manufacturing jobs

2005-2010

By William A. Ward

Are U.S. manufacturing jobs going to China? Or are they just going away? According to my research, five out of six of the U.S. manufacturing job losses since 1990 were victims of productivity growth (i.e., increasing output per worker).

Between 1990 and the end of 2004, manufacturing employment in the U.S. declined from 17.7 million to 14.4 million. Preliminary data indicate that the decline continued into the 1st quarter of 2005. More than 85 percent of those job losses occurred after 2000, paralleling in time the entry of China into the World Trade Organization (WTO). Is China trade, then, the reason for these U.S. manufacturing job losses? Calculations presented later in this article support the answer "No".

China's exports to the U.S. are *not* the most direct explanation for the decline in U.S. manufacturing jobs. Manufacturing productivity growth explains it much better – not only for the U.S. but also for job losses that were occurring in China and in the global economy as a whole. This profound decline in the manufacturing sector's propensity to generate jobs is the unexpected new challenge facing economic developers not only in the U.S. but around the globe. Meanwhile, because of the role played by the U.S. dollar and U.S. capital markets in the global economy, labor competitiveness as it is commonly defined will not solve the U.S. manufacturing job creation problem in the coming decade.

As discussed in later sections, China joined with the U.S. and the rest of the world in experiencing both rapid productivity growth and rapid loss of manufacturing jobs during much of the period after 1995.[1] The article analyzes the U.S. situation before turning to recent experience of other countries regarding manufacturing productivity and employment. Then it turns to a broader economic development transition in which, for the first time in our lifetime, manufacturing competitiveness does not lead to manufacturing job growth for 90 percent of the countries of the world – including the U.S. This emerging break between competitiveness and job creation represents the most immediate strategic challenge facing economic developers worldwide. In the final section, the article discusses the political, strategic, and tactical options this leaves for economic developers.

Photo courtesy of ICAR.

As local development strategy shifts, BMW, Microsoft and IBM collaborate on automotive systems integration in the BMW Building on the campus of the International Center for Automotive Research, a public-private collaboration involving state and local government, Clemson University, and an increasing number of private companies, located on the outskirts of Greenville, SC.

William A. Ward is a professor and director of the Center for International Trade, College of Business and Behavioral Science, Clemson University, Clemson, SC.

MEDIUM-TERM STRATEGIES FOR LONG-TERM REALITIES

Productivity growth cost the U.S. five times more manufacturing jobs during 1990-2005 than did import competition, an experience shared around the globe. No country added manufacturing jobs consistently between 1995 and 2002, including China, as upwards of 20 million manufacturing jobs disappeared globally. Shifting demand from 'goods' to 'services' as incomes grew joined productivity in reducing global manufacturing employment. And a dollar kept high by the world's leading financial sector gave U.S. manufacturing firms extra burdens to bear. Development professionals should respond by focusing on manufacturing companies rather than jobs and by looking strategically to services and other sectors for wealth creation in coming years.

SOURCES OF U.S. MANUFACTURING JOB GAINS AND LOSSES, 1990-2005

Using a simple model called "Job Shift Analysis", U.S. manufacturing job gains and losses are divided into three causal factors.[2] (1) Productivity growth, (2) GDP growth, and (3) Structural and competitive shifts. The first line in Table 1 shows the model's results for the U.S. over the period 1990-2004. The second line in the table shows the model's application to the more recent period 2000 through 1st Quarter 2005.

According to Job Shift Analysis, productivity growth costs the country jobs, GDP growth adds jobs back, and structural and competitive factors combine to do some of each – with the net effect depending upon the country and the competitive price dynamics that are at play. In practice, the Job Shift Analysis model simply calculates the losses from productivity growth and the gains from GDP growth and then attributes everything else to structural and competitive changes.

Table 1

Sources of U.S. Manufacturing Job Gains and Losses – 1990 to 2004, and 2000 to 1st Quarter 2005

Period	Productivity Growth Factor (Millions)	GDP Growth Factor (Millions)	Structural & Competitive Factor (Millions)	Total Actual Gains (Losses) (Millions)
1990 to 2004	- 7.5	+ 5.7	- 1.5	- 3.3
2000 to 1st Qtr. 2005	- 3.0	+ 1.8	- 1.8	- 3.0

Source: Ward (2005).

