

Research on the Standardized Reusable Delivery Box Business Plan Based on MATLAB

Yunfei Zhao¹, Hangdong Ye², Zipei Sun³

¹ZJU-UIUC Institute, Zhejiang, China. zhaoyunfei0613@icloud.com

²University of Connecticut, Connecticut, US. hangdong.ye@uconn.edu

³University of California, Los Angeles, California, US. mhwsbj@163.com

Abstract: China has the largest business volume in express industry across the world, but it also leads to a serious environment problem on account of surplus delivery boxes. This paper attempts to address the social environment problem by starting up a new business model which focuses on designing a new type of standardized and recyclable boxes and building both non-monetary and monetary incentive systems to include the general public in the recycling process. First, this investigation took the pick-up station on the international campus of Zhejiang University as the sampling and used its stored data as the sample data. MATLAB was utilized to build models by grouping and presenting sets of data in scatter diagram and carrying out linear fitting. This fitting curve then was used to analyze the number and the growth of delivery boxes in the past as well as the recycling situation of delivery boxes, and lastly the derivative of the data curve was used to predict the future development. Secondly, Creo was applied to the design of standardized boxes and aided to estimate the cost. In addition, online surveys were distributed to the general public in order to investigate their willingness to recycle our standardized boxes. More than 100 responses were received, and these collected data were organized in Excel. The findings demonstrate that more than 50% of people are willing to recycle delivery boxes in different ways suggested by the designed incentive systems and the standardized boxes are able to be used more than 100 times by calculation, thus the average cost is fairly low. In conclusion, it is highly likely that the standardized boxes will be adopted and applied to the express delivery industry and to solve the social environment problem caused by the huge amount of wasted delivery boxes.

Keywords: standardized; reusable; delivery box; potential. market; design; material

1 INTRODUCTION

Due to economic development and growing e-commerce, the total business volume in the express delivery industry in China demonstrates a trend of rapid growth (Figure 1). China's annual volume of the express delivery industry accounted for over half of the global express delivery market, ranking first in the world for five consecutive years, as shown in the data released by China's State Post Bureau (Figure 2) [1].

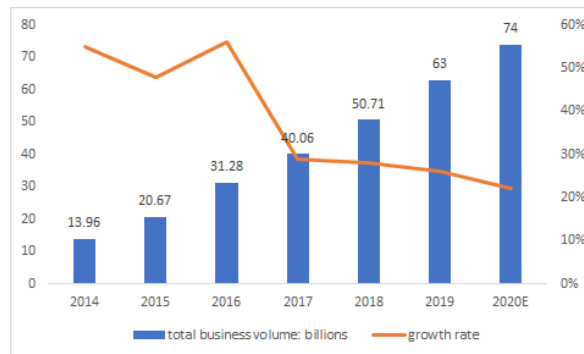


Figure 1. Total business volume and growth rate in China (data from State Post Bureau of China)

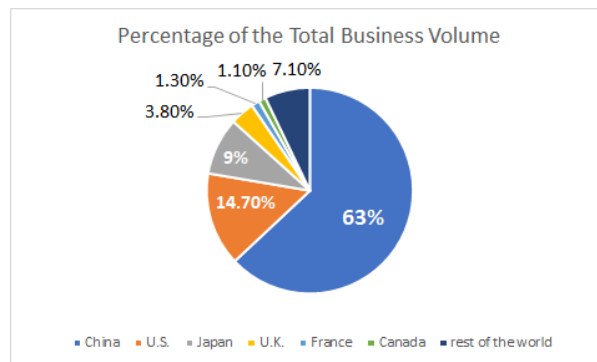


Figure 2. Percentage of the total business volume of several countries (data from State Post Bureau of China)

However, this booming industry also comes with significant environment problems. According to the data from China's State Administration of Market Regulation in 2020, the express delivery industry in China generated million tons of paper and plastic waste each year [2]. Therefore, the huge waste of resources becomes a serious burden on China's environment. In addition to the waste generated, the packaging materials can also have detrimental effects on the environment due to the ineffective breakdown and recycling process [3].

