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9B17D020

Tetra Pak: Creating a Recycling Chain in China

Yu Gong, Fu Jia, and Steve Brown wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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In early 2016, Terry Long had just been appointed as the recycling planning coordinator for Tetra Pak China Ltd. (Tetra Pak China). He sat in his office in the Yizhuang Economic Development Zone in Beijing. He felt lucky to be 15 kilometres away from the city centre and able to breathe cleaner air than people based in the city. As he looked out his window, he saw Tetra Pak China’s factory busily producing carton packages. He had always been proud to be a member of Tetra Pak International SA (Tetra Pak) and the environmental department. Within just a few years, Tetra Pak China had successfully created a recycling chain system, which had increased its recycling rate in China from almost zero in 2004 to 28 per cent in 2015. Tetra Pak helped develop several small- and medium-sized entrepreneurial businesses that devoted themselves to the recycling business. Furthermore, thousands of waste pickers had found that they could earn extra money by collecting used cartons and selling them to collectors. At the same time, the government, together with other companies and nongovernmental organizations (NGOs) organized campaigns to educate consumers about waste separation. Consumers were more aware that carton packages could be recycled, and they were participating in waste separation activities. Positive changes were happening.

Long felt his work was meaningful, and when he stepped into the new position, he began to ask questions: How could Tetra Pak continuously motivate recycling companies to grow even bigger? How could Tetra Pak support recycling activities to achieve an even higher recycling rate? How could Tetra Pak achieve its recycling targets without much financial support?

Company Background

Tetra Pak was the world’s leading food packaging and processing company. By April 2016, it operated in more than 175 countries and employed more than 23,600 people; it had net sales of €11.9 billion[[1]](#footnote-1) in 2015. Besides the familiar Tetra Pak package units used by consumers, the company also provided filling machines, processing equipment, distribution equipment, and service products to business customers in the food industry, particularly the dairy, cheese, ice cream, beverage, and prepared-food sectors.

Tetra Pak was founded in Lund, Sweden, in 1951 by Dr. Ruben Rausing, who believed that a package should save more than it costs, both for the environment and for customers. Tetra Pak effectively and efficiently used raw materials, applying aseptic technology to create packaging that prevented food losses, made food safe, and increased food availability.

Tetra Pak realized the importance of conducting business in a sustainable manner and taking full social and environmental responsibilities. Growth, innovation, environment, and performance were the four cornerstones of Tetra Pak’s strategy. In terms of the environment, as early as the 1980s, the company had conducted life-cycle analysis research for all aspects of its operations, from designing the product and purchasing materials to manufacturing, transporting, and filling the cartons, and then through to consumption and the end of the life of the cartons. Since 2004, Tetra Pak had been a member of the United Nations Global Compact, which brought together companies, United Nations agencies, labour, and civil society to support 10 principles in the areas of human rights, labour, the environment, and anti-corruption. Tetra Pak also co-operated with NGOs such as the World Wildlife Fund and the Forest Stewardship Council on issues such as climate change and sustainable forestry management.

Tetra Pak in China

In 1979, Tetra Pak began its operations in China, when the first Tetra Pak filling machine was put into use in Guangzhou. At that time, milk was a luxury product that was affordable only for the rich. Pasteurized milk products dominated the milk market. However, due to distribution restrictions, these products were produced and sold only in a few big cities or at regional levels.

Tetra Pak brought ultra-heat treatment (UHT) technology to China. Together with aseptic packaging, this technology made it possible to distribute milk from the major northern production provinces to the southern consuming provinces. With the protection of Tetra Pak cartons, UHT milk could last for up to one year on the shelf without refrigeration.

The consumption of dairy products had grown rapidly in China over the past two decades. According to the Food and Agriculture Organization (FAO) of the United Nations, China’s dairy industry grew 20 per cent annually in the first decade of the 2000s. Two previously regional players—Inner Mongolia Yili Industrial Group Company Limited (Yili) and China Mengniu Dairy Company Limited (Mengniu)—had become the two largest UHT milk producers and national brands in China. To date, UHT milk accounted for around 80 per cent of the consumer milk market, and pasteurized milk accounted for the remaining 20 per cent of market share.[[2]](#footnote-2)

Concentrating on UHT milk in the Chinese market, Tetra Pak expanded rapidly along with this trend. It had four packaging plants in the end of 2016, in Beijing, Foshan, Kunshan, and Hohhot respectively. According to the 2014–15 annual report of Tetra Pak’s parent company, Tetra Laval, China was its largest market in the world in terms of the quantity of cartons sold in 2014.

