
Competitive Manufacturing in a High-Skill Location

This annual Mass Insight report on location decisions in key Massachusetts economic sectors fills the gap that exists between broad economic analyses and the anecdotal knowledge each of us has of local or industry successes.

Past reports have touched on some of Massachusetts' manufacturing successes, but this is the first edition to fully examine the changing nature of modern manufacturing in the Commonwealth.

A great deal of confusion surrounds the role of manufacturing in high-cost regions where growth in service businesses dominates the news. Policymakers and the public easily mistake employee layoffs at some large firms for a continuing decline in all manufacturing operations. Public debate about manufacturing reinforces the confusion by focusing on the loss of low-skill jobs to lower-cost locations outside of the state and the country, and raises questions about the merit of investment, tax, and deregulation initiatives designed to help Massachusetts manufacturers compete.

All of this has tended to obscure three important and related trends in the nature of manufacturing operations that choose higher-cost locations such as Massachusetts and the United States:

- A shift to high-tech manufacturing processes, even in traditional sectors like textiles;
- In consequence, a need for the higher worker skill levels typically found in higher-cost locations; and
- A requirement for businesses to locate research and development, engineering, and customer service operations in close proximity to manufacturing facilities—creating another strong advantage for regions with high skills and a strong university system.

This report explains how these trends are providing Massachusetts (and other high-skill, high-cost locations such as ours), with a new competitive advantage in manufacturing. It provides a profile of what we manufacture, explains why manufacturing should remain high on the Commonwealth's economic agenda, and offers recommendations for steps we can take to maintain our competitive advantages.

William H. Guenther
President, Mass Insight

methodology

For this report, Mass Insight conducted more than 30 formal interviews with experts, location consultants, and senior executives from major manufacturing companies regarding decisions to locate and/or expand operations in Massachusetts. To provide a yearly update on trends in the five major service sectors in the state that we have tracked in the past, we also interviewed one leading executive from each sector. (That brief service sector report is being issued separately from Made in Massachusetts.)

Interviewees were asked about factors that affect major capital decisions, the competitive advantages and disadvantages of the state compared to other locations, and the impact of state policies.

Our selection of interviewees was designed to include a wide cross-section of companies representing both high-tech and traditional manufacturing; large public firms with multiple locations around the world as well as mid-sized companies primarily based in Massachusetts; and companies that produce consumer and commercial goods. We also selected companies from throughout the different geographic regions of the state.

We held separate discussions with a number of professional site consultants from outside of the state, in order to gain an external perspective on competitive conditions within Massachusetts.

Charts and data were collected from federal and state sources, as well as from Massachusetts organizations such as the Massachusetts Taxpayers Foundation and the Massachusetts Technology Collaborative.

We are deeply grateful to the executives and professionals who provided their perspectives over the course of our research. Their time and generosity made this report possible.

We would also like to thank the Design Studio at Monitor Group for the illustration, design, and layout of the *1999 Expansion Report*. Based in Cambridge, they share our goal (in the words of Edward Tufte) “to communicate complex ideas with clarity, precision and efficiency.”

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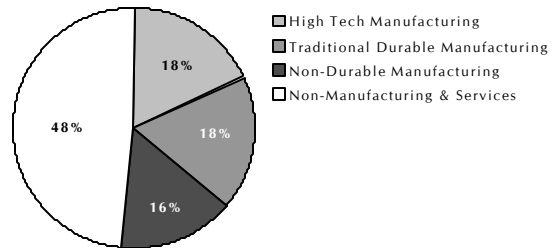
Manufacturing matters.

Massachusetts counts on manufacturing for growth.

Manufacturing represents more than half of the state’s base economy—that part of the economy that generates real growth through “exports” out of state—and it’s expanding.

[Finding One, page 6]

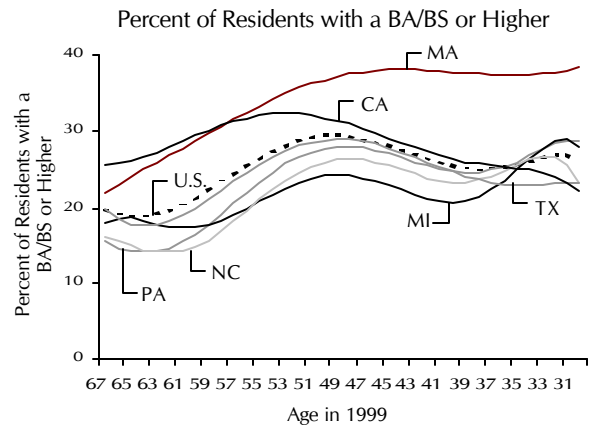
Manufacturing’s Share of Base Economy Jobs



Massachusetts has what it takes.

Manufacturers count on the nation’s highest skilled workforce—and on our universities.

New production processes demand highly skilled labor and proximity to first-class engineering, research and design. Massachusetts offers both. [Finding Three, page 12]



We know we’re competitive. But not many others do.

Improvements on Massachusetts’ competitiveness are still a state secret.

Interviews with out-of-state location consultants indicate that Massachusetts is still viewed externally as a high-tax, high-cost, complicated state in which to do business, local manufacturers and comparisons with five competitive states tell a different story.

[Finding Six, page 22]

“You have some significant advantages—central location in New England, labor supply, lowered tax rates—but no one knows the story.”

—National location consultant

Competitive Manufacturing in a High-Skill Location

Brains, not brawn, drive manufacturing today.