In response to the side effects of the booming express delivery industry, the Chinese government calls for environmentally friendly solutions. In *Opinions on promoting development of the express delivery industry*, the government emphasized the improvement of quality and efficiency of the express delivery industry. Moreover, in *Opinions on promoting high-quality development and formation of strong domestic market*, the government promoted environmentally friendly and recyclable delivery box materials, and called for reducing overpackaging and repackaging. Although several new startups have begun to address this issue, these existing solutions have yet to gain market traction due to their huge material cost, ineffective incentive system and lack of awareness. For example, during NPC and CPPCC meetings, politician Dou Zhuwei proposed his idea of "delivery box sharing." However, his delivery boxes have very limited use in the express delivery market. In addition, the shipping company ShunFeng also designed its own reusable package; however, producing one Feng Box

can be relatively expensive, and Feng Box can only be used for in-person delivery. Therefore, will there be any alternative solutions to mitigate the huge waste produced by the express delivery industry in China?

To answer the above question, our company proposed a solution to reduce waste generated by traditional packaging. Our company created a standardized delivery box that can be reused over 100 times [4]. The materials of our box are mainly LDPE and PVC (Figure 3). Our company plans to sell our standardized and reusable boxes to major express delivery companies in China, including Yuantong, Shentong, Zhongtong, Yunda and Shunfeng.

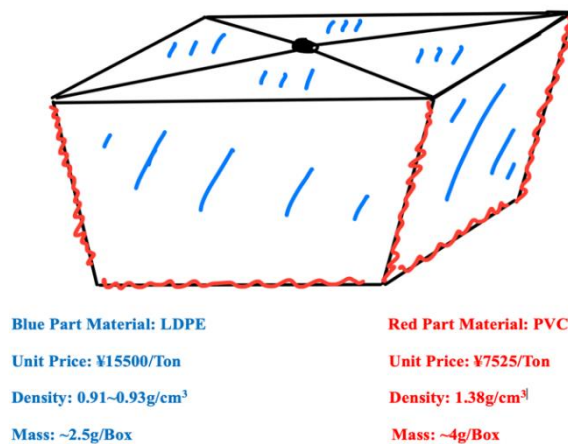


Figure 3. Standardized delivery box that our company designs

Our research strategy is combined with primary and secondary data. Our research methods include linear regression model with respect to the relationship between time and the recycling rate and surveys. Based on the above methods, we are able to estimate people's willingness to accept our solution quantitatively, and our methods effectively demonstrates the feasibility of our solution.

The rest of this essay is organized as the follows. Section two includes literature review. Section three introduces our main method. Section four includes our descriptive analysis of our data and results. Section five concludes.

2 LITERATURE REVIEW

Waste can cause serious environmental concerns. Poor waste management contributes to climate change and water contamination and can have direct effects on the health of ecosystems and species [5]. The express delivery industry, especially its packaging, is one of the major contributors to waste production. The rapid growth of e-commerce and express delivery industry result in abundance of waste every year in China, and the packaging materials are usually non-degradable [6]. In Xu Ming's article "Resources, Conservation and Recycling," he emphasizes the concern on material flows and environmental implication on post-consumer packaging

waste [3]. Xu analyzes the ineffective recycling process of post-consumer packaging waste in China, which directly contributes to contaminations, including, variety of toxic chemical residuals [3]. Moreover, researcher Chi emphasizes the trend of increasing purchase on incinerators to burn down delivery boxes yet with improvement on recycling rates [7]. Our business plan of standardized delivery boxes can fill the market gap and provide an alternative solution to the existing environmental issues.

3 METHODOLOGY

As we attempted to better understand the desirability, feasibility and viability risks of this new venture, we reached a set of key hypotheses, and we conducted three different studies to test those hypotheses. Study 1 was designed to have a better assessment of the desirability risk related to the scale of the targeted market and customers' interests on our value proposition. This study involved an experiment on a precise change pattern in terms of the package amount that people receive in previous years and an interview of a senior faculty on a dominant shipping company in China. Study 2 investigated the feasibility risk related to the public willingness to return the delivery boxes in some specific ways, and it involved a publicly online survey to help us understand it. Finally, study 3 was focused on the viability risk related to generate a sustainable revenue and profit. We calculated the total revenue and costs and framed an income statement in order to better understand the profitability of our venture.