Motivation for creating a recycling chain in China

A standard Tetra Pak aseptic carton was made of 75 per cent paper, 20 per cent polyethylene, and 5 per cent aluminum. The carton had a six-layer composite structure: the external-to-internal layers were polyethylene, paper, polyethylene, aluminum, polyethylene, and polyethylene, respectively. This unique structure effectively blocked air and light, and protected the package contents from deterioration.

Tetra Pak carton packages had a lower carbon footprint than alternative packaging such as plastic and glass bottles. Research suggested that the carbon dioxide emitted in producing a one-litre Tetra Pak carton was 60–90 grams, compared with 115–190 grams for the same volume of plastic packaging and 230–250 grams for a glass package. Carton packages also had other environmental advantages over their life cycle: they had a higher storage volume; they were easier to pack, transport, and store; and they protected food for a longer period.

Tetra Pak claimed that the cartons were 100 per cent recyclable as well as having these environmental performance advantages. However, due to their unique structure, Tetra Pak cartons had also been criticized for being more difficult to recycle than their alternatives. Recycling the cartons required special facilities not available in most developing countries over the past century. In China, for example, few used beverage cartons (UBCs) were recycled before 2004; most of them either ended up in landfill or were incinerated.

With a large market share in the aseptic packaging industry in China in the early 2000s, Tetra Pak felt a responsibility to look into end-of-life recycling practices, even though it had no legal obligation to do so. Jiayu Wan, environmental director of Tetra Pak Greater China, explained:

There are three drivers for our recycling practices. The first is Tetra Pak’s social responsibility. . . Northern European companies have a long tradition in this aspect. This is a very important driver, so we put the environmental protection in a high priority. Secondly, risk management: although there are no legal requirements in China, from a global perspective we implement it in China in advance, to provide a practical case and policy reference to the government for a comprehensive waste management legislation. Thirdly, we do this to enhance our product competitiveness in comparison to other packaging formats.

In 1998, Tetra Pak China set up its environmental department, and after approximately 10 years, Tetra Pak China created a UBC recycling value chain in China. During this period, Tetra Pak China invested more than ¥150 million[[3]](#footnote-3) in recycling. In 2015, Tetra Pak China achieved a recycling rate of 28 per cent of its UBCs. Tetra Pak set the recycling rate in its key performance indicators globally, making this a target not only for the environmental department but also for the whole company.

Creating a recycling chain in China

It took approximately 10 years (1998–2008) for Tetra Pak’s recycling chain to take shape in China. During that period, Tetra Pak China’s environmental department was a small department with a manager and three environmental engineers. The department reported to both the corporate communication department in China and to the global environmental department. One of its key responsibilities was to develop a sustainable recycling value chain.

Advanced recycling technologies used in developed countries were found to be not applicable in China, so the small team needed to find a solution for China. It adopted four steps to establish the recycling chain: (1) scanning the recycling market, (2) building awareness and selecting partners, (3) creating recycling capacity, and (4) securing the recycling capacity.

Scanning the Recycling Market

First, the environmental team examined the recycling market. The environmental engineers visited various cities in China to follow the life of the paper carton packages. They tracked the recycling routes: how consumers disposed of a carton package after they had consumed the drink, how it entered a dumpster and got to the landfill site, how many people touched it and how many processes it went through, and whether any companies recycled or reused it.

They realized that challenges for recycling existed at the two ends: first, China had no waste separation system—the majority of UBCs were mixed with other household waste; second, only a limited number of companies were capable of recycling the UBCs.

They also found the main collection force to be the thousands of waste pickers and cleaners who were highly efficient and motivated to collect valuable waste such as PET (polyethylene terephthalate) bottles, waste paper, cardboard, and metals to sell to secondary markets and make money. Some even made a living through this business. However, UBCs were low-value materials to these waster pickers; most importantly, no paper mills accepted them and the recycling technology was not available. The scan determined that (1) no existing recycling chain existed for aseptic packaging; and (2) if the market value was high enough, it would be possible to build a recycling chain.