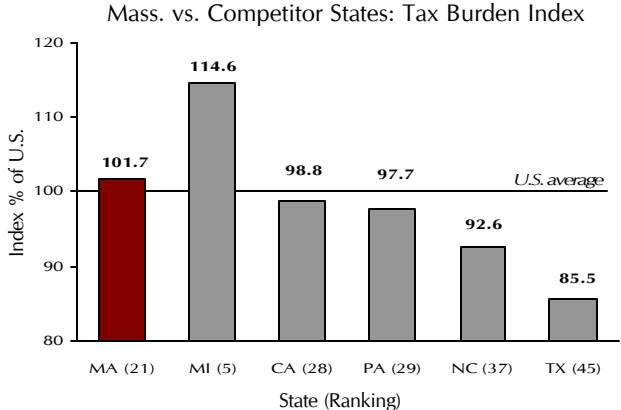
The dynamics of manufacturing have changed. High technology processes—for making both high- and low-tech products—have helped Massachusetts’ manufacturers set record levels of output and made our manufacturing workers among the state’s most productive. [Finding Two, page 8]



We’re competitive on taxes, but other costs and sites are concerns.

Recent changes have brought Massachusetts’ corporate tax burden into line with competitive states. Unemployment insurance costs remain high, however, and finding sites for manufacturing is a challenge.

[Findings Four and Five, pages 16 and 19]



recommendations

HOW TO CAPITALIZE ON MASSACHUSETTS’ MANUFACTURING STRENGTHS.

- **Increase the high-skill labor pool by:** marketing the state’s quality of life to retain more college graduates; supporting expanded high-skill foreign immigration; improving K-12 education; and fostering closer links between schools, colleges, and businesses.
- **Make taxation more predictable:** by eliminating sunset provisions on such programs as the Investment Tax Credit (ITC).
- **Speed up permitting:** by creating pre-permitted manufacturing sites.
- **Tell our story better:** by developing a marketing campaign targeted to out-of-state decision-makers that would promote Massachusetts’ success stories with high-value-added manufacturers and demonstrate our competitive advantages.

[Recommendations, page 25]

As Massachusetts, bastion of high finance and other service industries, strides into the post-industrial era, is its manufacturing sector fading? Does the industrial sector represent the gray, gritty wave of the past, using low-tech methods to produce (too expensively) outmoded products?

Conventional wisdom would say “yes.” But it’s a myth that couldn’t be further from the truth.

Today, manufacturing production in Massachusetts is at an all-time high.

It just looks different from the way it used to look. Almost all of the state’s surviving industries, however “traditional,” are by necessity “high-tech” in their processes, investing more in capital equipment and relying on the skilled workers for which Massachusetts is known in order to achieve competitive productivity. These employees receive good wages, good benefits and real opportunities for upward mobility. Manufacturing’s importance to Massachusetts has economic, geographic and social dimensions that make it vitally important to the future of the Commonwealth.

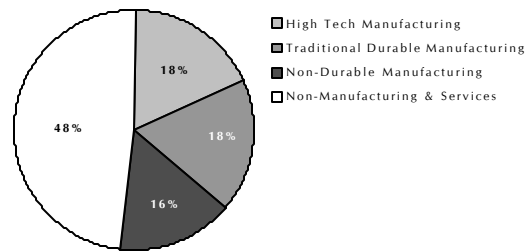
Manufacturing is central to our economy because it is an “export” sector.

Manufacturing sells most of its products outside the state and brings new money in. It represents 52% of the state’s “base” economy—that part of the economy that generates real growth through “exports” out of state (see pie chart, right). Constantly measured against competing industries in the national and global marketplaces, moreover, manufacturing is forced to improve its products and processes. Manufacturing is therefore the principal source of productivity growth in our economy—far outstripping services—and thus the driver of higher standards of living. It is every bit as important to the future of the Commonwealth as the financial and other service sectors that show up far more often in the local business headlines.

Manufacturing multiplies jobs.

While economists disagree about what multiplier effect to apply to manufacturing—two jobs elsewhere for each manufacturing job is widely cited—they agree that it is unmatched by other sectors of the economy. Sometimes the relationship is obvious; for example, the software industry has to a significant degree “spun off” from centers of computer hardware manufacture. There are many other cases, including education,

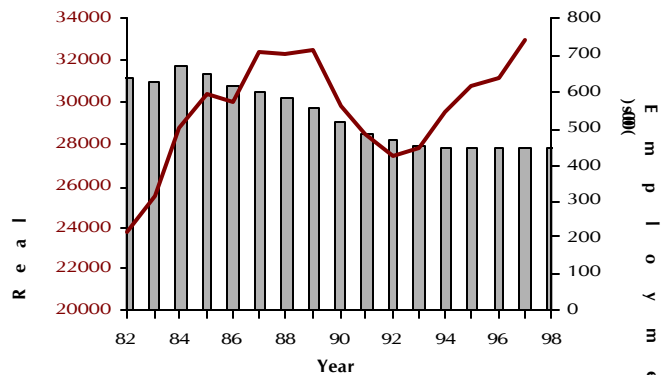
MANUFACTURING’S SHARE OF BASE ECONOMY JOBS
Manufacturing represents more than half of the state’s “base” (growth-producing through export) economy jobs.



Source: Massachusetts Taxpayers Foundation

FEWER JOBS, BUT RECORD-LEVEL OUTPUTS

Despite fewer jobs, improved productivity has pushed manufacturing’s real gross state product to a new all-time high.



Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis Division

Manufacturing is alive and well— and critically important to the future of Massachusetts.

research, consulting, and finance, in which key Massachusetts services industries benefit significantly from initial local markets in—and ongoing synergies with—our manufacturing sector.

Manufacturing continues to dominate “Outer Massachusetts,” outside of I-495.

