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The Development and Future Foresight of Metal Recycling Industry

The metal recycling industry is unique. It started a long time ago when people noticed that the supply of metal mining could not fulfill the demand for metal manufacture, adding the fact that it was more environmentally friendly to recycle metals than mining. Thus, it weighted equally with the mining industry and became the essential industry for most countries. It was also unreplaceable as the fundamental of the metal supply chain. However, recycling will create many pollutions, such as wasted water, gas, and plastics. Therefore, governments in many countries will specially regulate this industry for environmental protection purposes. This essay will mainly discuss the development and the future of the metal recycling industries in different countries, developing and developed. Then I will focus on using the knowledge economy in the before, current, and future metal recycling company situations, including managerial decision-making and employees' reactions to the changes.

My father works in this industry for over twenty years in China, so he experienced this industry's life cycle, from developing to declining. He also has many reliable business partners around the world. Thus, Things that happened to this company have occurred to most other metal recycling companies to interpret this industry through this company.

His company mainly works with aluminum, iron, and primarily copper. And the raw materials come from all kinds of industrial and everyday scrap metals, including car cooling systems, motors, crushing metals, electric wires, etc. Those used scrap metals will be collected, compressed, and shipped from foreign supply companies located mainly in Texas, Japan, and Western Europe. When the shipment arrives at the factories, workers will separate and categorize them. And the company will sell the finished metals as raw materials to other manufacturing factories or factories that can further purify metals.

Because of the unique characteristic of raw materials, the industry sees trust as the most critical knowledge economy factor in business transactions. The calculated profit on data may look promising, but many factors, in reality, will influence the transactions. The primary reason is that the metal percentage is lower than the written report. Because shipments were coming from all around the world and it was impossible to test each shipment personally. We could only define a product by its report and several photos given by the suppliers. When calculating profit and deciding whether to purchase a particular patch of raw materials, the company will use the given report as the primary source. Then the company evaluates profit and risk by minus the actual cost and potential costs: wages, utility use, and potentially losses like thefts and miss calculation of report. If the given percentage number is purposely miss calculated, it will seriously impact the whole batch's profitability.

Plus, the profit of this industry depends on the number of products. Today copper price per ton is near seven or eight thousand US dollars. And to get one ton of pure copper, the raw

material may weigh four or five times heavier. To profit from the cost like shipment, labor, rent, and copper price change, the quantity of raw materials is massive. A patch of shipment may include tons of electric wires or motors that need to ship in dozens of shipping containers. Thus, the value of raw material usually is high for its quantity. As a result, because the company is working with mass quantity and high-value products, it became prudent when choosing trusted suppliers.

Similarly, for the suppliers, they only work with companies that they have to complect trust. Because overseas shipping is the only transportation for massive products, it takes months for suppliers to obtain all the payments. The primary concern may lose the final half price. Thus, the major scrap metal suppliers will regularly have tours on partner factories in all countries, but the risk remains high for getting all payments.

Building trust in the metal recycling industry is complicated. The first reason is that companies were less bound to laws when breaking contracts. One company may file claims that the result of copper's actual outcome is significantly different from reports. But the negotiating or suing process may take months or years, and in the end, it may still count as the net loss. Like my father once mentioned, the business partner he worked with for over twenty years can easily take one patch of shipments worth millions. However, they value the trust and further co-operation more than this one-time job. Therefore, with all the trust concerns and seeking long-term co-operation, the supply chain for the metal recycling industry remains narrow and stable. A company will only conduct business with other companies that have more than ten years of relationship. I once attended a meeting in Hongkong for international scrap metal

companies and noticed an interesting observation. I found out that companies' representatives always form small groups, and there were barely interactions between groups.

Some startup platform companies also attended the meeting. They would like to create a platform that allows all certified companies to post their scrap metal supply. They made two models. First, they will send a professional analyzer to the supply companies to test the patch of metals, and it will come with more service fees. The second model is just agency service purpose on building the relationship between two companies. Initially, I thought this idea was plausible because it makes the market more transparent and involves the third person to make transactions more secure. But after I asked some opinions, I realized companies would have zero trust for the new platform, so there is no way that companies will trust the platform's report.

