduct your business? (1 min to read)

- If you are asked to apply this pattern to the new delivery concept, what will you do? (make use of similarities) (2 min)

- If you think it's totally different, will the difference spark you to overcome the problem? (translate the confrontations) (2 min)

### Clustering: (10 min)

Each participant is asked to select 2 ideas: one for business feasibility and another one for novelty. Cluster 8 ideas and choose 4 four further development.

#### Convergence: (10 min)

4 participants are divided 2 sub groups. Each sub group is asked to choose 2 ideas, detail the concept and complete business triangle.

- Who?
- What?
- How?
- Value?
- Internal consistency
- External consistency

#### Evaluation (10 min)

Each sub group presents 2 complete concept and Q&A

#### **Principles:**

Group size: 4 people Selected cards: 8 cards Experiment with similar and confronting patterns

## **BUSINESS MODEL CLUSTERS**





## Transit with movable locker station



## **QUESTIONNAIRE RESULTS**

The questionnaire can be viewed at: https://aoge.typeform.com/to/sLWLaN The general report can be viewed at: https://aoge.typeform.com/report/sLWLaN/He1kE0j7b1tKIdac The full results can be downloaded at: https://drive.google.com/open?id=0B1tql2VU\_1nfaThYTkFsR3JoOVk