Table 1 tells us that, of the 17.7 million manufacturing jobs that existed in the U.S. in 1990, as many as 7.5 million would have been lost to productivity growth if nothing else had happened up to 2004. That is because manufacturing output per worker increased by 73 percent during that period. But GDP also was growing, by 56 percent, which could have added back as many as 5.7 million jobs (at the new productivity levels of 2004). But GDP growth did not add back quite that many jobs. Total manufacturing job losses came to 3.3 million. So something else – structural and competitive factors, in the language of the model – cost the U.S. manufacturing sector an additional 1.5 million jobs between 1990 and 2004.

What about the 2000 to 2005 (1st Quarter) period? The even more rapid rate of productivity growth during that period "explains" 100 percent of actual U.S. manufacturing job losses (3.0 million lost from productivity growth ***versus*** 3.0 million actual losses). Meanwhile, 100 percent of the 1.8 million "new" jobs that GDP growth should have created in manufacturing did not go to manufacturing. They disappeared into the mysterious "structural and competitive" factor.

What is fueling this productivity growth in manufacturing? The digital revolution plays both a direct and an indirect role in manufacturing productivity growth. The direct effect gets the most attention.[3] It involves substituting ICT (information and communication technology) for labor in applications where that is feasible. The indirect effect of ICT, on the other hand, enables and enhances the de-aggregation and de-centralization of production and the related application of distributed supply chain management practices that have an even greater potential for impact on output per worker.[4]

Supply chain restructuring starts from focusing on core competencies (i.e., the internal sources of value added) and outsourcing much of the remainder to firms and to places that can turn the outsourced task into its own area of core competence. Manufacturing firms keep the tasks that have the highest value added (i.e., their core competencies) and outsource the others to companies who can then specialize themselves in the outsourced task. By definition, this should – and does – increase productivity in the manufacturing sector.

Besides increasing the measured productivity in manufacturing, supply chain restructuring also gives us an over-statement of job losses from manufacturing, *per se*. The outsourcing process moves some "service jobs" within the manufacturing firms to "service jobs" within service industries (e.g., outsourced HR functions, cleaning services, some marketing functions, some machinery repair and maintenance functions, etc.). Some of these jobs (we don't know how many) are not truly lost; rather, the accounting for them is moved to another sector.

There are two possible ways for a country to (partially) offset the negative employment effects of productivity growth: (a) General economic growth, and (b) Competitive gains in international markets. Both of these have their limitations. On the former, growth in GDP both in the US and globally focuses increasingly on expenditures for services rather than goods since, as people get richer, they spend relatively more on services. This shift in demand (discussed further below) limits the ability of economic growth to generate manufacturing employment. On the second strategy, it should be obvious

that not every country can experience competitive gains at the expense of everybody else!

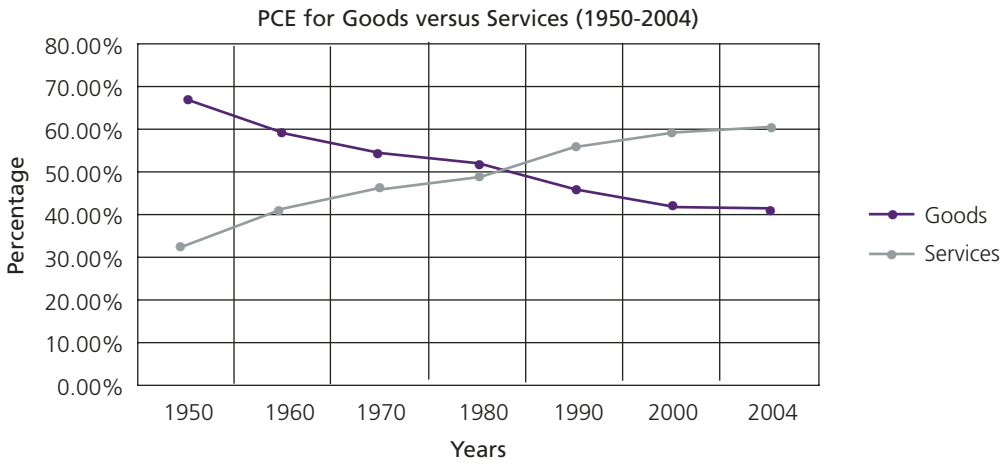
The shifting balance of demand towards services and away from goods is an important "structural" reason why GDP growth does not add back all the jobs that the Job Shift Analysis model is suggesting it should. Services, in the aggregate, are proving to be more income-elastic than goods as a whole. This tendency shows up distinctly in the personal consumption expenditures (PCE) part of the National Income and Product Accounts (NIPA) of the U.S., as shown in Figure 1. As real U.S. GDP grew between 1950 and 2004, services increased from 33 percent to 59 percent of PCE, while goods declined correspondingly from 67 percent to 41 percent. This particular structural shift in the U.S. economy is part of what is driving the "sectoral reallocation" of jobs.[5]

Meanwhile, a number of recent developments[6] resulting in the phenomenon called globalization have combined to allow supply chains to restructure globally rather than just nationally. This not only helps turn the manufacturing job-loss effect we are seeing in the U.S. into a global phenomenon, it also works to increase global GDP and to help spread internationally the changing balance between services and manufacturing. This broader transition is evident in the employment shifts occurring in the world's middle- and high-income countries, recorded by the World Bank and depicted in Table 2, for the decade following 1990/92.