Nowadays, people have a blind trust in the new platform. Most people use the platform because millions of others are using it. However, this kind of trust is unreliable. I used to sign up for a bicycle-sharing platform and paid two hundred yuan as a deposit, just like millions of other users did. The sharing company promised to return the deposit as soon as the user stops using a bicycle. The company finally went bankrupt, and millions of users, including me, could not retreat from the deposits. Another example is the new house renting platform provided different contracts for the landlords and tenants, and all the price difference became the earning for the renting company. The platform can be a great marketing tool to make the business transaction more transparent and faster, but users must be cautious with the potential risk of trusting the platform.

From the manufactory perspective of the scrap metal industry, labor was the primary factor before. When the shipment arrived at the factory, workers would finish most of the plastic and metals' separation works. They would use some simple machinery types to tear down the wires, and for small pieces of scrap metal, they would select and categorize by hand. Because a patch of shipment typically may include more than ten containers and weight over fifty tons, it may take up to a month for a thousand worker level factory to finish work on the patches. At that time, skills are minimally required because of the simple job and cheap labor cost. Workers would work in a designed position and get wages based on the quantity of work done. Therefore, more skilled workers worked faster and got paid more. However, workers familiar with all machines got the most produced, became the manager, and stayed the factory's longest time. The requirement of skills was different due to the further purchases of raw material. Working with air-conditioning parts requires operating crushing machines. Working with wires requires skills in operating tearing machines. There are many other machines in the factories that require skilled workers like lathes and forklifts. With more skills, there were more works available. I once asked a manager who knows all the skills about how he managed learned all. He said he could not wait there while the other team earned the money he could have achieved.

Two years ago, China banned scrap metal imports for environmental protection purposes. It generated a significant impact on the metal recycling industry globally. China used to consume more than 70% of scrap metal each year, and banning imports means that factories had to move to other developing countries like Thailand, India, and Malaysia. In the short term, the new factories will not be able to consume all the scrap metals because of the trusting problem, and it may take years for factories to work fully. Thus, developed countries, which are the major

exporters like the USA, West Europe, and Japan, have to recycle the used metals within their countries. Those years became the critical years for metal recycling companies to adopt this change. Many factories in China went bankrupt or move to other countries due to no import license, and suppliers struggled to find new customers. My father also moved the factory to other countries, but he placed very little investment. Because he believed that if China banned imports for environmental protection, other developing countries would soon put more strict regulations on importing scrap metals, mostly when every factory wanted to enter those countries.

Although the labor cost in other Asian countries may even cheaper than China's, working in an unfamiliar country means increasing unknown risk in the economy, culture, and political perspective. And as mentioned before, there will be a great chance of county-wide shutting down in the recycling business. Instead of investing in new factories, studying machines became a more popular direction for this industry. For factories in developing countries, devices can help control the quality of output and limit pollutions. And for factories in developed countries, machines will help to decrease labor use and boosting productivity. Many companies currently switch the focus on building machines for factories in significant export countries like the USA and Japan. Both countries have a high labor cost. Labor costs in those countries maybe ten times more expensive than in developing countries', which means if a worker uses the machine in the USA, the device has to be the same product as nine workers, otherwise will lose competitiveness against other factories in developing counties. Many factory owners in the USA would like to purchase machines that work in China because they are cheap, high productive, and easier to maintain. However, they noticed that the device became less effective in the USA. And the reason is that the machine is specifically designed for one factory use and cannot work correctly

without specialists' help. Take crushing machines as an example, metal products will easily damage the blade inside the machines. This situation may happen multiple times a day, and when it happens, the production line pulsed and need to either replace or reshape the blade. The replacement fee is much expensive than repairing, but only skilled people can fix the blade. For many factories in China, there was one specialist specifically working on fixing blades. With years of training, he can minimize the production line pulse caused by the damaged blade. However, factories outside China can only prepare dozens of new blades for a replacement, which will be a considerable cost.

With the retirement of many factories, many of their workers became unemployed. Interpreting this situation allows me to understand the upcoming knowledge economy poverty. Workers with specific skills will reposition to other factories like the workers who know how to shape blades. For most workers, years before, they originally came to the factory as a group based on their hometowns. The group size is typically ten to twenty people, and the leader now will try to find a new job for the group. It will be easier to find employment than individuals because of group size. If they cannot discover new jobs, the government will also place a job for them. Unemployment will lead to an unstable society, and that will be the last thing government expects.

