SMALL FACTORIES: WE NEED A LOT OF THEM FOR OUR FUTURE

BY WEN-LUNG CHANG, PH.D.

The world is in an unprecedentedly fast changing, and competitive period of history. The process of globalization and the great tech revolutions in the last half century are contributing to that. Countries that are quick to adapt will do well, and the slow ones will be left behind. One of the questions every nation should ask is how well its industry adapts. Does America have the right structures to compete and grow? What can we do to improve? In this article, the author will look at 1. what America has been doing in the last half-century. 2. What has happened in China, our major trade partner? 3. The Covid 19 pandemic disruption of the global supply chains shocked us. Many of our factories could not produce because they depend on foreign parts in production. Their supporting industries are in foreign countries. Future pandemics and political tensions around the world are inevitable. Expect a lot more trouble ahead. 4. It is wise for us to come up with a to-do list to reduce the future risk now. This author suggests securing our own factories first by building their support industry locally. Just a number of small factories will be enough to provide the needed parts. This can be done cheaply and quickly. These new small factories, when growing in number, also may work among themselves and produce additional products they can't do alone. Thousands of small factories working among themselves have helped China to dominate the world consumer product market. We need small factories like that too.

1. America was the greatest industrial power in the world after WWII. In fact, we were the dominant power at the time. Such dominance might have hurt us. We ignored the progress in the rest of the world for decades. Our car companies only changed the body slightly for new model years. There were few significant up-grades under the skin between 1955 and 1985. In the meantime, import cars from Japan and Germany were getting better and better. GM

finally had to file for bankruptcy in 2009 and built its modernized production with government help. Chrysler became foreign-owned. Ford handled the difficulties slightly better. It built new plants in the South to modernize production and cut costs. What went wrong with the American Auto industry? A major problem was their old vertically integrated production system, started by Henry Ford, and showed its high productivity during the war. The system was big and highly productive, but extremely inflexible. GM and Ford had a heck of a hard time making significant changes to meet the market demands in later years. The old production system is built for speed without the consideration for future changing demand. The new GM was forced to outsource a lot of parts and made its production system closer to a horizontally integrated production network. They are able to make significant changes quickly now. Outside suppliers can develop and deliver new parts quickly and bear a part of the initial costs. This is a far more flexible industry.

Ford is basically doing the same thing. Their next big test will be the shift to electric cars. We will watch how well GM and other car companies do. There is a major fault in the new GM's and Ford's horizontal network, however. It outsources too much from overseas. Supply chain disruption may shut down their entire production lines. America simply does not have nearly enough local supporting industries. In fact, we have been shifting away from mining, steel and aluminum making, hardware production, etc for decades. This will hurt us for years to come. Globalization should not mean giving up the security of our industry.

We see the lack of flexibility in the big old American hand tool factories as well. This author was a tool wholesaler in Northern California 40 years ago. He once suggested a new pliers design to

the sales manager of a pliers factory. The manager liked the idea but gave a "no" answer a few days later. Their factory would have to invest too much in new equipment. They would not do it unless they could sell 50,000 pieces a year. Years later, V8 Tools, a small factory owned by this author, made a pair of similar pliers. With the help of two partners, V8 made the first 4000 in a few months. No new equipment needed. The initial cost was so low and he would be happy to sell just 2000 pieces each year. What a shocking difference! This big pliers company finally added a lot of new tools to broaden its line in recent years. Most of them are imported. Its own factory is likely not flexible enough to produce many new products.

This author once suggested to the Manager of another hand tool company that they needed a 24" long ½" Dr. breaker bar. Their 18" one did not give enough torque for new cars. This company was unable to manufacture the bar because a 24" bar could not fit into their production line. They also tried and failed to make angle wrenches because their polishing machine requires a box end to anchor a wrench. An angle wrench does not have a box end. The inflexibility of their production line is very clear, and making changes would be costly.

Moving onto a broader view of the issue, many corporations tie their CEO's pay to the quarterly income of the company. That may explain why they rarely invest heavily in the future of the company. That is not a good thing for America.

There are a few big old tool companies still doing great. Lisle Corp, an automotive specialty tool company, routinely solicits new tool ideas from dealers and users year after year. Once accepting one, they try hard to produce it, either in-house or outsourced, both in the U. S. and overseas. The constant effort to meet new demands

will assure the long life of this company. Lisle is located in a small town in Iowa. The support from the local community may also be important to their success.