"Industry" in Table 2 combines manufacturing, mining and construction; but in practically all cases manufacturing is the dominant sector. You can see from Table 2 the increasing tendency for economic development to decrease the proportion of the workforce (both male and female) engaged in agriculture and industry and to increase the proportion engaged in services. In other words, contrary to urban legend, the

Figure 1

Personal Consumption Expenditures for "Goods" versus "Services" in the National Income and Product Accounts of the United States – 1950 to 2004



Source: National Income and Product Accounts, 1950 to 2004. Bureau of Economic Analysis.

Table 2

Employment by Economic Activity, High-Income and Upper-Middle-Income Countries (1990-1992 and 2000-2002)

	1990-1992		2000-2002	
	Male	Female	Male	Female
Upper Middle Income Countries				
Agriculture (1)	22%	17%	8%	8%
Industry (2)	32%	32%	22%	19%
Services (3)	46%	51%	70%	73%
High Income Countries				
Agriculture (1)	6%	4%	4%	3%
Industry (2)	38%	35%	19%	15%
Services(3)	55%	60%	76%	82%
United States of America				
Agriculture (1)	4%	3%	1%	1%
Industry (2)	33%	32%	14%	12%
Services (3)	62%	65%	85%	87%

Source: World Bank, World Development Indicators 2005.

(1) Agriculture, forestry, hunting and fishing are included in "agriculture".

(2) Manufacturing, mining, and construction are included in "industry".

(3) Transportation, communication, public utilities, trade, finance, public administration, private household services, and miscellaneous services are included in "services".

decline of manufacturing employment is not the unequivocal path to regional and national misery.

THE GLOBAL MANUFACTURING EMPLOYMENT PICTURE

As already suggested, the US is not unique in the manufacturing job losses analyzed here. Approximately 20 to 30 million manufacturing jobs were lost globally between 1995 and 2002, with two-thirds of those losses occurring in China itself. In fact, China lost as many manufacturing jobs in those years (15 to 20 million) as the U.S. possessed (17.2 million at the beginning of the period and 15.3 million at the end).

The 88 countries summarized in Table 3 represent 90 percent or more of global employment in manufacturing. Thus, in 2002 something more than 150 million and something less than 200 million workers were employed in manufacturing around the world. The number of manufacturing workers employed globally in 2002 (the latest year for which adequate cross-national data are available) was 20 to 30 million fewer than that employed in 1995. Part of this decline was due to the East Asian financial crisis of 1997/98 and the economic downturn that hit the industrialized countries in 2001. But another part was due to manufacturing productivity growth and to the structural and competitive shifts discussed previously.

Table 3

Estimates of Global Manufacturing Employment and Job Losses 1995-2002

Region	Mfg Employment In 1995 (000)	Mfg Employment In 2002 (000)	Change 1995 to 2002 (000)
Africa	4,242.7	3,925.9	- 316.8
Americas	31,944.1	31,691.3	- 252.8
Asia	76,594.3	58,395.4	- 18,198.9
Europe	58,319.3	55,657.3	- 2,662.0
Oceania	1,321.1	1,395.7	+ 74.6
Globally	172,421.4	151,065.6	- 21,355.9

Source: Ward (2005), assembled from ILO data on 88 reporting countries

So, have any countries gained manufacturing jobs in recent years? Yes, three countries of any significance experienced intermittent gains. From 2002, China began adding manufacturing jobs again. We don't know how many or how consistently, because China's data systems are incomplete and slow in reporting. In addition, we know that Canada and Ireland added a few thousand manufacturing jobs at times during 1990-2005, though not consistently. In two of these cases (China and Ireland), GDP growth rates were so high at times as to swamp both productivity growth and the rate of transition from goods to services consumption. And in both cases there were competitive gains as well.

As manufacturing employment wanes, Meds & Eds (healthcare and academic institutions) arise as the largest employers in metropolitan areas of the United States.

