

quantity of goods? Can we grow sustainably, that is, can we as if the human race was going to be around for millions of Chapter 4 attempts to grapple with these questions.

## CHAPTER 2

# Myths of Manufacturing

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The conventional wisdom of the last few decades has been that manufacturing is not a necessary part of a wealthy nation. This attitude toward manufacturing is enmeshed in a series of carefully constructed myths. Services exist in a world that is separate from manufacturing; we live in a “post-industrial” world, that is, one in which we don’t have to do much, if any, manufacturing in the United States. This leads to the myth that we can import whatever manufactured goods that we want. Somehow, they will just flow to us forever because all anyone needs are dollars, not goods and services. Most of the world thinks that they can grow their economy by selling to the United States. After all, in the magical world of the 21st century, the United States has proceeded through various “stages,” emerging from the primordial agricultural society, to the intermediate step of manufacturing, finally appearing in the guise of a services-based society. Finally, the mythical base of middle-class employment is almost exclusively in services, since manufacturing jobs are never coming back.

In reality, both services and manufacturing are indispensable for a wealthy economy. Services are, to a great extent, those activities that people do to use manufactured goods. The two sectors, manufacturing and services, therefore depend on each other, and their interdependence leads to positive feedback loops of innovation and growth. The base of the middle class is both services *and* manufacturing, and the decline of manufacturing is leading to the decline of the middle class.

Part of the reason that these myths can be propagated is that the economy is discussed as if it were an abstract set of ideas, not a complex system of interdependent, functionally different parts. Mainstream, or neoclassical economics is based on its own set of myths, which I will explore in the course of this book, but critical to the neoclassical outlook is the idea that every part of the economy is basically the same and can be understood as a competitive industry operating in the short term. As an antidote to that sort of thinking, let's look at the economy more as a naturalist or ecologist looks at ecosystems: by examining what is going on in an actually existing economy. The first part of the economic ecosystem we need to understand is the services sector, which, it turns out, is a diverse, varied system of its own, dependent on manufacturing.

## THE SERVICES MYTH

Let's start by looking at a table of the various services, including their size in terms of value-added, that is, the percentage of the economy they constitute. "Value-added" is the best way to compare sectors of the economy. Often, when people want to emphasize the importance of an economic sector, they will use the total industry output statistic, which shows not what the particular sector produces by itself, but what that sector *plus* all of the other sectors produced for that sector. For instance, the value-added for motor vehicles (mostly cars) in 2007 was \$98 billion, yet the total output was \$477 billion.<sup>1</sup> In other words, all the other industries added \$379 billion to the motor vehicle output, while the vehicle industry itself added \$98 billion. The advantage of using "value-added" as a measure is that, if you add up all of the value-added output for all industries, you come up with the gross domestic product, that is, the total output for the economy. In other words, you don't double count the various industries, and you get a more accurate reading of the various pieces of the economy.

I've also included the trade balances in Table 2.1, that is, the statistic which indicates whether a particular service sector has more exports than imports (a positive figure), or whether the sector has more imports than exports (a negative figure).

I have actually tried to minimize the number of categories; the first thing to notice in Table 2.1 is that there are quite a few

**Table 2.1** Services Are a Very Diverse Set of Industries

Service	GDP	% of GDP	Trade Balance (billions)
Wholesale and Retail	1,415,845	12.87%	N/A
Transportation Services	319,284	2.90%	-18
TV, Radio, & Publishing	169,357	1.54%	0
Movies and Music	41,195	0.37%	10
Telecommunications	200,879	1.83%	0.8
Legal	160,587	1.46%	2.5
Accounting	69,450	0.63%	0
Engineering Services	106,458	0.97%	1.9
Software, Computer Services	208,958	1.90%	5.9
Management Services	267,927	2.43%	0.5
Scientific R&D	51,422	0.47%	4
Advertising	57,435	0.52%	-0.4
Other Professional Services	94,736	0.86%	N/A
Health Care	89,342	6.26%	2.1
Educational Services	94,511	0.86%	11
Arts, Entertainment, & Recreation	106,597	0.97%	-0.05
Hotels and Restaurants	383,057	3.48%	8
Employment Services	84,491	0.77%	N/A
Building Services (e.g., Janitors)	38,725	0.35%	N/A
Business Support (Call Centers)	107,412	0.98%	N/A
Travel, Security, Other	54,276	0.49%	N/A
Administrative services			
Repair and Maintenance	106,389	0.97%	4.3
Personal and Laundry Services	57,474	0.52%	N/A
Organizations & Social Assistance	166,527	1.51%	N/A
Finance	626,886	5.70%	13
Insurance	256,010	2.33%	-21
Real Estate and Leasing	1,367,399	12.43%	5.4
Trade in other services, not elsewhere categorized	0	0	7
Nonsoftware Royalties	0	0	24
<b>Total Services</b>	<b>7,302,630</b>	<b>66.36%</b>	<b>61</b>