In much of the state, the economic centrality of manufacturing is far more direct. A recent study by the Massachusetts Taxpayers Foundation, *Dynamics of Growth: The Two Massachusetts Economies*, points out that manufacturing constitutes 74 percent of the economic base of “Outer Massachusetts,” the regions of the Commonwealth beyond greater Boston. While the Boston area has boomed because of its concentration of fast-growing, knowledge-based industries, the report argues, the rest of the state has been less dynamic as a result of its reliance upon “traditional” industries that face fierce national and international competition.

Led by software, business and financial services, the current expansion certainly has centered on Boston. But for much of Massachusetts, notably its established industrial cities, a healthy manufacturing sector remains the most realistic hope of increasing prosperity for the foreseeable future.

Manufacturing serves a broad range of labor.

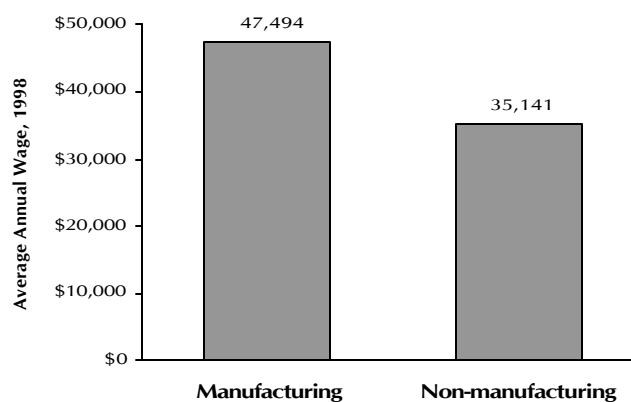
Manufacturing offers good jobs at good wages, particularly for those without college degrees. Massachusetts manufacturing employees are paid roughly one-third more than the average for all workers in the state—approaching \$50,000 annually in 1999. Manufacturing wage growth in the Commonwealth has outpaced inflation for the past two years, the first time this has occurred in a decade, and gains have accelerated this year.

These figures are particularly impressive for a sector with a continuing presence of “blue-collar” production workers. In terms of average pay, manufacturing trails only two predominantly “white-collar” sectors: finance, insurance and real estate; and wholesale trade. It leads

construction and transportation, communications and public utilities, and pays almost three times as well as retail trade, with its many part-time and youth workers.

GOOD JOBS, GOOD WAGES

The average annual wages for manufacturing jobs in Massachusetts (\$47,494) exceed those for non-manufacturing.



Source: Massachusetts Division of Employment and Training

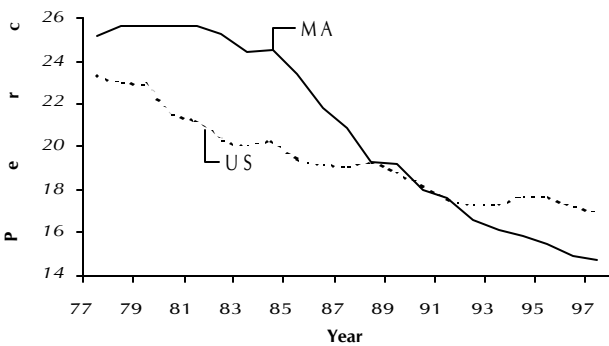
Couple these wages with the fact that manufacturing jobs generally carry excellent benefits, including health insurance, and it is clear that manufacturing continues to provide a route for those without extensive post-secondary education to achieve middle-class incomes, and to open up further opportunities for themselves and their children. For many, in fact, opportunities are improving, as modern production processes and management structures lead to intensified education and training and to increased responsibility and upward mobility.

These higher-wage (and higher-skill) jobs naturally help to drive up the total cost of manufacturing in Massachusetts. But as we shall see in the findings of this report that follow, the manufacturers who choose Massachusetts find that the highly skilled workforce coupled with new, more capital-intensive and technologically advanced production processes more than compensates for those higher costs.

Compared to many regions of the world—say, Mexico, South America, East Asia, and India—the United States is a high-cost country, and Massachusetts is a high-cost state within that high-cost country. Competition from low-cost producers has driven cost-sensitive manufacturing activity from the state. While manufacturing’s real Gross State Product (GSP) has reached a new high, as a proportion of total GSP, manufacturing has fallen from 25 percent in 1977 to 15 percent in 1997. Some of the decline in the share is simply a result of faster growth in services, as well as the collapse of the minicomputer business and the reductions in defense spending. But much is due to an exodus, or simply demise, of some manufacturing firms.

MANUFACTURING’S SHARE OF GROSS STATE AND NATIONAL PRODUCT

The decline of manufacturing’s share of Massachusetts’ Gross State Product mirrors (more steeply) the national trendline.



Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis Division

Does this mean that manufacturing will continue its secular decline, and ultimately disappear from Massachusetts? The answer, we believe, is no.

On the contrary, the prospects look good for a manufacturing sector that is growing in terms of output (see chart, page 6), with stable, if not growing, employment. In fact, real output recovered its 1989 level in 1997, growing at an annual rate of 3.8 percent from 1992 to 1997.

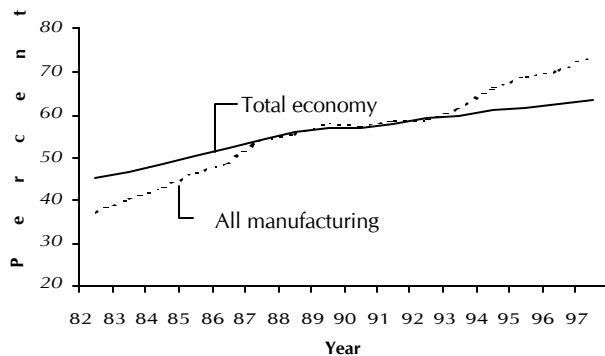
The key to success: productivity growth.