THE CHINA MANUFACTURING EMPLOYMENT PICTURE

Sheer size makes China the global manufacturing lightening rod in any contemporary economic storm. Judith Bannister (2004) estimates that China employed 98 million workers in manufacturing in 1995, declining to 80 million in 2001 and recovering to 83 million manufacturing jobs in 2002. That would make China the employer of one-fourth to one-half of the global manufacturing workforce estimated in Table 3.

China deserves some of the lightening bolts being cast its way.[7] It is important to keep the pressure on China over the renminbi (RMB) exchange rate regime, continued reform of their financial sector, and enforcement of trade agreements. But the analysis in this article suggests that success in these efforts will not restore U.S. manufacturing to the job creator status it had in the 1970s.[8]

Bannister (2004) and others report that China's manufacturing productivity expanded by approximately 60 percent between 1995 and 2001. Meanwhile, China was experiencing GDP growth averaging 7.8 percent per year (Liu 2004) or higher. If we apply our Job Shift Analysis model to China, we conclude that productivity growth should have cost China an astounding 37 million manufacturing jobs over those years, and that GDP

growth should have added back an even more astounding 42 million. In fact, between 1995 and 2001, China lost 18 million manufacturing jobs. This suggests that structural and competitive factors were at play in China as well, though – given the differences between the U.S. and Chinese economies – these factors were playing vastly different tunes in these two national economies.

PRODUCTIVITY: THE TWO-EDGED SWORD

Productivity is a two-edged sword that can cut both the enemy and the wielder. To stay competitive in a globalized economy, you must have productivity growth. But, if you have it, you need fewer workers to produce the same or even moderately-higher levels of output. You get some idea of the role productivity growth plays from Table 4, which shows the parallel between manufacturing productivity growth and manufacturing employment change in an important sub-sample of the world economy.

In Table 4, Canada appears as an exception among the major industrial countries to the common tendency for productivity growth to reduce employment. Why is that? The answer either must be in competitive gains that we already agreed not everybody can enjoy, or it must be in a very high growth rate of GDP. Because Canada's GDP has grown pretty much in line with that of the U.S., then competitiveness must be the answer. So let's look at what manufacturing workforce competitiveness involves, in the conventional wisdom.

Labor force competitiveness is tracked by the Foreign Labor Statistics group at the U.S. Department of Labor, and its web page assesses the cross-national factors affecting comparative labor costs measured in dollars per unit of output.[9] Its analysis is based on the presumption that, in order to gain global manufacturing market share based on labor cost competitiveness, a company or nation must (1) increase the output per worker, (2) control wages, and/or (3) keep the value of domestic currency low relative to that of trading partners and competitors. Two of these three competitiveness factors involve controlling or reducing workers' purchasing power (wage restraint and low currency value), which few would consider "economic development". We have shown that the third (productivity growth) reduces employment unless accompanied by (a) Growing demand for manufactured goods, and/or (b) Increasing competitiveness *vis a vis* trading partners so as to capture an increasing share of global markets. The problem with the first option is that, as Figure 1 suggested, growth in global purchasing power does not translate one-for-one into demand for manufactured goods. The problem with the second option, as previously discussed, is that not everyone can achieve competitive gains at the same time.

Table 4

Productivity Growth and Employment Change in Manufacturing in 14 Countries, 1992-2003

Country	*% Growth In Output per Worker In Manufacturing (1992-2003)*	*% Change in Employment In Manufacturing (1992-2003)*
Canada	34.5	+1.1%
Australia	42.0	-25.7%
Japan	54.3	-25.7%
Korea	155.3	-11.8%
Taiwan	76.1	-2.7%
Belgium	44.0	-16.8%
Denmark	36.0	-12.6%
France	58.0	-10.9%
Germany	35.1	-21.0%
Italy	10.9	-2.9%
Netherlands (*1990-2002)	35.2*	-12.7%
Norway	13.5	-1.5%
Sweden	101.5	-3.6%
United Kingdom	34.9	-18.1%

Source: Bureau of Labor Statistics, US Department of Labor.