In transforming from the labor force to machine force, the government must intervene for society's interest because this transformation is a paradox. If machines can take over all the works, the production will become more productive and boost economic growth. However, in the short term, there will be an increasing unemployment rate and threaten society's stability. In a

short time, the government will ensure a low unemployment rate by limiting marching to the machinery age. For example, Elon Musk is a big fan of machines, and if he can, he would like all of his Tesla factories to operate without human beings.

Nevertheless, the government required the minimum job position he must provide for each factory. In the long term, the government will focus on education on working adults. I expect to see more low-cost skill training classes in the future. The working class will be able to update the knowledge during work. Those classes will most importantly be authenticated so that the certificate will weigh similarly to a university degree in a resume.

What will be the future of the scrap metal recycling industry? This industry just experienced a massive change that major factories move out of China to other developing countries. But I believe that is for the short term because eventually, the major export countries will have to consume all the used metal within their countries because of their regulation. This process may take over ten years to compute because the factories in developing countries will remain highly competitive because of the low labor cost. The industry can bring in remarkable taxes for those countries. Suppliers in the USA have already started investing in building their factories. However, the major problem is that their factories can only consume a tiny portion of their total goods at a much higher price than export.

One of the significant changes is the shift from labor to machine. The cost of buying machines is higher from the calculation, and productivity is lower than using the labor force. But there are other external costs and benefits like environmental protection, government policies.

No way developed countries like the USA have mass labor factories. Their current challenge is to use the machine to compete with labor factories. The development of technology can solve the challenge. For example, when processing small mixed metals with diameters about two centimeters, workers will separate them by hand. There is a machine that can handle the job automatically with more accuracy and productivity. The device will shake the metals till even place on the plate. Then the machine will measure each piece's color, density, and material. Then it will separate the metals by air. I believe there will be more machine inventions in the future.

The structure of the companies' network will change. The small change of government policies will generate a considerable impact on this industry. For example, processing electric wires will have two primary products, the plastic and copper core. We do not have the license to handle plastic, so we need to sell them to other factories with the permit. During those two years, most of those factories got relocated to banned plastic imports, so we cannot find the factories to proceed with the plastic and stop importing wires. Thus, companies are more willing to get united to handle those changes. For instance, when facing the challenge of banning imports, many Chinese factories worked together to make suggestions and pressure the government. Finally, both sides compromise that some scrap metals are allowed to import, and the license will continue. I expect companies will form a closer relationship to handle the changing environment, such as updating machines, changing policies, and taking culture difference problems.

Platform by then will become plausible, but the process will be long and complicated. The primary problem is that how a platform can gain trust from each company. The answer is the union or organization like platform: every company uses it, and every company controls the

platform. Like building a Golf field, companies will pay for the membership and "own" a portion of the union. In that case, there will be a more transparent market for every user on the platform. And most importantly, users are obligated to obey the union rules so the business fraud will occur less often. Plus, trust-building will be more straightforward and allow more starter companies to enter the industry.

The beginning of the union will be the most challenging part. It will require supreme power from significant recycling companies. They will be the precursors and attract other companies. That may take years for those companies to make the agreements, but the union will quickly attract other companies if they do. Why will any company willing to pay the membership and join? The primary benefits will be the broader collection with other companies globally and the less risk transaction. Taobao, the largest internet shipping website in China, uses an intermedia called Alipay. Instead of paying directly to the shops, buyers will firstly transfer payment to Alipay. When Alipay receives the charge, it will notice the shops to ship the product. And after the users receive the products and check if they work correctly, the payment will transfer to the shop. The union can work similarly: the buyer company pays to the organization first in full. If the buyer receives the product, they will notice the organization to transfer the payment. So, supply companies will be more likely to get the charge in full, and buyers will take advantage when negotiating the product's quality because of the union's involvement.

Moreover, membership in the union means the company invests in the organization. The investment will work as the safety deposit and prevent that company from breaking the contract. However, there are some flaws in this kind of transaction. Because the payload is typically

massive, some companies will not be able to pay in full. And when a union is working with the claim about the quality, it may take a long time to investigate and make fair decisions. And trust, as usual, why should a company trust this system.

The scrap metal recycling industry has experienced some severe changes from business networks, government policies, environmental protection, and labor use. And there will be more revolutionary changes in the industry. I expect the market will be more transparent, fair market and a closer relationship between companies. There will be a shift in employment for all workers, sales, and manager levels. Companies must remain flexible for those changes or will soon lose competitiveness. Nevertheless, the greater the threat, means better the opportunities. With fewer competitors, the remaining companies will have a promising future.