Building Awareness and Selecting Partners

After scanning the recycling market, Tetra Pak decided to help create a recycling chain in China. The company first needed to look for recycling partners. The environmental team realized that, recycling capacity was the key to establishing the value chain. With the market demand and value, collectors would be motivated to purchase UBCs from waste pickers. The capacity could also be applied to manufacturing waste from Tetra Pak and filling waste from dairy customers.

Since 75 per cent of the cartons were made of high-quality virgin fibre, the environmental team first approached big paper mills. However, the big mills were reluctant to collaborate with Tetra Pak, even though they could gain Tetra Pak’s support. Compared with the mills’ production capacity, the UBC volume was small and unstable, and the mills would have needed to invest extra time into the collection process. “Later we realized we needed to find small companies who wish to be pioneers and have a development potential, who have a passion for environmental protection,” said Carol Yang, former vice-president and cluster leader of corporate communications at Tetra Pak China. That was how Tetra Pak China later found its recycling partners.

Hangzhou Fulun Ecology Technology Company Limited (Fulun) was one of those recyclers. Jun Yang, the founder and chief executive officer of Fulun, set up the company in 1994 in Fu Yang (now a district of Hangzhou city), Zhejiang Province. Fu Yang had a long history of paper production, spanning more than 1,900 years. Fulun was a tiny player, initially surrounded by more than 300 paper mills. Yang had always been creative among his peers, and at the very beginning, he had updated his facilities to deal with the used paper core tubes that others could not deal with because of their hardness. By chance, Yang found that UBCs contained high-quality paper fibre, and he modified his equipment to deal with the UBCs. With the cheap materials, Yang gained higher profits compared with his competitors. However, as a small-scale company, he felt pressure from the government, which did not favour small paper mills based on the assumption that they produced more pollution. He wondered about the development direction for his company.

In 2004, Yang met Tetra Pak’s former environmental engineer, Haibin Zha. Yang recalled the meeting:

He talked with me about the future of my company, the future of paper industry, what could be the future trends. Companies need to stand from a multi win or win-win point to think the question, if we the small companies could collaborate with the multinational company [Tetra Pak], it was like a small boat with an aircraft carrier.

Yang noted that he agreed with Zha’s environmental protection ideas, saying, “I am a local person, and after years of development, the creek in front of my home has been polluted; there were no fish left. Continuing with the traditional development mode is definitely not a sustainable way.”

After Zha showed him around Tetra Pak’s Kunshan plant, Yang said, “It soon changed my mind. Compared to the plant, ours was just a workshop.” Yang gained confidence after his visit to the plant and decided to collaborate with Tetra Pak to recycle the UBCs.By the end of 2015, Tetra Pak China was working with eight small and medium privately owned recycling partners.

Creating Recycling Capacity

After building awareness and selecting recyclers, the next step was to develop these recyclers, enhance their recycling capacity, and increase the recycling rate. Tetra Pak China applied various strategies to increase the recycling rate. Environmental engineer Rendy Ren, of Tetra Pak China, explained:

We applied several ways to increase the recycling rate. First was the recycle capacity; we help our recycle partners to expand the capacity . . . we may help them upgrade the equipment or build another production line. Of course, we do this together with our partners, and Tetra Pak expects no financial returns. Second, we help them create the collection network . . . we wish to establish a better waste separation system . . . if so, the recycled volume could increase a lot. Third, we help to enhance the value of the recycled products. . . . Fourth, we increase the public awareness, as an environmental protection program to promote the public to take part.

Developing Recycler Partners

Once Tetra Pak found its recycler partners, it provided them with various kinds of support. At the beginning, one approach was to provide the partners with discounted factory waste material. Another was equipment investment. Yang recalled the recycling prices:

At that time, their [the Tetra Pak factory’s waste material] price was very cheap; the market price was ¥1,500 per ton, while their price to me was ¥450 per ton . . . why do they let me earn money? I was quite curious at the beginning, and later I realize they wish I could earn the money and then recycle UBCs from the household waste. From a sustainable perspective, this was a temporary subsidy to help us to develop; Tetra Pak’s final aim was to build a sustainable recycling value chain.