How could this have happened? Over that same five-year period, real manufacturing output per worker grew at an annual rate of 4.6 percent per year. The moral of this story: We can’t compete in the production of goods where efficient production requires low-paid workers, but we can compete where manufacturing requires high-skilled workers engaged in efficient production. As one manufacturer interviewed for this report put it, “We’re in the business of maximizing profits, not minimizing costs.”

It’s important to realize that such manufacturing is not limited to what we normally think of as high-technology sectors. The textile industry, for example, has been a local leader in replacing notoriously labor-intensive production processes with new models that use labor much more cost-efficiently. Consumer products lend another prime example: What explains the success of Gillette’s Boston operations, a consumer products plant located in the heart of the third costliest city for doing business in the country?

MANUFACTURING’S HIGH WORKER PRODUCTIVITY

The average economic output per manufacturing worker in Massachusetts has grown to exceed that of the average worker.



Source: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis

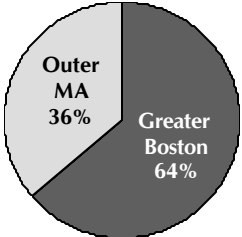
The answer is that Massachusetts manufacturers such as Gillette may not be producers of high-tech products, but they have come to use high-tech production techniques that keep their costs down (see Profile, page 7).

Massachusetts manufacturers have gone high-tech— even to make “low-tech” products.

REGIONAL SNAPSHOT: WHAT DOES MASSACHUSETTS MAKE—AND WHERE DO WE MAKE IT?

Golf balls. Plastics. Razor blades. Textiles. Telecommunications hardware. Missiles. Medical instruments. Paper. The range of products being manufactured in Massachusetts today can come as a surprise to those who have believed (to paraphrase Mark Twain) the greatly exaggerated reports of manufacturing’s demise.

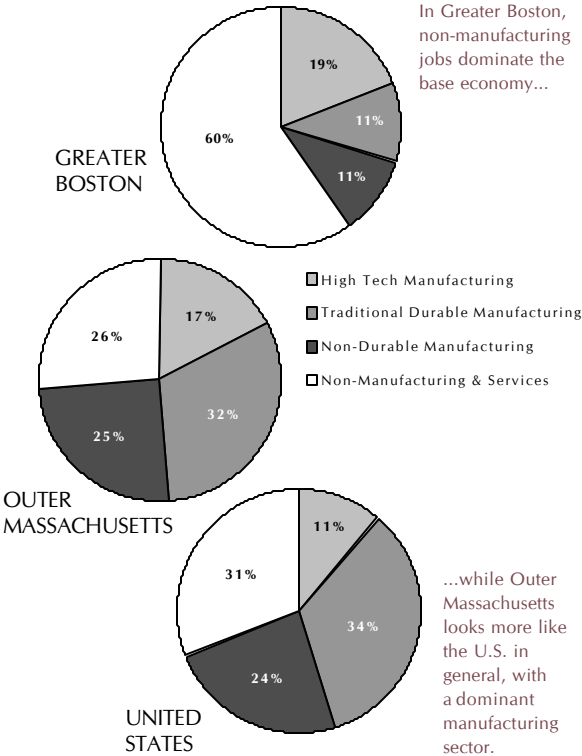
However, all of this manufacturing activity is not evenly distributed around the state. The Greater Boston region, which accounts for 51.2 percent of the state’s jobs, has 48.2 percent of high-tech manufacturing jobs, or about its even share. However, Greater Boston’s share of other durable manufacturing is only 24.1 percent, and its share of non-durable manufacturing is 36.5 percent. The Boston metro region not surprisingly specializes in the export of services, with 62.0 percent of all such jobs in the state.



With only 13.1 percent of all jobs, the Northeast region of the state has 34.0 percent of all of Massachusetts’ high-tech jobs. Other durable and non-durable manufacturing—“traditional” manufacturing—is spread around the state, with the exception of the Cape and the Islands, which have very little manufacturing. The Central and Connecticut Valley regions have a large manufacturing presence in traditional manufacturing, especially in durables, and the small Berkshire region has a disproportionately large share of non-durable manufacturing.

GROWTH-PRODUCING JOBS BY SECTOR IN MASSACHUSETTS AND THE U.S.

Sectors	Employment Percent of Region’s Base Economy		
	Greater Boston	Outer MA	U.S.
Total Base	100%	100%	100%
High Tech Manufacturing	19%	17%	11%
Aerospace, Ships	2%	3%	2%
Computer Hardware	4%	3%	2%
Telecommunications	1%	3%	1%
SemiConductors	4%	4%	3%
Medical Instruments	2%	2%	1%
Other Instruments	6%	3%	2%
Traditional Durable Manufacturing	11%	31%	33%
Machinery	5%	11%	10%
Fabricated Metal	3%	8%	6%
Other Traditional Durables	3%	12%	17%
Non-Durable Manufacturing	11%	25%	24%
Chemicals	2%	3%	4%
Plastics	1%	5%	3%
Other Non-Durables	7%	17%	17%
Non-Manufacturing & Services	60%	26%	31%
Money Management	9%	1%	3%
Insurance	6%	7%	6%
Private Universities	17%	5%	5%
Software	12%	6%	6%
Management Consulting	17%	7%	10%



Source for all data on this page: Massachusetts Taxpayers Foundation. Numbers may not add correctly due to rounding.

Those techniques, in turn, have driven a need for a much more highly skilled (though in many cases, smaller) labor force—and that plays to Massachusetts’ most significant competitive advantage.

Manufacturers today are becoming service providers—a boom for high-skill locations.