*Source:* Percentages are from *Survey of Current Business*, January 2005, "Annual Industry Accounts," Table 1, and trade figures are from *Survey of Current Business*, October 2004, "U.S. International Services," Table 1. To calculate the value-added percentages for several small service subsectors, the data on revenue was used to calculate the percentage that a certain sub-subsector was of a subsector, and that percentage was applied to the subsector's value-added.

different kinds of services. Some services distribute the goods and services that the production sector creates, that is, they are part of what I call the *distribution system*. Retail services sell the goods that are the output of the manufacturing sector, and wholesale services store and distribute those goods; together they comprise 12.3 percent, or about one-eighth, of the economy. This includes Walmart and the other big-box stores, the small mom-and-pop stores that still exist, as well as larger warehousing centers. This sector is almost completely dependent on trucks and shipping, both of which are considered services.

Real estate constitutes fully one-eighth of the economy, almost exactly the same as the entire manufacturing sector. Real estate's function is to redistribute buildings, which have to be produced by construction workers using construction equipment, using materials output by the manufacturing sector.

So just distributing goods, services, and real estate comprises one-quarter of the economy, twice as much as manufacturing. Finance and insurance generate 7.5 percent of economic activity; finance, insurance, real estate, retail and wholesale, took up almost one-third of the economy. By contrast, in 1970, finance and insurance constituted 4.1 percent and manufacturing, 22.7 percent. Finance and insurance recycle surplus resources that translate into money that the rest of the economy generates. They generate nothing of tangible use themselves; they are completely dependent on others to generate that which they then use.

There are other parts of the distribution system. Advertising comes in at about one-half of 1 percent, as does accounting. Advertising might be ubiquitous, but it is actually of little direct economic importance (except in New York City). I'll also add in one-third of transportation's 3 percent for freight transportation, that is, trucks and ships. Adding this all up yields a little over one-third of all economic activity just for distribution of goods and some services. This doesn't even count the finance, marketing, and accounting departments of companies within the production system.

One kind of service has the function of directly interacting with government: legal services, at about 1.5 percent (one could count part of accounting here, perhaps). Then there is government itself, at about 12.9 percent of value-added. So distributive and government services together equal about half of the economy. Government is almost totally dependent on taxes, borrowing, and printing

money; however, much of government spending is used to make military equipment. So one half of the economy—manufacturing (one-eighth, although dropping all the time) and the nondistributive services (three-eighths)—provide the wealth that enables the other half of the economy—the distribution system (three-eighths) and the government (one-eighth)—to operate.

Most of the rest of the services involve the use of manufactured equipment to help people. Health consumes 6.3 percent of gross domestic product (GDP); it uses massive amounts of equipment and drugs. The two-thirds of transportation that I didn't put under distribution is used to move people in nonprivate vehicles, such as planes, trains, and transit, and constitutes 2 percent of the economy. Hotels and restaurants, at 3.5 percent of GDP, use buildings and food machinery to provide a service. Telecommunications services, at about 2 percent of the economy, use sophisticated telecommunications equipment to move voice, video, and cable. Personal and laundry services (0.5 percent), such as haircuts, use various instruments and machinery as well. So at least 14 percent of the economy is taken up with using machinery to provide services.

Some services should probably be considered industrial, because machinery is their focus. Repair and maintenance of machinery, 1 percent, fits this definition, as could most engineering services, another 1 percent.

Then there are the entertainment sectors: TV, radio, publishing, movies, and music, at about 2 percent, and the rest of art, recreation, and other entertainment comes in at 1 percent. Most of the public would probably guess that these industries constitute at least one-quarter of the economy, because they focus so much attention on themselves, and they are certainly interesting to most people, but their contribution to the entire economy is quite small. Most of these small industries rely on telecommunications networks and various other, mostly electronic, technologies. Just as planes are used to move people from one place to another, TV and movie cameras, editing, and music studios move information and entertainment to people.