Tetra Pak China also purchased recycling equipment and let the recycler partners use it for free. The ownership of the recycling equipment remained with Tetra Pak. One principle was that the investment should not exceed 30 per cent of the recyclers’ whole plant investment. Environmental director Wan explained: “Actually to them our investment was very important . . . this was a risk sharing principle. If we [pay for] all the equipment, they don’t have any risks, then it was very easy for them to withdraw. If they have their own investment in it, then it was totally different.”

Tetra Pak also provided support to these recycling partners during daily operations, as Wan explained:

According to the different conditions of each recycle partner, we provide specific training or hire the related experts to provide consulting services to solve the corresponding issues. For instance, the recycle partner in Beijing, because of the restrictions of the local environment policy . . . its key point was on the upgrading of the current technology to cope with the regulation. We are looking for related experts to optimize production, not to develop new technologies but focus on its energy usage, water usage, etc., while on the other hand, Fulun is at a developing stage. It has needs in purchasing and utilizing new facilities. Then we could let our supply management department contact experts who have the experience of the new equipment in other countries to provide help.

Tetra Pak also organized a recycling partner conference every year, where it shared industry trends and advanced technologies with its partners. The conference also provided an opportunity for the recyclers to network. Normally the conference was held at a recycling partner’s site to enable recyclers to visit each other’s plants and learn from one another.

Enhancing the Value of the Recycling Chain

Tetra Pak had a history of looking for ways to enhance the value of recycled products so that recyclers could generate higher profits from UBCs than from waste paper. The initial recycling technology separated paper pulp in a hydra-drum and left behind a polyethylene and aluminum mixture (i.e., PolyAl), which could be sold to other industry customers but had a lower value than if the aluminum and plastic were sold as separate commodities.

PolyAl-separating technology was available in other countries. However, the technology required a high investment, which was not feasible in China because the recyclers were all small- and medium-sized companies. Tetra Pak searched around in China for a Chinese version of the technology to separate the PolyAl. In 2007, Tetra Pak collaborated with Shandong Tianyi Plastic Company Limited (Tianyi) and Liaocheng University to develop a local technology to separate the plastic and aluminum in China. In 2009, the technology was commercialized in China, and it achieved separating purity of 99.5 per cent. Tetra Pak worked with environmental research centres to ensure that Tianyi’s production processes met environmental requirements. Tianyi later also become a Tetra Pak partnered recycler.

The technology proved to be economic, efficient, and green. Previously, the mixture of plastic and aluminum could be sold for around ¥1,200 per ton; in 2009, the separated plastic grains could be sold at ¥2,000 per ton, and the aluminum could be sold at ¥9,000 per ton.

After the technology was installed at Fulun, Yang commented, “After we implemented the PolyAl separation line, the value of the UBCs has increased by 30 per cent, our monthly sales increased by 25 per cent.” In 2016, Fulun produced recycled craft paper for wallboard and packaging companies, polymers for plastic recyclers, and foil flakes, which replaced virgin material for insulation and fireworks manufacturers. Later, another recycler based in Beijing, Beijing Xinhongpeng Paper Industry Co., Ltd. (Xinhongpeng), also installed the technology with Tetra Pak’s support. Both Fulun and Xinhongpeng agreed to recycle more UBCs with the extra profit, and they planned to expand their waste handling capacity.

Educating Waste Pickers

Besides working with the recyclers, Tetra Pak also worked with waste pickers beginning around 2006. The collection network was very complex: UBCs might first be collected by waste pickers or scavengers, who collected them in communities or picked them up on the streets, or by cleaners who collected at schools or public places. After accumulating a certain volume, these people sold the UBCs to a collector, which might then sell to a bigger collector or directly to the recyclers. Cleaning companies could also collect the UBCs in large public places such as train stations and airports and then sell them directly to the recyclers.

After the recycling partners were established, the fact that UBCs could be recycled needed to be communicated to waste pickers, the large majority of whom were not organized. One collector partner Tetra Pak found was Lianhe Dingsheng, the earliest company in Beijing to purchase UBCs. The majority of waste pickers had limited education, and it was very difficult to communicate with them individually using posters. At the end of 2006, Tetra Pak and Lianhe Dingsheng organized a training event for waste pickers to help them understand the value of UBCs; more than 100 people attended the training. In 2007, they held two similar training sessions, and the participants had a coverage of more than 100 local communities in Beijing.