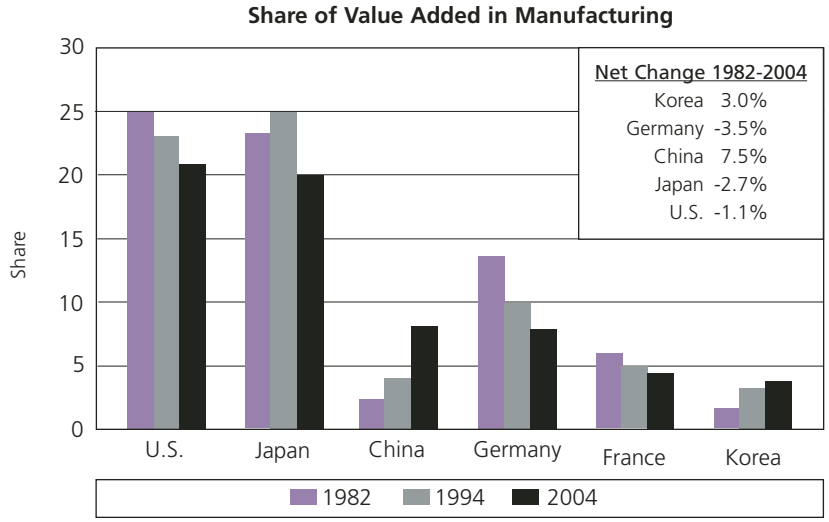
COMPETITIVENESS *VERSUS* JOBS: THE EMERGING DIVIDE

For the first time since manufacturing and economic development came to be viewed as synonymous[10], the link has begun to break between manufacturing competitiveness and the creation of jobs. In country after country, manufacturers have responded to the growing global competition by cutting jobs and increasing output per worker: U.S. manufacturing output, for example, increased by 60 percent between 1990 and Spring 2005, while U.S. manufacturing employment decreased by 20 percent. Meanwhile, the U.S. Bureau of Labor Statistics forecasts that overall U.S. manufacturing employment will decline by another one percent between 2005 and 2011.

The conflict between competitiveness and job growth is made most poignantly by the experience of Korea. In Figure 2, Korea is seen consistently and rapidly increasing its share of global manufacturing value added from 1982 to 2004. In Table 4, on the other hand, total manufacturing employment in Korea is seen to decline by 11.8 percent between 1992 and 2003. Korea's 155 percent growth in productivity during the latter period kept it globally competitive as a supplier of manufactured goods. But, at the same time, this

Figure 2

Selected Countries' Shares of Global Value Added in Manufacturing, 1982 to 2004



Source: New York Times.

competitiveness reduced rather than added manufacturing jobs.

China, on the other hand, began adding manufacturing jobs in 2002. There is no way of knowing yet if that job growth continued in 2003 and 2004 but we suspect that it did. Why China and not Korea? Because of differences growing out of the three-part competitiveness equation tracked by BLS. Firstly, wages are low in domestic currency in China, where another 200 million workers in rural areas remain to be absorbed into employment (which will tend to hold down wage rate growth – particularly in the inland provinces that are just beginning to develop). Secondly, the exchange rate for the RMB is tied to the U.S. dollar at an exchange rate said to undervalue the RMB by 25 percent to 40 percent (the July 2005 revaluation of 2.1 percent and the dollar replacement with a basket of currencies notwithstanding). Consider further that manufacturing output per worker in China increased by 60 percent between 1995 and 2001, according to Bannister (2004). China has made a strong commitment to using its low domestic wage rate and undervalued exchange rate to create the huge numbers of jobs they will need. And China also is making concerted efforts to add productivity growth into its side of that competitiveness equation.

Unless the global economy experiences tremendous growth in demand for manufactured goods, the foregoing analysis suggests a dire scenario: (a) Continued loss of manufacturing jobs on a global scale, and (b) Allocation to China of a large percentage of whatever manufacturing job growth does occur in the next few years. Given that dark prospect, what brighter alternatives might there be?

THE STRUCTURE OF GLOBAL DEMAND: A TEETERING IMBALANCE?

The brighter but unlikely alternative would be for the Asian countries (of which China is by far the largest in population) to mature beyond the export-led growth that simply lives off of the demand created in the strong-currency countries, in particular the U.S. What should they be developing into? The World Bank, the International Monetary Fund, and the U.S. monetary authorities would like to see these countries develop financial systems strong enough to generate and manage demand domestically.

Not only China but also a number of countries in the region (including Thailand, Taiwan, and Malaysia) as well as Japan and a number of countries from the Former Soviet Union used fixed and undervalued exchange rates to run trade surpluses and to generate domestic savings. As Ben Bernanke (then chairman of the President's Council of Economic Advisors and recently appointed chairman of the Federal Reserve System) pointed out in a March 2005 speech, channeling these savings back into U.S. capital markets is having important effects upon the U.S. economy. First of all, it is holding up the exchange rate on the U.S. dollar and thereby decreasing the calculated competitiveness of U.S. manufacturing workers. Secondly, the flows of these foreign savings into U.S. capital markets are keeping dollar-denominated interest rates low and indirectly fuelling the housing boom, deemed largely responsible for increasing the feeling of household wealth that underpins the U.S. consumption boom and savings bust.