This "movement" takes place using flows of information. Because software, which takes up 2 percent of the economy, is the action of making changes to instructions for a piece of hardware, a computer, there might be some justification for considering software industrial. After all, the first hardware computers were hard-wired to calculate

certain equations; by changing gears and other metal mechanisms, you could calculate a different equation. Now, of course, we can type in the changes in the form of pieces of software. In turn, software is used for all kinds of economic sectors, so it is probably safe to categorize software with the other services in which machines are used to provide a service.

Educational services, whether nongovernmental (about 1 percent) or governmental (1 percent from federal sources,<sup>2</sup> 3 percent from local sources for primary and secondary education,<sup>3</sup> and 0.5 percent from local higher education financing<sup>4</sup>), also require various kinds of media and information technologies, although here we see some straight person-to-person transfer of knowledge, some of it not mediated by technology. Organizations and social services (1.5 percent) may use various technologies, but are closer to being “pure” services. Scientific research and development, at 0.5 percent, usually involves some form of equipment.

There are various other services, such as management consulting at 2.5 percent of GDP, that are used in all industries, as well as miscellaneous services totaling 3.5 percent, which are numerous and involve a mix of machinery and people-to-people services. Most services either use machinery to provide the service, or are somewhat industrial in the sense of working directly on machinery; only small parts of particular categories of services are not focused on machinery of some kind. The conclusion is clear: services need machines.

Even the one-third of the economy that composes distributive services needs machines. The financial industry was revolutionized by computers and communications—it could not have taken down the global economy in 2008 without them! Then there is retail and wholesale, which Walmart and other big-box stores and chains have taken very far into the computer age by focusing on supply chains, that is, the complex task of making and moving goods all over the planet.

Once we break down the service categories, we can see how important manufacturing is even in the service industries. However, when we look at trade, we can see that the dependence is even stronger.

## THE TRADE MYTH

Fully 80 percent of world trade among regions is in goods, and only 20 percent is in services. That is, if you take a region such as

North America, Europe, or Africa as a unit, then the vast majority of trade among these regions is in goods, not services. As the World Trade Organization (WTO) documents, “While the services sector generates approximately two-thirds of the total world value added, its share in total trade remains below 19 percent” in 2007.<sup>5</sup> As seen in Table 2.2, the United States is the only region or country with such a huge imbalance. The other closest deficit is Europe, whose deficit is almost the same as its deficit with China, while the United States is in deficit with every region.

In 2008, the United States imported over \$2.1 trillion of goods, and exported almost \$1.3 trillion, yielding a trade deficit, or imports in excess of exports, of \$840 billion. Yet the United States exported only \$550 billion worth of services, while importing \$405 billion,<sup>6</sup> yielding a trade surplus in services, or exports in excess of imports, of \$144 billion; this surplus in services equals only 17 percent of the trade deficit in goods. Services constituted only 30 percent of all exports and 16 percent of all imports. If we look at all trade by

Table 2.2 U.S. and World Trade Deficits

Country/Region	Trade Surplus with United States, (in Dollars)	Trade Balance with the World (in Dollars)	Percentage of U.S. Trade Deficit
China	285	262	33%
Japan	87	92	10%
Rest of Asia	66	220	8%
Europe	117	-254	14%
Canada	69	29	8%
Mexico	77	24	9%
Rest of Latin America	35	48	4%
Former USSR	16	112	2%
Middle East	34	273	4%
Africa	72	74	8%

*Note:* The United States has a trade deficit in merchandise of \$858 billion in 2007, and is in deficit to all parts of the world. Only Europe has a large trade deficit besides the U.S., of \$254 billion, 219 billion of that from China.

*Sources:* WTO, International Trade Statistics, 2007, Table I.13 for U.S. trade, U.S. total; Europe trade with China, Table I.14; for the former Soviet Union, Africa, Middle East, South and Central America total, Table I.4; Mexico, Table I.9. Rest of Asia total is estimate based on above tables and Table II.30.

adding up imports and exports, we find that services constituted 22 percent of all trade for the United States, close to the world average.