Tetra Pak also provided free balers to collectors, including Lianhe Dingsheng, to help them transport the UBCs to recyclers in a more organized manner. In 2009, Tetra Pak and some collectors launched a “pick-king” assessment activity, which awarded outstanding waste pickers for picking the highest volume of cartons in a given period.

Educating Consumers

Tetra Pak’s corporate communications department organized a series of campaigns with support from the marketing and environmental departments to promote public awareness of environmental protection and UBC recyclability. In May 2005, Tetra Pak and *Shanghai Youth Daily* held a large public event in Shanghai for two months with the theme “Recycle Tetra Pak UBCs, happy for environmental protection.” From 2007, Tetra Pak launched recycling education programs with the slogan “Green life, start from me” for three consecutive years in several primary schools in Beijing. In May 2008, Tetra Pak donated hundreds of benches made from approximately 120,000 UBCs to Beijing’s Olympic Forest Park. In 2009, Tetra Pak launched another campaign, “Green World Expo, proud of me,” to support the Shanghai World Expo. Within half a year, 700,000 people had taken part in the campaign, which covered the local communities in 12 districts in Shanghai, and 113 tons of UBCs had been recycled. In the end, the waste was transformed into 2,000 benches on the Expo site, menus, and trash bins in the park. This campaign also had an influence on Tetra Pak’s customers; in the month following the Expo, almost all of Tetra Pak’s customers invited Tetra Pak to give presentations on environmental protection and provide them with ideas for their own waste recycling.

These types of campaigns continued. For Tetra Pak, the value of these activities was threefold: they educated consumers about environmental protection and the recyclability of UBCs; they influenced customers about the importance of recycling; and they supported the recyclers by providing them with recycled materials and by purchasing their products, such as benches.

Besides these campaigns, Tetra Pak China also tried to implement pilot collection projects with the government—an effort Tetra Pak China termed the ‘policy driven’ approach. The pilot projects focused not only on UBCs but also on household waste in general. Tetra Pak China coordinated experts, academics, and NGOs to conduct collection research to help local governments launch holistic designs for separation, transportation, and technics to deal with the rubbish, and to determine what related facilities should be built.

Securing the Recycling Capacity

Tetra Pak China took a holistic approach to creating the recycling chain (see Exhibit 1), while recyclers made the recycling network more solid by establishing their own recycling channels. In order to secure the recycling rate, Tetra Pak China provided incentives to its recycling partners while constantly encouraging them.

Rewards Based on Recycling Volume

Once recyclers received equipment support from Tetra Pak China, they were required to sign contracts and agree to achieve a certain volume of recycling in the next few years. They also provided access to third parties representing Tetra Pak China, who conducted annual accounting audits. These recyclers sent monthly recycling data to Tetra Pak China for tracking.

For Tetra Pak China, the investment in recycling equipment represented a support activity; the company did not require any financial compensation in return. According to Rendy, “We only have requirement on the recycling volume, so I support you with this equipment. I wish you could achieve a certain recycling volume in next few years . . . the continuous increase of recycled volume actually also help us achieve our recycling target.”

Every year, Tetra Pak determined a recycling target, which was agreed to by Tetra Pak and the recyclers. The recyclers were rewarded according to the volume they recycled. Wan outlined the process:

We have some incentive actions. For example, one key point is our factory waste material; the materials are in good quality, clean and not consumed, so they are an ideal recycle source. Every year, based on the location and other factors, we allocate the factory waste material to different recyclers. Based on the target they achieve, we provide them a corresponding discount. To be simple recyclers are financially encouraged to increase recycling. . . . This incentive is to keep recyclers being positive.

Wan was also thinking about changes to the support Tetra Pak could offer to recyclers. “Within the whole recycling subsidy, we may separate a part based on recyclers’ project proposals. We invite recyclers to apply based on their needs, and then submit to an approval committee.”

The recyclers were fully aware of the incentives and consequences. Yang, CEO of Fulun said that, “based on the price of the factory waste material, if we achieve the target the price is cheaper, higher if not.”