Maturation of China and the other Asian economies and their transition from export-led to domestically-generated economic growth would help increase global demand and potentially add back some jobs in global manufacturing. Let's face it, the primary source of global demand generation for the past several years has been the U.S.[11] But none of the countries, including China, seem able or committed to move to the next stage in economic development. The fact that Japan's economy (and, particularly, its financial system) has been slow to mature beyond the export-led, managed-currency approach does not give us much hope as regards the rest of Asia.[12]

What does this export-led growth and weak financial sector talk have to do with manufacturing job losses in the U.S.? Well, it all stacks up to an exchange rate for the U.S. dollar that will remain too high for the labor force competitiveness calculations to imply competitive job gains in U.S. manufacturing. The U.S. will continue to have manufacturing firms that are globally competitive, but they will not be job-creating manufacturers of the type we came to know in previous decades. And we will likely see continued trade deficits for the U.S. economy.

Photo by Lisa Garrett, Tri-County Technical College, Pendleton, SC.

Tech schools created in the 1960s and 1970s to train manufacturing workers have morphed into 2-year and 4-year colleges providing both training and education for a range of applications.

IS THERE A PRECEDENT?

Manufacturing jobs are caught between two global forces that are strikingly reminiscent of events in the late-19th and early-20th centuries. In the late-1800s the Second Industrial Revolution added dramatically to agricultural and manufacturing capacities, particularly in countries like the U.S. and Germany – the two leading beneficiaries of the technologies of that Revolution. Meanwhile, with the major trading nations of the world on the gold standard, money supply and demand growth were constrained by the availability of new discoveries of that metal. With productive capacities growing much faster than money supply, the price level in the U.S. declined by half over the course of the 19th century.[13]

How is that similar to the situation today? On the supply side, today's similarities grow out of two phenomena: (a) Growing manufacturing productivity in country after country, as discussed previously, and (b) Globalization and the related market liberalization in large parts of Asia, in particular including the world's two biggest countries (China with 1.3 billion and India with 1.0 billion of the world's 6.3 billion people) and in the former Soviet Union. All together, these 'emerging market' countries have one-half the world's population and workforce. Thus, global progress in market liberalization since 1990 has doubled the internationalized capacity to produce tradable manufactured goods. Productivity growth (i.e., increase in output per worker) since 1990 has doubled that again. Thus, taken together, these two developments imply a four-fold increase. This shock to global supply capacity since about 1990 is, indeed, equivalent to another industrial revolution.

On the other side of the market, the global economy is constrained by the reality of the U.S. as the primary source of growth in global demand. Much of the world is employing its workforce off of demand leakages from the U.S. economy. A primary component of this leakage, of course, is the huge trade deficit the U.S. has with the countries identified here (including Japan) that are pursuing export-led growth strategies. Such broad-based pursuit of that strategy is possible today only because the U.S. dollar and the U.S. financial system of which it is an integral part have morphed into the gold and the silver mines of the 21st century. This is sustainable, of course, only so long as the world wants to hold growing balances of U.S. dollars and U.S. capital market assets in its investment and risk management portfolios. Stephen Roach at Morgan Stanley has been a leader (of a large band of followers) in pointing out the "global economic imbalance" and the precarious situation this convergence of policies has created for the world economy.

WHAT ARE DEVELOPERS TO DO?

Long-standing targets of adding jobs and increasing wages (two core objectives of economic development) are not likely to come from long-standing approaches to competing for manufactur-

What does this export-led growth and weak financial sector talk have to do with manufacturing job losses in the U.S.? Well, it all stacks up to an exchange rate for the U.S. dollar that will remain too high for the labor force competitiveness calculations to imply competitive job gains in U.S. manufacturing. The U.S. will continue to have manufacturing firms that are globally competitive, but they will not be job-creating manufacturers of the type we came to know in previous decades. And we will likely see continued trade deficits for the U.S. economy.

ing investments. So what can development professionals do when the global macroeconomic and global manufacturing environments align against them in this way?

First of all, it is not facetious to suggest that business retention and expansion units need to refocus on "business retention and contraction" in coming months as regards manufacturers. Productivity growth and competitiveness considerations will reduce the number of workers in the manufacturing firms that you now have. You should help both the companies and the elected officials with the politics of that reality. Secondly, you need to help companies work out which parts of their value chain should stay with you and which parts should be relocated or consolidated somewhere else (the Manufacturing Extension Partnership can be a valuable partner here). In other words, focus for now on the companies and not the jobs. The immediate task is to keep as much as you can of what you have. This means being realistic about giving up some parts that will be more competitive elsewhere in order to keep the overall company and its supply chain competitive. This is a very different job from the one most of us have been asked to perform in the past.