Outsourcing can be a virtue, not necessarily a sin, in the modern economy. We see this in hi-tech business as well. Years ago Intel was the giant in chip making and AMD a small newcomer. Now AMD's stock value is higher than Intel. (3) AMD outsourced a lot and came out with cheaper, cooler running, more energy-efficient chips. AMD is combining the strength of many specialized companies. Intel mostly produces in-house. Their chips may be a little more powerful, but run hotter and consume more energy. Their lead over AMD is shrinking.

America had many low-tech small factories 35 years ago. This author found a steel mill, several fastener and hardware makers, a plating shop, a welding company, a production tool maker, a boiler company, a couple of hand tool factories and so on just in Northern California at that time. That was when he decided to try out his idea of a modern factory. He wanted to produce two sets of wrenches of the future, V8's super thin wrench sets. Northern California should be the right place. He bought an old hydraulic forging machine from Dallas. A local tooling maker and a plating company were willing to work with him. Things looked good until he failed to get a permit from the local government. He finally realized that small low tech factories were no longer welcome. His belief was further confirmed when the city used eminent domain to force out a welding business and gave the space to a big biotech company. Today, there are not many low tech factories in California at all. Judging by the goods we import, we can assume that there are not many in America as a whole. (4)

For a brief period, this author considered locating V8 in North Carolina or Texas. Unfortunately it didn't work out. He finally decided to build his V8 factory in China and became an eyewitness to the forty years of industrial revolution there.

2. THE INDUSTRIAL REVOLUTION IN CHINA, THE LAST FOUR DECADES:

This author started visiting China in 1984, soon after they opened up to the outside world. By the beginning of 1992, he had visited 16 large hand tool and hardware factories in the country. In addition, he also visited 3 factories in Japan and 6 in Taiwan, and 5 in the United States. He could easily see the unique structures of the old Chinese factories. They were large in size, owned by the state and not profit oriented. Employees were on government payroll. They lived and ate in dormitories. The factories were vertically integrated in the sense that they do everything in-house from raw materials to final products. However, they were not well integrated: The tooling department only had enough work for about one week per month. The chrome plating room operated two days a week. The forging machines were busy most of the time, so friends from the tooling and plating rooms would often stand around and talk to the workers on the forging line. These factories were inefficient to the extreme. Their products were limited in variety. Look cheap and outdated in the eyes of an American buyer. When they were ordered to export to western countries, they struggled mightily. They had to sell cheaply and borrow from (state-owned) banks to cover the losses. When the debts had gone out of hand, the government bankrupted many and sold the assets to the old employees. The new owners tended to fail again because the old system was still there. At this point, we saw

an ever-accelerating increase of privately owned small and specialized shops in hardware, plastic, electrical and electronic industries, etc. The growth was often driven by the old employees of bankrupt factories and the strong export demands. The government still owns all the huge companies in steel making, infrastructure construction, train, ship, and airplane productions, etc. However, the huge steel industry continued to offer good support to small shops. They never failed to supply the right steel bars at reasonable prices. They also offer a wide range of high grade alloy steel at good prices. Eventually, they help the small private companies to dominate in the export trade to the western countries.

Companies from Taiwan and other countries started to invest in China about this time. Foxcom built several factories to make products for Apple and others. European auto factories entered the market with joint-ventures. A lot of small and median foreign-owned electronics and hardware companies started to show up. China welcomed them with open arms and frequently offered tax breaks. Local governments opened many industrial parks to house new factories with low rent for the land. This author made some heated computer keyboards in China at that time. The keyboard manufacturer was located in Guangzhou. The micro heat switch was sourced from a small Chinese company with about 10 employees. They buy wafers and other materials they use from local suppliers. A couple of guys designed, tested, and packaged the switch within a week. The UL listed transformers the keyboard needed came from a Taiwanese company in Shanghai. The first 4000 keyboards were completed quickly and passed the UL Listing safety test too. This clearly demonstrated the power of horizontal integration. Currently, V8 Tools factory in China routinely works with as many as eight other

companies. Together they produce hundreds of parts economically. Both initial investments and production costs for new products are much lower than doing everything in-house.

The small factories also can offer great support to large manufacturers. V8 Tools' partners routinely make parts for auto companies, agricultural machinery makers, and, occasionally even high-speed train factories. Thousands of small and medium factories employ millions, contributing greatly to the country's double digit growth in the last three decades or so.