3.1 Study 1

1) Part 1 (Data)

From the macro point of view, China has a continuously increasing business volume in the e-commerce industry. The potential demand of delivery boxes is getting larger due to the explosive growth of express industry. To obtain a precise change pattern in terms of the package amount that people receive in the previous years, we collect the data and organize an interview in a delivery station in International Campus, Zhejiang University to see whether the market prospect and public attitude is appropriate for our team to launch the standardized boxes program.

Every delivery box that is sent to this delivery station is registered in the computer system with a bar code on the packing. The computer system records when the package arrives and leaves the station, product information, rough size and weight, etc. There are students who prefer to open the packages and take the item out in the delivery station, then put the things they want in their own bags and return the useless boxes to the delivery station. The delivery station sets four recycling tanks for those students and recorded the rough profit earned by these returned boxes every month in the system. We asked for permission to search the system and collected several sets of data for our following analysis. The sets of data we get from the delivery station is as followed.

- 1) The number of packages that this delivery station receives every month.
- 2) Profit that the delivery station earned using wasted boxes every month.
- 3) Unit price for a kilogram of wasted boxes earns in the previous years.

- 4) Rough number of people that were around the campus every month. (Data collected by the student union)
- 5) The rough number of boxes for one kilogram.

All the data above are recorded from Jan 2018 to Nov 2020.

We classify the raw sets of data and make one Excel file to process the numbers. For the convenience of calculation, we label the sets of number 1, 2, 3, 4, 5 above as A, B, C, D, E. The equations we use to analyze the data are listed below.

- 1) To get the data sets X that shows the average number of delivery boxes one person receives per month. $X = A/D$
- 2) To get the data sets Y that shows the recycling rate in this delivery station. $Y = B/C * E$
- 3) The derivative of two data sets. $X' = dX/dt, Y' = dY/dt$

Then all the processed data sets can be analyzed as points in a 2D space where x axis stands for time and y axis stands for the value. We use MATLAB to put all the data points that we get from previous calculation in terms of average number of packages that one person receives per month and recycling rate for delivery boxes in the station into one single plot. Then the least squared method is applied to combine all the points together and create a linear fit curve. The curves indicate the trend that how these two variables change with the respect to time. In our final plot (Figure 4), the red round points are the data points that stand for the average number of delivery boxes that one person receives per month. The blue star points are data point stand for the rough recycling rate under our calculation in this delivery station. The red and blue lines are the linear fit lines that show the trend of these two kinds of points change. Our analysis for the plot we get will be discussed in the result section.

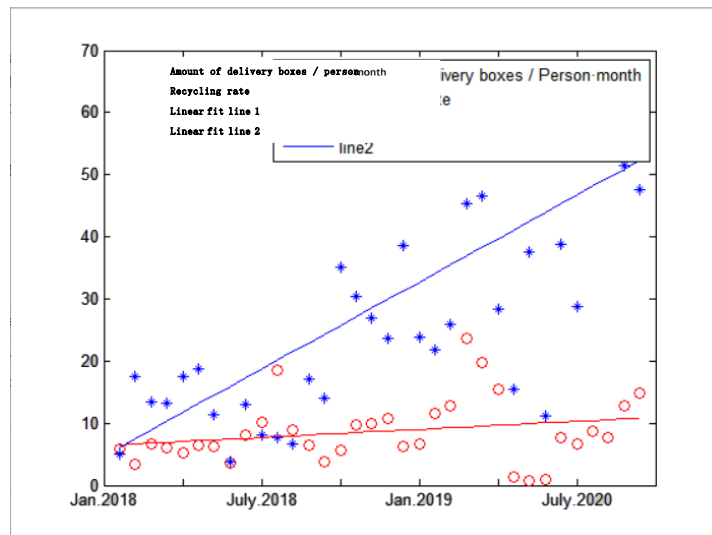


Figure 4. Collected data analysis in the sample delivery station

2) *Part 2 (Interview)*

In order to obtain direct information from our potential customers and future partners, we organized an interview with a staff working for S.F. Express company on 20th Nov 2020. We asked several questions in terms of market situation and public preferences from his view, potential partners and competitors, suggestions for our project, etc. The details he provided as a worker in express industry help us better organize and adjust the whole structure of our business plan. The questions we set for the interview and the staff's answer that were translated into English are as followed.