Which parts of your existing manufacturing investments might you be able to keep? You might be able to keep the parts of the business that produce high value-added per worker and that also need the special advantages your locale provides to them – supplier networks, market outlets, specialized workers, specialized training facilities (in short, all the things that "cluster theorists" talk about).[14] Even large-scale manufacturing facilities are having a hard time functioning as stand-alone entities. Thus, for example, the capacitor manufacturer Kemet is moving much of its operations to Asia, not solely because labor is cheap there but because that is where the company's markets are.

Recognize that service industries will be a growing part of your local employment base. This broad sector includes high-paying industries such as business services (where many out-sourced jobs from manufacturing have gone) and professional services as well as low-paying jobs in retail, hotels, etc. Attend to this reality in strategic planning activities, and focus on creating growth in the higher-paying segments of these industries.

Late-19th and early-20th century manufacturing facilities of historical significance – such as Mill's Mill in Greenville, SC, shown here – are experiencing rebirth as pricey condos for office and residential use.

Recognize that service industries will be a growing part of your local employment base. This broad sector includes high-paying industries such as business services (where many out-sourced jobs from manufacturing have gone) and professional services as well as low-paying jobs in retail, hotels, etc. Attend to this reality in strategic planning activities, and focus on creating growth in the higher-paying segments of these industries.

The problem of high production costs facing the "real" sector in the U.S. arise from successes in the U.S. "financial" sector in past decades.[15] So focus part of your development strategy on parts of the financial sector that could make sense for your locale. Florida has talked about incentives to attract part of the mortgage service industry. Ireland, addressing similar problems in the Euro zone, has acquired a big chunk of the global financial services business.

Finally, do not downplay those who argue that the world is changed and that you will need vastly different strategies for dealing with new challenges. For the most part, these chroniclers of revolution will not be able to tell you specifically what you need to do to prosper in the future. Why? Well, precisely because the environment is now different, and the next generation of conventional wisdom about economic development is only now being worked out. What the analysts and the chroniclers can tell you for sure, however, is that previously-reliable strategies of buffalo hunting for job-creating manufacturing behemoths have moved beyond passé.

FOOTNOTES:

1 Though China began adding back manufacturing jobs in 2002. This point is discussed further at a later point in this article.

2 More discussion of that model is contained in the Working Paper on which this article is based, which can be found at the Center for International Trade web site http://business.clemson.edu/cit/.

3 Gordon (2004), Jorganson and Stiroh (2000), and Oliner and Sichel (2000) analyze and debate the role of ICT in U.S. productivity growth 1990-2004. In the 1990s, Gordon began suggesting that productivity within the sectors producing the ICT was dominating overall productivity growth in manufacturing (Oliner and Sichel later would attribute two-thirds of productivity growth in non-agriculture industries in the 1990s to productivity within the ICT industries). Some analysts suggest that Sweden's rapid productivity growth is due to this phenomenon. Works cited in this note deal not only with the production but also the use of ICT in manufacturing.

4 This is related to the "cluster" phenomenon to which we return later.

5 The issue of sectoral reallocation has been analyzed in a series of articles in journals published by the Federal Reserve Banks of New York and Chicago. Much of the focus in those articles after 2001 has been jobless recovery, a subject touched upon in Gordon's (2004) discussion of cyclical factors in productivity growth but not discussed here. Core references on this aspect of sectoral reallocation are Aronson, et al (2004), Groshen and Potter (2003), Lillien (1982), and Rissman (1997).

6 This subject is discussed in much greater detail in the forthcoming book, *The Rise of Market-Based Society: Technology, Institutions, and the Choice of Market over Hierarchy.*

7 See the text of interviews with the Xinhua News Agency, posted at the CIT website (http://business.clemson.edu/cit/).

8 U.S. total manufacturing employment reached a historical peak in 1979, at 19.4 million workers. As a percent of the civilian workforce, manufacturing peaked in the late years of World War II at one-third of the workforce before declining to approximately 11.3 percent of the U.S. workforce by mid-2005.

9 The Foreign Labor Statistics page can be found at http://www.bls.gov/fls/home.htm

10 Which arrived in earnest in the late 19th century, though much earlier Alexander Hamilton's *Report on Manufactures* had propounded that view in opposition to Thomas Jefferson's argument that strengths in the primary industries of agriculture, forestry and mining were the true sources of national wealth and security.