Zhenqi Guo, the general manager of Xinhongpeng, noted that if his company did not meet the target, “Tetra Pak will reduce support. When you apply for projects next year, it will reduce the support, including the factory waste material it considers your performance.”

Tetra Pak China did not punish recyclers. According to Rendy, “some of them didn’t meet the target; basically, we do not have any strict punishments. Later, we hope to make a rule: the equipment on your site is for you to use. If you meet the target you can use it for free. If not, we may charge you . . . however, this is a possible method, and we have never tried it.”

Constant Encouragement for Recyclers

Conflicts also arose between Tetra Pak and its recyclers, which mainly focused on the recycling progress. Tetra Pak China emphasized sustainable development of the recycling chain and applied a long-term recycling rate. However, the target was not aligned with those of the recyclers. According to one recycler, “the mission is not a stiff number; it is an expectation . . . what happens if [it is] not met, and [there is] nothing they can do?”

Another recycler expressed a similar concern:

Tetra Pak gave us lots of help along our development; it also gave us lots of pressure [by] investing in capacity. I have to maintain it. If I can’t collect the volume, or I can’t sell more products, it means cost to us. . . . The company is mine; there are many employees. I have to be responsible.

On the other side, Tetra Pak China believed it played a facilitating role by constantly encouraging the recyclers. According to Wan:

Relatively speaking, we are not in the recycling business, we are standing far and high. We could help them to see the trend for this industry, we could tell them which direction they could go. . . . Sometimes it is unavoidable. Many recyclers are small companies; they may at many times be content with their current situation. They may think, “I have a capacity of 20,000 tons, I have a profit rate of 10 per cent, 12 per cent is good enough.” Then I will tell them where is the industry growth area, what it will look like, if you hold this opportunity, your business may double.

Tetra Pak China praised Fulun as an exemplar among its peers. As Wan outlined, “Now it has a new plant plan; the investment is very big, with over 100 million RMB. Why would it be willing to do so? He is an entrepreneur with a further insight. He is considering the development in the next 10 years. . . . We wish the recyclers can have a long-term view [like Fulan].”

Tetra Pak China’s recycling achievement

After the creation of the recycling chain, Tetra Pak’s recycling levels increased from almost nothing in 2004 to about 28 per cent in 2015. Approximately 167,300 tonnes of UBCs were recycled in China—the equivalent of more than 16.7 billion standard 250-millilitre cartons (see Exhibit 2). Tetra Pak proved that it was possible to build up a recycling chain even without enforcement or supporting legislation in a developing country. However, Long’s questions remained for further exploration: How could Tetra Pak continuously motivate recyclers to grow even bigger? How could Tetra Pak support the recycling activities to achieve an even higher recycling rate? How could Tetra Pak achieve the recycling target without much financial support?

Exhibit 1: Tetra Pak’s recycling chain in China

Raw-material suppliers

(paper, aluminum, polyethylene)

Tetra Pak

Brand owners (e.g., dairy companies)

Distributors

Consumers

Secondary market

Recyclers

Collectors

Waste pickers

Note: Waste picker refers to individuals who are stationed at one community or patrol a certain region to sort and collect recyclable waste; Collector refers to the medium or large scale waste dealers who buy recyclable waste from individuals and sell to the recycler; Recycler applies the production process to recycle the waste into products and sell to secondary markets; Dotted lines represent the collection routes.

Source: Created by the case authors, based on interviews.

Exhibit 2: Tetra Pak China’s recycling of used beverage cartons, 2005–2015, by volume and rate

Source: Tetra Pak internal data.

1. € = Euro; US$1 = €0.92 in December 2015. [↑](#footnote-ref-1)
2. “China's Pasteur Milk Accounted for Only Two Percent of the Market Share of Milk”, www.ce.cn,

   www.ce.cn/cysc/sp/info/201208/22/t20120822\_21215700.shtml, (accessed on September 25th, 2017, in Chinese). [↑](#footnote-ref-2)
3. ¥ = CNY = Chinese yuan; All currency amounts are in ¥ unless specified otherwise; ¥1 = US$0.16 in January 2016. [↑](#footnote-ref-3)