Labor costs and new production processes are not the only factors driving change; new demands from the marketplace have been at work as well. The old model

As one manufacturer interviewed for this report put it, “We’re in the business of maximizing profits, not minimizing costs.”

of mass production on an assembly line, with large inventories of raw materials, intermediate products, and final products is no longer viable for high-cost regions like Massachusetts. Today’s manufacturers are increasingly

service providers to their customers. Manufacturing service means producing items customized for individual clients with fast turnaround, quick delivery, and essentially no inventories—a model that’s possible through new production processes requiring high-skill labor and a dynamic that favors even high-cost locations close to regional customers.

The new model also favors Massachusetts because, as both high-tech and traditional employers emphasized, it puts a premium on locating manufacturing in proximity to engineering and design departments to make it easier to shape and change product designs. And that means the university connections that draw engineering and design operations to Massachusetts once again provide a significant competitive advantage.

**EVOLVING TECHNOLOGIES:
INCUBATING NEW PRODUCTION MODELS AT MIT**

Rapid changes in computer-related technology, including Information Technology, have enabled Massachusetts manufacturers like Gillette to adopt new successful models of production. The changes include a closer and more responsive interaction with suppliers and customers, made possible by the Internet; enterprise resource planning models and software; and a redesign of the production process to accommodate product variety, rapid set-up time, and low inventories.

The new approaches are an evolution of Toyota’s “lean manufacturing” system—but have also benefited enormously from the proximity of Massachusetts’ vaunted higher-education institutions.

One of the academic centers involved in developing these new techniques, and in supplying the engineers and managers who will implement them, is the Production Systems Design Laboratory at MIT. The lab, housed in the Mechanical Engineering Department, designs systems and machines to implement a linked-cell manufacturing system, where parts flow one at a time according to a model called the single-piece flow cell. The route of each cell is readily traceable and known, so there is a predictable level of output, very little inventory or waste, and a dramatic reduction in the number of defects produced. David Cochran, head of the laboratory, estimates that only 5 to 10 percent of manufacturers have adopted the system so far, and that the potential for a revolutionary change in industrial production is great, with a significant impact on locations like Massachusetts where employees have the skills to make these systems work.

GILLETTE: TECHNOLOGY'S CUTTING EDGE NEEDS PRODUCTION *WITH* ENGINEERING

Gillette opened its doors in South Boston in 1903, and never found the need to relocate. Its South Boston plant employs 3,300, and another manufacturing facility in Andover employs 500-600. The South Boston facility manufactures the Mach III, Sensor, Atra, and Trac II products. Andover produces Right Guard, The Gillette Series, Foamy, and other products for men.

Gillette is a traditional manufacturer that is successful because it has embraced high-tech manufacturing and factory management worldwide. The company has a global workforce of 40,000. Major facilities are located in California, Minnesota, Iowa, Tennessee, England, Germany, and Brazil. Information technology allows Gillette to run its worldwide operations as if it were one virtual factory.

Company PROFILE

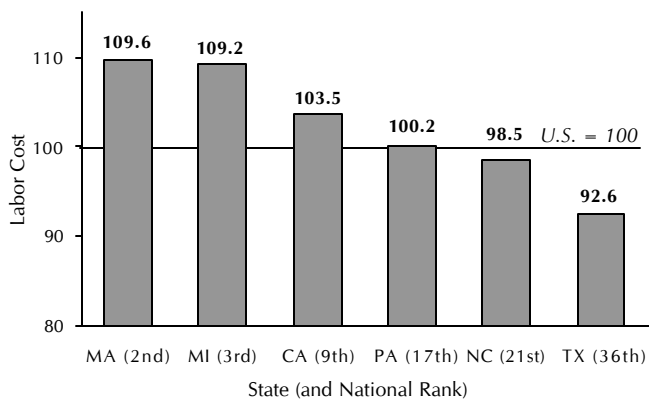
As for other international manufacturers interviewed (in both high-tech and traditional sectors), unit production costs at Gillette are an important factor in determining where production is located. Proximity to customers is another factor.

But location decisions are driven mostly by the ability to support the technology, and that nerve center is located right here in Boston. The South Boston facility houses Gillette's R&D, engineering, and product development staff under the same roof as its production operations. Other pertinent observations include the following:

- *Capital expansion is an ongoing activity.* In the last 18 months, capital expenditures for Mach III totaled \$750 million, half here and half in Berlin.
- *Gillette consciously rotates top production management* between its plants around the world to enable techniques and knowledge to be shared—and increased—throughout its facilities. Its head of global manufacturing is German, its previous Andover manager was from the U.K., and an American runs its U.K. factory.
- *Total employment has been relatively stable in Boston*, but the employment share of engineers, designers, technicians, and managers has been increasing. There are not many people on a Gillette plant floor. Those who remain are primarily high-level technicians and lower-level engineers. The flow of materials is managed precisely, with computer-controlled, automated guided vehicles delivering parts to where they are required, when they are required. It is very much the picture of large scale, capital-intensive manufacturing in a high-cost, high-skill state.

The cost of manufacturing in any high skilled location like Massachusetts is high—much higher than in rapidly growing industrial economies abroad, somewhat higher than in low-cost, lower skilled states (such as Texas), and in the same range with states more similar to us (such as Pennsylvania, California, and Michigan).

MASSACHUSETTS LABOR: PREMIUM COSTS...
 Massachusetts ranks second among all states in labor costs.



Source: Regional Financial Associates, November, 1998

Despite the costs it helps to drive, however, skilled labor is the number one location factor for those companies engaged in high value-added manufacturing. U.S. labor costs in states with substantial numbers of skilled workers are seen as relatively equal. For Massachusetts and these competitor states, high skills justify the costs.