Q1: The change trend of the package amount receives by the delivery station.

A1: These days, the delivery station receives more and more packages, like about 600 to 700 packages per day. Last week, during the Double Eleven Discount, we have received more than 2000 packages every single day. On average, a delivery station has to cope with tens of thousands of packages every month.

Q2: Do you have any strategy to recycle the boxes? What do you think of students' attitudes toward recycling?

A2: We have set up recycling bins and many students are willing to just leave the delivery boxes there. For several semesters, the number of recycled boxes has been continuously increasing. In my opinion, students around the campus want to recycle since the boxes are useless for them, but the paths for them to recycle are limited. Actually, the boxes worth little value for us as well. We just sell the boxes to the waste collector at an extremely low price.

Q3: Do your company have any similar plans or policies for box recycling? What do you think of our project?

A3: S.F. Express, the shipping company I work for right now, does not have relevant policies. As far as I know, other shipping companies do not have such policies either. This way is innovative, but I don't know whether it can actually be done. There are so many boxes out there to be collected, so the market size certainly has no problem. I think you can seek for some corporations since the shipping companies would like to pay attention to the environmental problems with a group of university students. And the business model should be clearer as well.

We have recorded the whole process and the analysis for the interview will be discussed in the result section.

3.2 Study 2

As it regards the feasibility of the venture, we need to understand public willingness in returning the delivery boxes to the shipping company. The attitude of the general public toward recycling standardized delivery boxes is a crucial one that affects the operation of recycling processes. It is also important for us to know what incentives can motivate the common people to join in the recycling processes and to what extent are they willing to do so. Moreover, we would like to investigate, what percentage of the population, if any, will voluntarily recycle the delivery boxes even without incentives. The answers to these questions are highly related to the feasibility and the cost of our business plan. Our main hypothesis is as followed.

Hypothesis 1:

There is a sufficient number of people (e.g., 50%) to support our recycling processes and help us make it successful.

Hypothesis 2:

The public has a higher rate of recycling the delivery boxes in the way of just leaving the delivery boxes in the Pick-up Stations than in the way of returning them to recycling bins next time.

To answer this, we designed a brief survey consisting of six questions and issued them to the online public. Generally, we attempted to gather information from three aspects: a) People's general acceptance to the standardized delivery boxes; b) What specific incentives we provided are more attractive to them; c) In which way are they preferable to recycle the delivery boxes.

According to the main two different ways of delivering packages in China, that is, a) delivering packages to the Pick-up stations and b) sending packages to your home directly, two corresponding ways of recycling boxes naturally emerges. Firstly, if their packages are delivered to the Pick-up Station, the respondents who are willing to recycle the boxes in our survey are allowed to either leave the packaging boxes in recycling bins established in Pick-up station or get the packages home and return the boxes to the station next time they come to pick up their packages. Alternatively, if their packages are sent to their home by couriers, we offer them the option to return the boxes to the couriers and they will take the boxes back and reuse them.

Additionally, there are two possible monetary incentives that we designed for people who are willing to recycle the delivery boxes. The first one is to get free shipping for one time per week if you are on the top position on the weekly ranking, which is determined by the number of recycled boxes. The second one is to get certain amount of money in the form of "red envelope" in online applications every time you recycled a box.

3.3 Study 3

To determine the viability risks of our business model, we calculate an income statement by using assumptions and key estimates.

1) *revenue*

Assumptions: we are going to sell 2 billion delivery boxes per year based on the market demand with a price of ¥2 per box. Our revenue is ¥4 billion per year.

2) *cost*

Our potential costs include cost of goods sold (raw materials, labor and overhead), operating expenses (depreciation expense, administrative expense, marketing expense and transportation expense), and other expenses (loss/damages, Research and Development). The total cost is ¥1.2459 billion per year.