Table 2.1 shows, in the rightmost column, the trade surplus or deficit of the service categories. We see from table 2.1 that even in allegedly “post-industrial” sectors, like finance, which has a trade surplus of \$13 billion or software of \$6 billion, there is not nearly enough trade going on to make up for the \$840 billion shortfall in goods. In fact, there are also some service sectors that have a large deficit for the United States, such as insurance at \$21 billion or transportation services at \$18 billion (not surprising considering the number of cargo ships sailing our way). Movies have a surplus of only \$10 billion; *The Sopranos* cannot save the U.S. economy.

Most services cannot be packaged up and sent abroad, because most services involve, in one way or another, actually using a manufactured good, and you can’t export or import that experience. The main way in which services are “exchanged” is through tourism, in which the person physically moves to the place where the service takes place. Except for small nations that are particularly well-endowed with tourist destinations, no country can survive on tourism—nor should one want to, because tourism-centered economies can experience wild swings depending on the global economic conditions.

A large nation such as the United States cannot exchange the goods it needs for services alone. *It must exchange goods for goods*, in the long term. In the short and medium term, as long as the rest of the world accepts U.S. dollars in return for goods, the United States can keep giving the rest of the world currency instead of goods. But either the international community will decide that they will never get much back for their dollars, or the mountain of dollars outside the United States will become so large, that the dollar will plummet in value. When that happens, the \$2.1 trillion in imported goods will require many more dollars to purchase, and the trade deficit could actually get worse.

Most economists assume that if the dollar goes down, U.S. exports will become more competitive in terms of price, and so exports will go up, imports will go down, and the trade deficit will start to narrow. This assumes that the United States can easily increase its manufacturing to take advantage of a cheaper dollar; it also assumes that U.S. manufacturers can replace more expensive imports with home-made varieties of goods. But both of these assumption are based on the further assumption that U.S. manufacturing is competent enough

to compete with even more expensive foreign goods, and that the United States can easily ramp up production, if needed.

Since 2006, however, the Japanese Yen has generally become more expensive,<sup>7</sup> even as the U.S. trade deficit with Japan has increased.<sup>8</sup> Since 2000 a similar counterintuitive phenomenon has taken place with Europe: even as the Euro increased vis-a-vis the dollar,<sup>9</sup> the deficit with Europe, except for the recession/depression year of 2008, went up.<sup>10</sup> A lower dollar will not necessarily lower the trade deficit.

Well, the story goes, we’re losing out to China and other lower-wage countries. But in reality, higher wages can lead to trade deficits too. As of 2007, as we see in Table 2.2, about 32 percent of the goods trade deficit of the United States was with countries that pay the same or higher wages: \$117 billion with Europe, \$69 billion with Canada, and \$87 billion with Japan. At 32 percent, this is just under the 33 percent of the U.S. trade deficit that is accounted for by China. We never hear that we need to raise wages to compete with our developed trading partners.

German manufacturing workers were compensated 44 percent higher than U.S. manufacturing workers in 2006, and that figure increased from 15 percent in 2000, probably reflecting the rise of the Euro; Workers in the part of Europe that uses the Euro receive 23 percent higher wages. For Japan, the Yen fell between 2000 and 2006, resulting in a decrease in compensation from 12 percent higher than Americans to 15 percent below.<sup>11</sup>

The percentage of goods that the United States consumes from abroad, instead of from U.S. producers, continues to grow. In 1998, 25 percent of U.S. consumption of manufactured goods was imported; by 2007, that number had jumped to 37 percent.<sup>12</sup> For industrial machinery, the consumption of imports jumped from 35 percent to 57 percent<sup>13</sup> in the same years.

So countries with either higher wages or comparable wages in manufacturing are outcompeting U.S. manufacturing firms in the international market. It is possible to trade goods for goods, using high-priced labor, as Japan and Germany show, and as the United States was able to do until about the 1980s. But it will not be possible over the long run to trade services for goods. We are thus in a trade bubble, just as we were in a dot com bubble and then a sub-prime bubble.

Much of U.S. trade is with regions such as Europe and Japan that pay higher or similar wages (depending on the exchange rate).

Europe and Japan have roughly comparable wealth per person<sup>14</sup> and larger manufacturing sectors. Does that mean that they are not as advanced as the United States, or simply that a large and thriving manufacturing sector is necessary to be wealthy, unless the country is the United States? After all, only one country in the world can prop itself up by providing the international reserve and exchange currency.