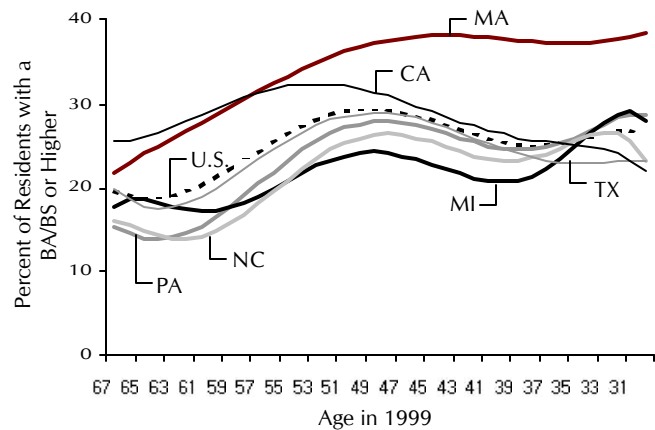
Again and again, manufacturers interviewed for this report emphasized that the main reason for preferring Massachusetts as a location is the quality of its workers. It did not matter whether they were high-tech or traditional manufacturers, or whether they were talking about professional workers such as engineers, or production workers.

Massachusetts' manufacturing workforce is among the nation's most educated.

Data on the educational attainment of Massachusetts manufacturing workers relative to workers in compet-

ing states bear out the perceptions of these interviewees. Among the college educated, the proportion who have a four-year degree is higher in Massachusetts. With the exception of California, where the difference is too small to be statistically significant, the proportion of manufacturing workers with at least some college educational attainment is highest in Massachusetts.

...BUT YOU GET WHAT YOU PAY FOR
 Massachusetts' workforce has grown to be significantly better educated than other states' and the U.S. workforce as a whole.



Source: March Current Population Surveys, 1994-1999

Furthermore, the educational attainment of Massachusetts' manufacturing workers increased during the 1990s, consistent with the anecdotal evidence gathered in the interviews.

The state's universities are critically important to manufacturers seeking skilled labor.

One high tech manufacturer, who is located 30 miles from Boston, purchased a small engineering firm next to MIT. The motive: "to recruit engineers right out of college." Turnover in high tech among engineers is becoming increasingly common. Employers emphasize the need for easy access to a large pool of the required talent. This is one reason why high-tech manufacturing is concentrated near Boston, in the Greater Boston and Northeast regions of the state.

We are a higher cost location,
but high skills make Massachusetts worth the investment.

Company roots matter.

The other frequently cited reason for a Massachusetts manufacturing location came down to a question of roots. Companies that started in Massachusetts prefer to stay if they can possibly do so. Many traditional manufacturing establishments, like paper producers in Holyoke, owe their existence to a craft heritage developed in the heyday of the state’s industrial revolution. Faculty or students of MIT and other area colleges founded others, especially those in the high tech sector. Traditional and non-traditional manufacturers mentioned a reciprocal responsibility to the communities in which they were located.

Several interviewees had investigated the option of relocating and found the cost of moving plant and capital, and losing employees, was not worth it. Some manufacturers have set up additional facilities in other states, but the Massachusetts location was kept because of its strategic value as the home of the engineering staff.

Expansion in other states, or in other places around the world, was most often motivated by the desire to be close to regional or foreign customers or suppliers. The motivation to replace expensive Massachusetts labor by less expensive foreign labor was rarely mentioned.

HIGH LOYALTY, LOW TURNOVER

In our interviews, accolades for production workers in Massachusetts—including those who are high school graduates—came up as frequently as they did for engineers. Employers stressed the quality, commitment and loyalty of their production workers. Turnover among the production workforce in traditional manufacturing appears to be low. One employer in the New Bedford area said that production work was family oriented, and that many of his workers’ parents and grandparents had worked for him. A few traditional manufacturers mentioned the importance of a craft tradition.

A high demand for more high-skill labor.

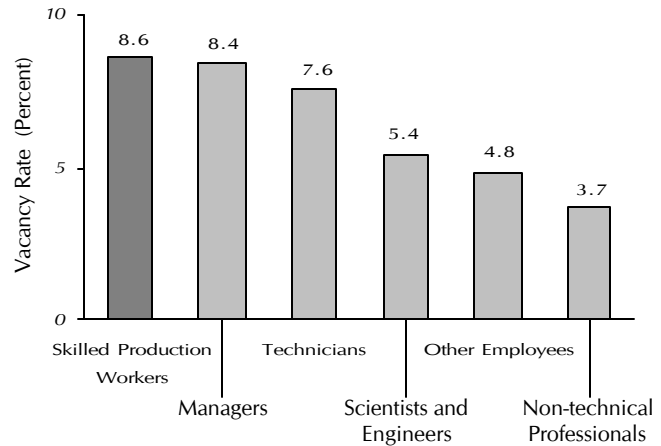
Having made the decision to locate here, are manufacturers finding all the high-skill labor they need? The answer is a resounding no.

Manufacturers across the board are finding it harder to find engineers. The shortage is particularly severe for high-tech companies. Attrition rates are rising. Interviewees expressed concern that they are losing high skill workers to other areas of the country, especially where the quality of life is good and the cost of living is lower.

The labor shortage situation for production workers is mixed, with some employers reporting problems, and others not. Shortages seem to be less severe in traditional manufacturing and in the New Bedford and Lowell areas, but there are exceptions.

THE NEED FOR SKILLED PRODUCTION WORKERS

At technology-intensive companies, the highest job vacancy rate is for skilled production workers.