11 With the introduction of a new currency (the Euro), the European Union has tried to keep government deficits and monetary growth under strict control in order to build faith in the new currency. Japan, the third major potential source for global economic leadership, continues to be the model for the export-led growth policies followed by much of the rest of Asia and, like China, lives off of demand generated elsewhere (the U.S., primarily).

12 Though Jesper Koll of Merrill Lynch Japan sees the Japanese economy finally turning a corner. http://www.accj.or.jp/pages/koll_052004

13 Demands for bi-metalism (i.e., adding silver as a monetary partner of gold) grew during that century as a way of dealing with the shortage of money.

14 Much has been said in this *Journal* and elsewhere about cluster strategies, and this article will not repeat that litany in this wrap-up section. Porter (2000 and 2003), Porter (1990 and 1998), and Markusen (1996) are traditional references.

15 See Bernstein (1992), and Ward (forthcoming).

SOURCES

Daniel Aronson, Ellen R. Rissman, and Daniel Sullivan, "Can Sectoral Reallocation Explain the Jobless Recovery?" *Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. 28, No. 2, (2nd Quarter 2004).

Judith Bannister (2004), "Manufacturing Employment and Compensation in China". Consultant's report to US Department of Labor, Bureau of Labor Statistics (December). http://www.bls.gov/fls/chinareport.pdf

Peter L. Bernstein (1992). *Capital Ideas*. New York: The Free Press.

Alfred D. Chandler (1977). *The Visible Hand: The Managerial Revolution in American Business.* Cambridge, MA: Harvard University Press.

Robert J. Gordon (2004). "Five Puzzles in the Behavior of Productivity, Investment and Innovation" (Version of March 31). On-line at http://facultyweb.at.northwestern.edu/economics/gordon/FivePuzzles.pdf

Erica Groshen and Simon Potter, "Has Structural Change Contributed to a Jobless Recovery?" *Current Issues in Economics and Finance,* Federal Reserve Bank of New York, Vol. 9, No. 8 (August 2003).

Dale W. Jorgenson and Kevin J. Stiroh (2000). "Raising the Speed Limit: U.S. Economic Growth in the Information Age." *Brookings Papers on Economic Activity* 31:1, pp. 125-211.

David M. Lilien. "Sectoral Shifts and Cyclical Unemployment". *Journal of Political Economy*, Vol. 90, No. 4. (August 1982).

Justin Yifu Liu, "Is China's Growth Real and Sustainable?" China Center for Economic Research, Peking University. Working Paper No. E2004003 (February 26, 2004). http://www.ccer.edu.cn/download/3024-1.pdf

Ann Markusen (1996). "Sticky Places in Slippery Space: A Typology of Industrial Districts", *Economic Geography*, Volume 72, Issue 3 (July), pp. 293-313. Available on-line at http://www.hhh.umn.edu/img/assets/3728/districts.pdf

Stephen D. Oliner and Daniel E. Sichel (2000). "The Resurgence of Growth in the Late 1990s: Is Information Technology the Story?" U.S. Federal Reserve Board (May). On-line at http://www.federalreserve.gov/pubs/feds/2000/200020/200020pap.pdf

Michael J. Piore and Charles F. Sabel (1984). *The Second Industrial Divide: Possibilities for Prosperity.* Basic Books.

Michael Porter (1990 and 1998). The Competitive Advantage of Nations. New York: The Free Press, 1990. Republished with a new introduction, 1998.

Michael Porter (2000 and 2003). "Locations, Clusters, and Company Strategy," in *Oxford Handbook of Economic Geography,* (G. Clark, M. Gertler, and M. Feldman, eds.), Oxford: Oxford University Press (2000). Also reprinted in *The Globalization of the World Economy: SMEs in the Age of Globalization*, D.B. Audretsch, , Cheltenham: Edward Elgar Publishing (2003).

Ellen R. Rissman, "Measuring Labor Market Turbulence", *Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. 21, No. 3 (May/June 1997).

William A. Ward (2005). "Manufacturing Productivity and the Shifting U.S., China, and Global Job Scenes – 1990 to 2005." CIT Working Paper 052507, Clemson University Center for International Trade (August 4). http://business.clemson.edu/CIT/papers1.htm

William A. Ward (forthcoming). *The Rise of Market-Based Society: Technology, Institutions and the Triumph of Market Over Hierarchy.*

Daniel Yergin and Joseph Stanislaw (1998). *The Commanding Heights: the Battle for the World Economy.* Touchstone Books.