The United States is wealthy now exactly because it was so dominant in manufacturing for most of the 20th century. Because of that dominance, the dollar became the international reserve currency and exchange medium of choice, and because of the exalted status of the dollar, the United States has so far avoided the worst of its abandonment of manufacturing-centered policies.

## STAGES OF GROWTH MYTH

The myths that services and trade can be separated from manufacturing have a foundation in the larger historical myth that there are stages of growth that countries go through, from hunting and gathering, to agriculture, to industry, to services. In reality, this sequence is completely wrong. First of all, many hunting and gathering societies, such as the Native Americans, had a much better grasp of the ecological necessities of life, and were able to live, sustainably, in thriving ecosystems for millennia. On the other hand, it is unclear how much longer the current particular variant of civilization is going to last.

As for the rest of the sequence, manufacturing, agriculture, and services have always been intermixed. Not only did human beings never exist who were not completely dependent on tool-making, not even the *previous* species, *Homo erectus*, lived without tools. *Homo sapiens* always invested at least some time in the "service" of the arts, as the prehistoric caves, such as Lascaux, attest; and that was before agriculture.

However, most stage theorists argue that societies moved from a predominance of labor being invested in agriculture, to the majority being involved in manufacturing, to most people working as "service" workers. The implication is that agriculture is less advanced, associated with peasants; then comes the huge soul-deadening assembly lines of manufacturing; then the quiet, air-conditioned life of

the service worker. Each stage involves more and more knowledge, until we come to the final "knowledge worker," in Robert Reich's terminology. There are several problems with this image.

First, agriculture has always been knowledge intensive, and has involved the tool-making expertise of urban artisans, then guild members, then engineers designing machines. In addition, agricultural advances, which have always been important to societies, involve a sophisticated understanding of ecology and chemistry. The Incan methods of raised gardening and the use of a charcoal-type soil additive, *terra preta*, may even now have important implications for mitigating global warming<sup>15</sup>; the central Americans discovered how to make corn, chocolate, and tobacco, among other foods.

In Europe, important advances in productivity took place as a result of changes in the design of plows, a kind of tool; also societies figured out how to keep some land without crops, that is, stay fallow, while cycling various crops on the same piece of land to raise its fertility, as in growing nitrogen-fixing legumes. These were all important steps in the advancement of agriculture.

When chemists applied their new ideas to agriculture as they learned about the nature of soil and the production of artificial fertilizers and pesticides, a revolution in productivity occurred. For centuries people have been breeding different varieties of plants for various uses, and in the 20th century various strains of grains were developed that ushered in the "green revolution."

Just because agriculture only employs about 1 percent of the American population now does not mean it is "lower" than other sectors. It is exactly because so many knowledge workers are involved in agriculture that so few people need to be involved. However, it may be the case that it will be necessary to drastically increase the number of people devoted to gardening and farming so that we do not destroy the soil and water that makes agriculture possible. Will this mean that agriculture will rise to a higher stage because more people are employed there? Does the number of people employed in a sector tell us which sector is more advanced? Or, since agriculture is at the lowest stage, does that mean that a society that employs more people in growing food will be a less advanced society?

No, an increase in labor in agriculture will simply mean that human beings are finally attempting to feed billions of people without destroying the biosphere. An expansion of organic farming could

even lead to an expansion of the middle class, because the skill and knowledge level of the new farmers/gardeners will have to be high. All stages of an economy are important and crucial; the functions of the various sectors are critical to understand, not the number of people involved or how much money they happen to make in any particular economic era.

Through the latter half of the 19th and first half of the 20th centuries, people in developed countries moved from the farm, where productivity increases were phenomenal. Productivity in manufacturing increased at the same time, because the increases in productivity in both manufacturing and agriculture occurred for the same reason: machinery improved. Millions of people went from the fields to the factories; millions also moved to services. Services were burgeoning because of the activities that used all of the new goods rolling off of the assembly lines, and because machinery, such as office equipment and electricity-generating equipment, led to new jobs in new service industries.

Manufacturing was always a very knowledge-intensive activity. In fact, it may be argued that humans have big brains and dextrous hands exactly to create and use tools, a form of manufacturing. Perhaps speech developed mainly to communicate and discuss the process of making tools.

Jane Jacobs argues that cities formed before agriculture.<sup>16</sup> That is, tool and artifact making, along with commerce for various kinds of materials for use in manufacturing, created the cultural interchange that resulted in agriculture. Thus, one form of knowledge intensity, cities and manufacturing, gave rise to another form of knowledge, agriculture.