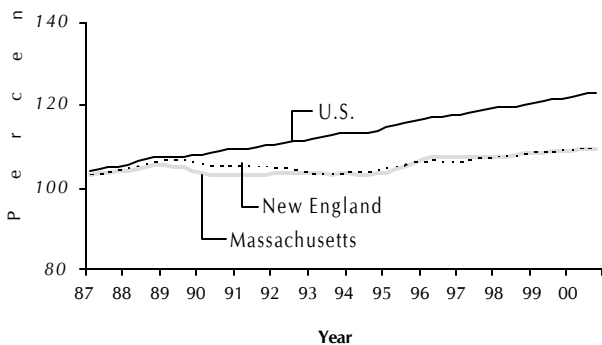
Source: Massachusetts Technology Collaborative: Index of the Massachusetts Innovation Economy—1999

Higher education and immigration to the rescue.

Where do Massachusetts' highly skilled workers come from? The numbers tell an interesting story. In a nutshell: without the state's ability to retain out-of-state workers who came here for college or university studies, along with a net surplus in international migration into the state, we would be in trouble. (See charts on this page.) Massachusetts is investing heavily through the Education Reform Act of 1993 in the skill development of its own children (*Recommendations, page 24*), but while that process is underway, it is particularly dependent on infusions of skilled labor from these two other pools.

MASSACHUSETTS' LABOR POOL CHALLENGE

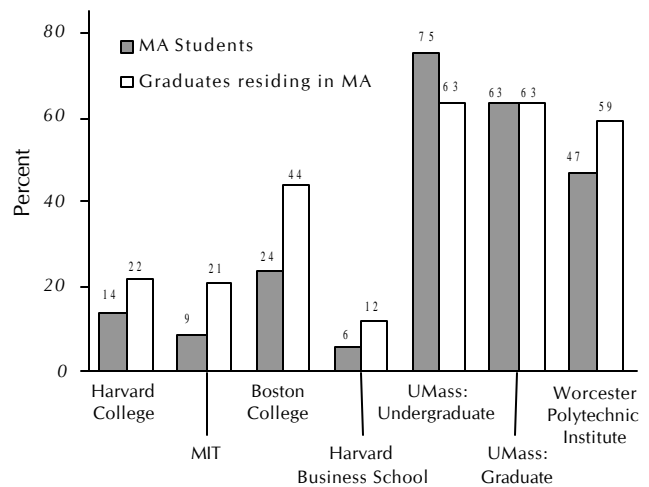
While the U.S. labor pool has climbed over the past decade, Massachusetts' and New England's have grown at half the rate.



Source: U.S. Bureau of Labor Statistics

HIGHER ED GRADUATES WHO DECIDE TO STAY

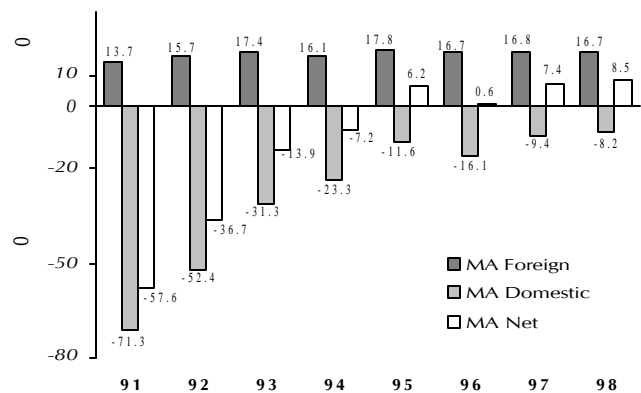
College and university students who come to Massachusetts and stay represent a critical source of highly skilled and professional employees.



Source: University admissions and alumni offices. Harvard College graduate percentages are based on major reunion classes, 1972-1995; MIT figures based on graduates from the classes of 1980-1996; all others represent all graduates residing in Massachusetts.

IMMIGRATION'S IMPACT ON THE LABOR POOL: NET MIGRATIONS INTO & OUT OF MASSACHUSETTS

Thanks in large part to foreign immigration, Massachusetts' overall labor pool has grown slightly in recent years.



Source: U.S. Census Bureau

We asked the interviewees about several other issues that could influence location decisions, including taxes (in the context of costs); infrastructure issues such as electricity deregulation, permitting, and transportation; and labor matters including education and visa regulations.

Recent progress on Massachusetts' corporate tax structure and employment mandates has made the state more competitive.

There is a common perception among companies located here that the tax image of Massachusetts is improving. The investment tax credit (ITC), research and development tax credit, and single sales factor are important to manufacturing companies and widely used, according to interviewees. Some executives pointed to recent efforts to ease the impact of workers' compensation and unemployment insurance costs. Others pleaded ignorance regarding tax questions, because their accountants handled these matters. Even this is an indication that Massachusetts' taxes may not be the burning issue that it has been in the past.

At the same time, overall costs—including state taxes—play an especially crucial role for one class of manufacturers: larger companies that have multiple plant locations producing the same product. The rationale for multiple plant location is to be close to customers around the world, but allow considerable flexibility in sourcing the levels of production worldwide. In other words, production can be shifted between several plants to achieve minimum costs. Companies such as these are doubly important to Massachusetts because they produce a large spin-off effect, spawning suppliers and other forms of new business within the state. They constantly monitor costs, and the impact of corporate tax changes can be enough to throw those costs out of kilter. (See “*Small Cost Differences Matter.*”)

**SMALL COST DIFFERENCES MATTER—
ESPECIALLY TO LARGE COMPANIES**

As one employer told us, his company's plant manager knows “to the fifth decimal point” what it costs to make his products in every other company plant around the world. Large companies with multiple locations track marginal costs carefully and shift production between plants. Changes in Massachusetts' tax structure and employee mandates (along with the efficiencies of new production models) have helped enable Massachusetts-based manufacturing facilities to remain competitive with their counterparts in other states and overseas.