Assumptions:

- 1)The raw material cost per box is ¥0.06885 according to U.S. Plastic Corp statistics.
- 2)Total number of workers hired are 3000 with an annual salary of ¥60,300.
- 3)Monthly rent for production factory is ¥150,000

4) Total number of production lines are 200. Machines per production line costs ¥1,500,000. One production line can produce 50,000 products per day with an estimate life of 10 years and salvage value of ¥100,000. We use straight line method to calculate our annual depreciation expense.

5) Income tax is charged at 25% of our pretax net income according to Law of the PRC on Enterprise Income Tax.

Estimates:

Annual administrative expense is ¥0.05 billion.

Annual marketing expense is ¥0.01 billion.

Annual transportation expense is ¥0.02 billion.

Annual loss/damages cost of our delivery boxes is 0.5 billion.

Annual research and development expense is ¥0.02 billion.

3) *Net Income*

Based on our calculations, we have a net income of ¥2.06 billion.

4 RESULTS

4.1 Study 1

1) *Part 1 (Data)*

According to the plot we get, the red and blue lines that fitted by the MATLAB are all continuously decreasing, even though the data points ranged from February to September in 2020 are influenced by the COVID-19, but the linear curve still can show the general trend. For the red line, which represents the average number of delivery boxes that one person receives every month, is increasing from about 6 packages /person · month to almost 15 packages/person · month. We believe that the data would be much larger without COVID-19 in 2020, maybe reaches a number like 20 packages/person · month. Moreover, the package numbers in October and November are the highest among the whole year, which may due to the great discount day Double Eleven in China. The curve indicates that people receive more delivery boxes because of the rapid growth of e-commerce industry. The potential market volume is satisfying, the total number of delivery boxes is ideal and large enough to support our project.

According to the blue line, which stands for the recycling rate, is also increasing at an ideal rate. At the beginning of 2018, the average recycling rate is only around 8% ~ 10%. However, the recycling rate in this delivery station has risen up to over 50% in 2 years. We believe the main reasons are the recycling tanks set by the station and improvement of public attitude towards recycling.

Although the data we obtain from one single campus delivery station is limited, the result can still imply the general situation around the whole country. We prefer to start our project in the

university campus at the beginning since students receive ideal number of packages and their attitude toward recycling program would be more friendly compared with average level of the whole society. We take the delivery station in international campus, Zhejiang University as one sample for our market analysis, the data cannot represent the exact situation in the whole country, but the curves imply the information in terms of general trend and future prediction for our target market.

2) Part 2 (Interview)

From the staff in the delivery station, we can obtain some information that helps us adjust the business model. The following key points the interview implies are the ones we think significant in terms of evaluating our project.

1) The number of delivery boxes is increasing at an ideal rate and the amount nowadays is already large enough to support our business. The market potential for delivery boxes is considerable and immeasurable in the future.

2) We can tell from the interview that the public attitudes toward recycling is ideal. Even the profit for customers, delivery station, shipping company is quite low right now, there are still many people try to recycle the boxes. The lack of recycling paths becomes their largest obstacles, which means that the demand of projects targeting recycling delivery boxes is urgent in the market right now.

3) Our potential competitors have not triggered similar programs that support the boxes recycling. The volume of our company is small compared with those large shipping companies in China, so taking a step ahead is important and it will be a great chance for us.

4) The program launched by university students that helps solve social environmental problems are welcomed in the large companies and are supported by the Chinese government.

4.2 Study 2

The data demonstrates that we have 107 participants completed our surveys. Since we have questions asking their age ranges, we collect the information that thirteen of them (12.15%) aged under 20, forty-six of them (42.99%) aged between 20 to 30, twenty-six of them (24.3%) aged between 30 to 40, and twenty-two of them (20.56%) aged above 40 (Figure 5). This distribution of age ranges ensures the diversity of our sample. Moreover, 10 of them (9.35%) never shop online, 80 of them (74.77%) receive 1 to 5 packages per week, 15 of them (14.02%) receive 5 to 10 packages per week, no one receives 10 to 15 packages per week, and 2 of them (1.87%) receive more than 15 packages per week (Figure 6). It shows that the current business volume of express industry is high so the potential waste of delivery boxes can be very huge. According to statistics, current recycling rate of delivery boxes is under 20%. It reflects potential social environmental problems, which is an urgent problem needed to be solved. When it comes to our incentive systems, one of the most important non-monetary incentives is to provide them with inspiring feedbacks about how their actions of recycling boxes have made great contributions to protect the environment. For instance, we can show them how many trees they have saved in terms of the number of boxes they recycled (e.g. 2000 recycled boxes = 1 tree). They may naturally have a sense of psychological satisfaction and also form a positive competition system with others. Two other possible monetary incentives we mentioned in research design have the following outcomes in our survey: 28 respondents (26.17%) chose to