## THE POST-INDUSTRIAL MYTH

To argue that manufacturing has been superseded by the service economy involves some interesting problems of dating. When exactly did this switch take place? Daniel Bell published *The Coming of Post-Industrial Society* in 1976.<sup>17</sup> He argued that there was a shift from manufacturing to services in more advanced societies. Many societies were 90 percent farmers before they became industrial; were most people employed in manufacturing at some point in time, only to move to services?

Except for rather short periods in specific cities, no society ever even surpassed using 50 percent of its workers in manufacturing; for most societies; one-third of employment in manufacturing seems to be the maximum.

In fact, according to *The Historical Statistics of the United States*, perhaps the only time there were more manufacturing workers than service workers was around 1850!<sup>18</sup> The first year when manufacturing was separated from construction in the statistics was 1870, when there were 2 million manufacturing workers and almost 3 million service employees. Agriculture employed about 6 million. By 1920, there were about 11 million farmers and 11 million manufacturing workers, and over 14 million service workers. Already by 1940, there were over 23 million service workers, and still about 11 million manufacturing workers, with agriculture down to 9 million. By 1970<sup>19</sup> the numbers for both manufacturing and services had basically doubled, while agricultural employment had plummeted to less than 4 million.<sup>20</sup>

Thus, by the time Daniel Bell celebrated post-industrialism, the ratio of manufacturing to service workers had been holding very steady for 30 years—about one-quarter of workers were in manufacturing and a little less than two-thirds in services. In 2007, there were about 2 million agricultural workers, 16 million manufacturing workers, about 11 million in construction, and the rest, about 113 million, in services<sup>21</sup>—three-quarters of the working population, compared to only 11 percent for manufacturing. In 1970, very few manufactured goods were consumed in the United States that were manufactured abroad; currently, about 37 percent are, with over half of machinery made abroad. So it makes sense that from 1970 to 2007 the percentage of U.S. workers in manufacturing would change from about 24 percent to about 11 percent; half of the workers who used to be employed manufacturing for domestic consumption are now in services. Is this an advance or a decline? Should a society that has an industrialized agricultural system have about one-quarter of its workers in manufacturing and about two-thirds in services, including government? This certainly seems to be approximately the number that one finds in leading countries such as Germany and Japan.

The Japanese and German manufacturing sectors are larger than the U.S. sectors: in 1995, the Japanese, German, and U.S. sectors were 22.4 percent, 22.6 percent, and 17.6 percent; by 2005, the shares were 20.2 percent, 23.2 percent, and 13.4 percent, respectively,

according to the Organisation for Economic Co-operation and Development (OECD).<sup>22</sup>

As we saw in the discussion of services above, manufactured goods are used by the service industries to generate services. It is exactly because manufacturing is so efficient that it is able to generate more jobs in the services industries than in its own industries. The same leveraging process operates within manufacturing; the machinery industries, which provide the basic machinery to build all output, generate at most 3 percent of GDP. Yet they directly help in the creation of the 12 percent of the GDP that comprises manufacturing, which in turn is used—along with imported manufactured goods—to generate the rest of the economy.

How can an economy change into a “post-industrial” one, when its actual consumption patterns between manufacturing and services have been pretty similar since 1947? In 1947, personal consumption of goods from the United States was 40.7 percent, and from imports, 2.4 percent. By 1970, the figures were 30.7 percent and 5.4 percent, respectively. In 2007, only 23.9 percent of goods were consumed from domestic sources and 14.1 percent from imports. Consumption of goods went from 43 percent in 1947 to 36.1 percent in 1970 to 38 percent in 2007;<sup>23</sup> hardly an earth-shattering shift. Clearly, we’re not post-industrial when it comes to consumption—have you been in a mall lately?—but when it comes to production, since many of the things made in the mall come from abroad.

But how can we consume something that we can’t trade for? As I showed above, we can’t trade services for goods, in the long term. If we want to consume things, we need to make things, either to directly consume or to trade for and consume indirectly. In other words, we have to produce the goods that we consume. “*Post-industrial*” ultimately means “*pre-industrial*,” that is, *poor*.