3. LESSONS FROM THE COVID PANDEMIC:

When the Covid 19 Pandemic swept the world in late 2019, we were shocked into a deep recession in early 2020. Our government quickly spent $5 trillion dollars in the Pandemic relief and gave money directly to taxpayers and businesses with payroll expenses. (5) The Federal Reserve Bank dropped the interest rate to near zero and printed 5 trillion more dollars for the market. That was a tremendous amount of stimulus to our economy and boosted the demand strongly and quickly. Our economy bounced back and made this deep recession a relatively short one. Unfortunately, we have done little to increase the supply of goods. Shortages piled up quickly. Persistent high demand and low supply inevitably caused high inflation. The Federal Reserve Bank had made a number of large interest rate increases and shrinked the balance sheet recently. But it was too little too late. Prices for almost everything went up sharply. Inflation reached 7% by the end of 2021 and 9.1% in June 2022. (1)(6) We are likely to see another recession in 2023. Unfortunately we can count on more international crises in the future.

It is of utmost importance to every nation to find ways to make their supply chains more dependable.

We import a great variety of goods, food, other consumer goods and industrial supplies. One small category has a disproportionately larger impact on our economy: The chips and hardware parts that our factories outsource. A new car includes hundreds of chips, both analog and digital. Some are switches, others are processors. They typically are relatively cheap and a good portion of them are made overseas. When the pandemic stopped the supply, the auto factory had to shut down. Notably, the unavailability of a $40 chip halted the production of a $40,000 car. (2) The impact is disproportional. Similar arguments may be made for some bolts, nuts and other hardware items factories are importing.

Automakers do not use the most advanced 5nm chips. The cheaper and larger 28nm to 40nm are usually good enough. But each car comes with hundreds of different chips and different models may require custom ones. Each brand also has its own requirements. In addition, changes in design are frequent. The consequences for suppliers are high, but the total dollar amount for these small parts are relatively low. The more flexible small chip makers are more suitable for this kind of business. The demand for larger and cheap analog chips is also high. Small factories may shine there too. The big guy in this field is Texas Instruments. Some numbers in their report card are interesting: Their revenue is 20.19 Billion with around 100000 customers worldwide. (7) It seems to include a lot of small customers. Their net profit margin is an unusually high 44.21%. That may mean the demand for large analog chips is very high and growing. Based on commerce department

reports, there may be a serious shortage in America.(8) That could be a good point of entry for new small chip factories.

We also had a serious shortage for Imported bolts and nuts and other small metal items used by manufacturers and house builders. We used to produce many of these items locally. But factories often shut down because they could not compete. Hardware factories also found that they no longer can buy the right steel bars for their production. Our steel manufacturing is shrinking. This weakening of the supporting industry is a huge problem. We will have to think about what we can do with steel, aluminum, plastic, etc..

4. REBUILDING AMERICAN INDUSTRY, A FEW FIRST STEPS:

America still has the best biotech and has launched the most satellites, but the vast part of our industry, important to people's lives, has been shrinking for decades. It is the time to do a few things to reverse the bad trend. We may start with a few relatively cheap and easy steps, building some small factories to make chips and hardware items that our factories are currently importing. If successful, our big factories will be more secure in the next crisis.

Step 1: The Commerce Department should conduct a survey to pinpoint exactly what chips and hardware items our industry is importing.

Step 2: They should recruit people to start small factories to make these needed parts. The Treasury Department can offer low interest loans to help people to start. This loan will be forgiven if a new factory has been in production for six years under the same ownership. This is a reward for supporting our industry. The Federal government collects billions from import duties each year.

Please spend some of this money to support our industry. If successful, it will strengthen our industry significantly.

Step 3: They should Advertise the success of new small factories and encourage more people to jump in. The success of a few may accelerate the growth. It is also helpful if people know that our government supports small factories. The politically powerful big businesses should not have objections because these small factories are designed to support them.

Step 4: When new small factories increase in numbers, we can encourage them to work with each other and to form horizontally integrated production networks. The networks can make products that none of the small factories can do alone. More such production networks will signal the beginning of a new era of modern American Industry. How significant can this be? Just look at what has happened in China.

Is there more we should do? Of course, there is a lot more. We need to address mining, steel making, battery production and so on. However, starting with the small easy steps can bring quicker and far-reaching results. Do not believe that American industry is too old and too big to grow fast. We just have to change to fit into the new age. If successful, we can dominate the world economy for a long long time.

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