get free shipping one time per week in terms of the number of boxes you recycled in the ranking, 40 respondents (37.38%) chose to get certain amount of money in the form of "red envelope" in online applications every time they recycled a box, 38 respondents (35.51%) reported that they could recycle the boxes without any rewarding, and one respondent (0.93%) would not recycle delivery boxes even with rewarding (Figure 7). Even though these two monetary incentives can account for a certain amount of cost, we are able to control it to a minimum level. Combined with non-monetary and monetary incentive systems, even though the actual situation may not be so optimistic in practice, we have enough confidence in getting more than 50% support (hypothesis 1) from the public to make it through.

1. What is your age range ?

Options	Total	Proportion
Under 20	13	12.15%
20 to 30	46	42.99%
30 to 40	26	24.3%
Above 40	22	20.56%
Number of valid applicants	107	

Figure 5. Results for question #1 - age range

2. How many packages you would receive per week ?

Options	Total	Proportion
Do not shop online	10	9.35%
1 to 5	80	74.77%
5 to 10	15	14.02%
10 to 15	0	0%
More than 15	2	1.87%
Number of valid applicants	107	

Figure 6. Results for question #2 – package amount

3. Generally, how would you get your packages ?

Options	Total	Proportion
Delivered to Pick-up Stations and then pick up by myself	58	54.21%
Directly delivered to my home	45	42.06%
Other ways	4	3.74%
Number of valid applicants	107	

Figure 7. Results for question #3 – benefit selection

4. Which one of the following benefits you want to get from recycling standardized delivery boxes ?

Options	Total	Proportion
Free shipping one time per week according to the rank of the number of boxes you recycled	28	26.17%
Get certain amount of money in online applications every time you recycled a box	40	37.38%
Not a big deal. I'm willing to do so even without rewarding	38	35.51%
Not willing to do so even with rewarding	1	0.93%
Number of valid applicants	107	

Figure 8. Results for question #4 – package receive approaches

5. In which one of the ways would you want to recycle the boxes ?

Options	Total	Proportion
Leave the boxes in recycling bins in the Pick-up Stations after taking out the items	51	47.66%
Bring the packages home first, and return it to recycling bins next time you come to pick up your packages	31	28.97%
Couriers come to recycle the boxes when they come to deliver your packages to your home	23	21.5%
Not willing to recycle the boxes	2	1.87%
Number of valid applicants	107	

Figure 9. Results for question #5 – methods for recycling

We have mentioned two main ways of delivering packages in research design. Based on our data analysis, 58 respondents (54.21%) reported that their packages are always delivered to the Pick-up stations, and 45 respondents (42.06%) reported that their packages are sent to their home by couriers, other 4 respondents (3.74%) received their packages in other mixed ways (Figure 8). Given two different ways to receive their packages, three corresponding ways to recycle boxes have been provided to our respondents. According to our data analysis, 51 of them (47.66%) chose to leave the boxes in recycling bins in the Pick-up stations after they retrieve packages, 31 of them (28.97%) chose to get their packages home first and return the box to the recycling bins next time they come to collect their packages, 23 of them (21.5%) chose to return the box to the couriers who deliver packages directly to their home, 2 of them (1.87%) rejected to recycle the boxes in any of these ways (Figure 9). It demonstrates that the majority of our respondents are willing to just leave the delivery packaging boxes in the station for recycling and take their items home. This is also the primary way of recycling we focus on, as it is the easiest way to operate the recycling processes for both parties and can reduce the cost to the lowest level. And at the same time, our hypothesis 2 has been validated.