## THE MYTH OF THE NEVER-RETURNING JOBS

Even if it can be shown that manufacturing is necessary for an economy, the conventional wisdom responds, “but the jobs aren’t coming back.” Apparently discussion of the phenomenal changes of the past century comes to a screeching halt when the idea of rebuilding the manufacturing sector rears its head. We put a man on the moon, wiped out polio, built thousands of miles of roads and

millions of acres of suburbs, we talk on computers and compute on phones, but we can’t have millions more manufacturing jobs, even though the country will sink into poverty without them. And the alleged reason for this seems to be that low-wage countries will beat us, particularly China.

If wages were the most important determinant of manufacturing prowess, then China would never have lost its leadership from 1,000 years ago, because they always had a surfeit of people. In fact, according to the historian John Darwin, by the late 1700s, “A technological transformation would be needed before European producers could overcome the historic advantage of their Asian competitors: the much lower costs of production in their artisan industries.”<sup>24</sup> If Europeans needed to use better machinery two hundreds years ago to compete against lower wages, shouldn’t the U.S. be concentrating on making better machinery now?

By the logic of wages-determine-all, China would have been number one all along, and America would have been an also-ran. Because in the 20th century almost the exact opposite took place—American wages were the highest in the world while American manufacturing was the most competitive in the world—there must be something wrong with the focus on low wages. As Eamonn Fingleton points out, in the course of praising what he calls “hard” industries:

The whole trend of wages over the last fifty years underlines the importance of pivotal production technologies in the world income league table. In the 1950s, when the most advanced production techniques were typically deployed only within the United States, American manufacturing workers were the world’s highest-paid, earning about six to eight times as much as their counterparts even in Japan and Germany. By the 1980s, however, Japan and Germany had caught up in production technologies. Wages in these nations duly passed American levels and have stayed ahead ever since.<sup>25</sup>

The problem with the low-wage approach is that it is the capability and reliability of the machinery, not the cost of the workers, that is the most important factor in manufacturing competence. The Chinese realize this, which is why they have been training up their workers and engineers, even to the point of insisting that foreign manufacturers train Chinese workers and own the factories jointly. The idea is to



advance up the ladder of technological competence, as the Japanese did when they moved from being the butt of jokes about their toys in the 1960s to becoming the symbols of reliability and design that they are now.

The low-cost idea, like many ideas in neoclassical economics, assumes that the technologies of production already exist, and that the technology doesn't change. Therefore, the reasoning goes, we just have to worry about costs, like workers on an assembly line. But a wealthy nation innovates and changes more than a poor nation, and it does so by empowering its scientists, engineers, and skilled production workers. It does so by paying the workers so much that the managers are motivated to continuously improve the power of the machinery so as to minimize the number of workers hired. This process actually increases the number of workers hired overall, because the newly gained wealth is used to hire more workers—if the factories can't move abroad.

If workers should be as badly paid as possible, it is a short step to the idea that manufacturing work is miserable and not worth saving. There is a relentless portrayal of manufacturing as consisting of huge assembly lines full of people doing deadening, physical work. Manufacturing work is portrayed as dull, dirty, and dreary. In reality the most important physical work in manufacturing is done by highly sophisticated, skilled production workers who make the components outside of the assembly line. In partnership with skilled production workers, engineers design the machinery that is used to create goods and organize how humans will use the machines to create goods. Managers on the factory floor must monitor this entire process. The considerable and important technological progress that takes place in manufacturing comes out of the heads and experience of engineers and skilled production workers who are intimately involved with the manufacturing process.

## CONCLUSION

The popular conception of manufacturing seems almost like the fantastic images that medieval painters imagined the world outside Europe to be—full of bizarre beings, many scary and many ridiculously powerful, evoking strange cultures and strange people. But when Marco Polo and others finally went out into the real world,

and when scientists explored the actual ecosystems that were “out there,” they discovered how approachable and rational the world really was.

We seem to be in the same position in relation to economies that the European medieval painters were in relation to Asia. We need to take a look at all of the sectors of the economy, both service and industrial, and see how they actually fit together. We need to see what gets traded and why. Surprisingly, neoclassical economists sing the praises of trade but don't seem to understand some basic ideas, such as a nation can't trade services for goods.

In fact, neoclassical economics is the theoretical bulwark for many of the misconceptions that arise about manufacturing. The biggest misconception of all may be that neoclassical economics has a theory of economic growth and an understanding of how technological societies change and create mutually self-reinforcing, virtuous networks. In the next chapter, I will explain how a different way of looking at the world will help us to understand how the economy really works.