4.3 Study 3

Table 1. Income Statement

Sales	4 billion
Cost of Goods Sold	
Raw materials	(0.137billion)
Labor	(0.1809billion)
Overhead	(0.048billion)
Operating Expenses	
Depreciation Expenses	(0.28billion)

Administrative Expense	(0.05 billion)
Marketing Expenses	(0.01 billion)
Transportation Expenses	(0.02billion)
Other Expenses	
Loss/Damages	(0.5 billion)
R&D	(0.02 billion)
Income Tax (25%)	
Net Income	2.060575 billion

Our income statement demonstrates successful revenue streams and provides us a sustainable profit.

5 CONCLUSIONS

This article aims at providing a solution to reduce the huge waste generated by the express delivery industry in China. Our solution is to produce standardized and reusable delivery boxes that can be reused over 100 times, and then we sell the boxes to major Chinese shipping companies. To determine the feasibility of our solution, we collected data from a delivery station at Zhejiang University and calculated the average amount of delivery boxes per person and the recycling rate with respect to time. In addition, we conducted a survey regarding to people's willingness to accept our standardized delivery boxes. Our findings are that the amount of delivery boxes per person per month and the recycling rate are both positively correlated with time, meaning that people are more inclined to recycle as time goes by. We also find that over half of our sample from the survey are willing to pick up the deliveries at the Pick-up station. Based on our findings, we are able to determine the desirability, feasibility and viability risks of our business model. We find that our desirability risk is minimal due to government support and large customer segment. The data shows that almost 80% of our sample would like to use our standardized and reusable delivery boxes. In terms of our feasibility risk, we have determined our raw materials to make our product. It is feasible to build our product and scale the value proposition.

Our company plans to sell delivery boxes to major express delivery companies in China (Figure 10). We plan to use Creo 6.0 to create the shape of the standardized delivery boxes. (Figure 11). Since the recycling process would be inconvenience and costly if we use traditional packing methods like adhesive tape, we design a new connecting method on the top of our boxes. The fundamental theorem for this kind of connection is mortise and tenon joint structure, two slides of paper hooking with each other can provide a way of packing which satisfies both requirements in terms of strength and reuse. As for the material, we choose PVC for the supporting parts and LDPE for the surface area. In this way the whole structure can be strong enough for our reusable processes and also keeps the ideal weight and cost.

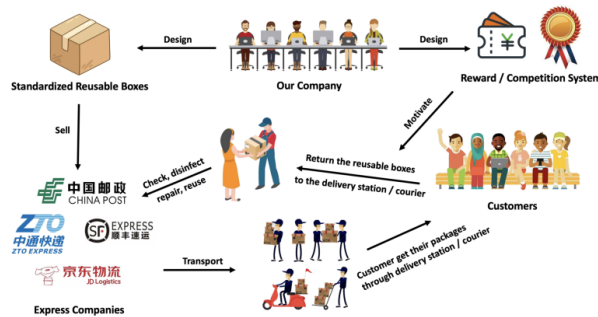


Figure 10. Business model for our company

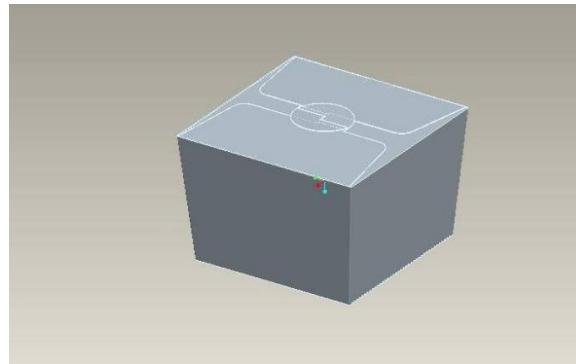


Figure 11. Standardized delivery box appearance

According to the "Plastic Strength and Support Design" by Bin Ye, the material we would like to apply on the standardized boxes have quite high levels in terms of intensity and strength [4]. We are expecting that for every single delivery box we produce can reach over 100 times recycling time. Then if we include the variables that some people are not willing to return the boxes and some boxes are broken during the transporting process, the general average recycling time for one box should be over 20 ~ 30 times. Under such calculation, the standardized boxes that we would like to promote will have ideal profit space.

However, even though our plan can reduce the waste in terms of delivery boxes, the plastic we use on our standardized boxes are not environmentally friendly materials and can still cause pollution. The lasting time for these two kinds of materials are too long to easily go through the process of soil decomposition. Therefore, we will try to replace the materials that even better for the environment and make our program 100% environmentally friendly. Furthermore, our business model is viable and able to make sustainable profit. Based on our estimates, we are able to sell 2 billion delivery boxes per year with a price of \$2. Therefore, we calculated an income statement with a total revenue of 4 billion and a net income of around 2 billion. Therefore, our viability risk is very minimal [8-10].

However, the findings and conclusions can be biased with the consideration of these factors. The sample sizes in both of our research methods are not large enough. In our linear regression model, our sample only includes students and faculties from Zhejiang University. In our survey,

our sample size is only 107 people with the majority of them from age 20 to 30. Second, we may encounter response bias in our survey. It is possible that people who care about the environmental issues are more likely to respond to our survey. These limitations might shape the reliability of our analysis and associated conclusions. We need further research to understand the size of our potential customers, customers' desirability to our products and risks remaining undetermined.

Our findings have important implications on environmental problems, such as pollution and waste of resources. Some materials used in the traditional delivery boxes cannot be recycled and generate pollution. In addition, the traditional cardboard boxes are products that can only be used one time. However, our standardized reusable boxes can be easily break down and recycle, thus reducing the need for waste disposal. Our standardized box is healthier and “greener,” and mitigate the pressing need for solving environmental problems and help achieve the common good.

Acknowledgment

We gratefully acknowledge the valuable guidance and suggestions from Dr. Matthew Grimes during our research project and preparation of the paper.

REFERENCES

- [1] State Post Bureau of China (SPBC), 2020. The National Five-Year Plan for Express Delivery Sector. available at. State Post Bureau of China, Beijing, China (In Chinese).
- [2] Emch, Adrian, et al. “Adrian Emch.” *e, Concurrences*, 6 Aug. 2020, www.concurrences.com/en/bulletin/news-issues/august-2020/the-chinese-state-administration-for-market-regulation-breaks-new-ground-with.
- [3] Xu, Ming. “Resources, Conservation & Recycling.” *Journal*, 2019 www.journals.elsevier.com/resources-conservation-and-recycling.
- [4] Ye, Bin. " Strength and Bearing Design of Plastics ", *Chemical Corrosion and Protection*, 9-19, Vol.18, No.2, 1990. <http://lib.cqvip.com/Qikan/Article/Detail?id=284593>
- [5] “Waste: a Problem or a Resource?” *European Environment Agency*, 23 Nov. 2020, www.eea.europa.eu/signals/signals-2014/articles/waste-a-problem-or-a-resource.
- [6] Gong, Yingchun. “Express Delivery Service Generates Massive Waste.” *Express Delivery Service Generates Massive Waste - China.org.cn*, www.china.org.cn/environment/2016-03/30/content_38142697.htm.
- [7] Ma, Chi. “Report Sheds Light on Waste in Booming Delivery Services.” *Chinadaily.com.cn*, 2019, www.chinadaily.com.cn/a/201911/12/WS5dca5740a310cf3e35576dc7.html.
- [8] Ltd, Research and Markets. “China Express Delivery Market: Size, Trends & Forecasts (2018-2022).” *Research and Markets - Market Research Reports - Welcome*, www.researchandmarkets.com/reports/4520709/china-express-delivery-market-size-trends-and.
- [9] Liu, Yang. “Opinions on Promoting High-Quality Shipping and Formation of Strong Domestic Market.” *Suggestions of the National Development and Reform Commission and Others on Promoting the Development of High-Quality Logistics and Forming a Strong Domestic Market _ Government Affairs _ China Government Official Website*, www.gov.cn/xinwen/2019-03/02/content_5370107.htm.

[10] “Opinions on Promoting the Development of the Express Delivery Industry.” Several Suggestions of the State Council on Promoting the Development of the Express Industry (Published by Central Government [2015] No. 61) Government Information Disclosure Column, www.gov.cn/zhengce/content/2015-10/26/content_10256.htm.