Tax policy needs a long-term commitment to be effective.

Beneficial as they have been, the positive tax changes of recent years would be even more effective, interviewees said, if it were clearer that they were here to stay. When there is a ten-year window to plan investment streams, a 3- to 5-year sunset provision for a credit such as the ITC creates uncertainty.

Other frustrations were voiced with respect to the sales tax, which some executives argued is over-complicated and creates significant compliance costs. For example, while manufacturing equipment is exempted, pollution control, safety equipment, and some tools are not.

Some executives indicated that a primary tax concern at present is Massachusetts' high personal income tax; by raising the cost of living, they said, this tax makes it more difficult to recruit workers and encourages some employees to move to New Hampshire. Other interviewees felt that the current level of taxation is fair, because public expenditures support education and a high quality of life.

“Taxachusetts” is gone, but a long-term commitment to cost control and recent tax changes is critical.

Electricity deregulation: Starting to produce significant savings.

Electricity deregulation won universal acclaim from interviewees and seems to be working well for manufacturers. Energy-intensive users, in particular, reported sizeable savings. In some cases, firms were already getting good deals through municipal power providers and felt that competitive pressures were persuading their current providers to maintain favorable rates.

Transportation infrastructure: A need for better Logan access.

With the exception of air transportation and increasing congestion identified around Route 495 in the northeast, the interviewees were generally satisfied with the transportation infrastructure. Logan Airport is viewed as difficult to get in and out of, in addition to its service issues. Manufacturers are coming to rely on several regional airports, including Bedford, Manchester, Worcester, T.F. Green (in Rhode Island), and Bradley Field (in Hartford).

Permitting: Improving, but still a challenge hinging on local cooperation.

Sentiment about permitting and the regulatory structure was varied. Time to permit new facilities is very sensitive because of time pressure to get production rolling in this new environment of product variety, quick development time, and short product life cycles. A biotech company reported that its number one reason for expanding in Massachusetts was timing. Each day the company saved in the permitting process meant another \$1 million in sales.

Most who addressed this issue reported that improvements in the system have been made, that the permitting process is easier now and takes less time. However, most still found it costly to deal with. Further, the municipality in which the manufacturer is located appeared to make a big difference. Some praised the cooperation between the local, state, and federal governments; others bemoaned the trouble involved. Permitting times varied from a few months to a few years, depending on the project and permits. Companies with air emissions constraints face an especially difficult permitting challenge.

QUAKER FABRIC: BENEFITING FROM IMMIGRATION

Quaker Fabric Corporation, located in Fall River, produces upholstery fabric for furniture manufacturers and specialty yarns for the home furnishings and apparel industry. Quaker has survived and thrived in Massachusetts by investing in capital equipment, diversifying its products, exporting, and using a variety of measures to upgrade the skill level of its workforce.

Company PROFILE

The public perception of the textile industry is that it favors protections like import quotas and tariffs, but Quaker is a free trade advocate, supporting NAFTA and “fast track” presidential trade authority. Quaker also advocates open immigration policy and the H1B program, and counts on these initiatives to help it identify and recruit skilled workers. The company has ties to its community that go back more than 50 years. While its new production processes use fewer workers, the company’s overall expansion has more than compensated for lost jobs: employment at Quaker has increased from 1,100 in 1990 to 2,400 today.

Education: A call for improvement in math and reading skills.

Echoing a theme of previous Mass Insight *Expansion Reports*, interviewees indicated that their primary long-term issue is recruiting and retaining a skilled workforce. We asked which skill levels were most frequently lacking among production workers, and this evoked many comments on education, both good and bad.

First, the bad news. Most contacts were disappointed with math skills among workers and applicants, particularly with basic math operations such as using percentages.

Reading and communication problems were also an issue but less problematic than math skills, except with respect to immigrant labor. Many employers provide English as a second language training, and some also provide refresher courses in basic math. These skills are more important now because of the widespread use of computers for controlling equipment, as well as for all kinds of record keeping and communication. While in the minority, two executives in traditional manufacturing companies said that math and English were not critical for their operations, but that mechanical ability and the “ability to fix things” were. These continue to be important skills in the new single-piece flow cell model of production as well.

Now, the good news. Employers praised the colleges, particularly the community college system. They rely on these educational institutions to train both technical workers and skilled production workers. As one high-tech contact put it: “We have no unskilled jobs here.” The community colleges work closely with employers to provide training tailored to their needs. In some cases, state training grants help fund skill attainment. Particular schools mentioned include Minuteman, MassBay, N.E. Technical Institute, and Quinsigammond. Four-year institutions such as Northeastern University were also mentioned. The Aluminum Casting Research Lab of Worcester Polytechnic Institute was cited as a nationally renowned institution that is of vital importance to area manufacturers.

Visas: A high priority where skilled foreign workers are used.

Immigration is an important source of production and engineering workers for most manufacturers. Several employers rely on foreign workers to enable them to run 7-day, 24-hour operations, and rate foreign workers highly in terms of quality and dependability. At the production worker level, most employers do not report issues with obtaining visas. However, at the engineering level, the stakes are higher and employers say that the H1B program is critically important, given the acute labor shortage for such skills. One high-tech employer says that their company celebrates six different New Years.

Where can new manufacturing find a home in Massachusetts?
The answer is crucial to attracting expansion.

This report has focused mainly on issues and trends that face Massachusetts on a statewide level. But if, as Tip O’Neill used to say, all politics is local, the same is surely true for developing manufacturing sites.

Finding suitable manufacturing sites in Massachusetts today can be a challenge.

As the local economy has boomed, it has become more difficult to find sites suitable for manufacturing. Limitations include the lack of new (greenfield) land in older developed areas, the obsolescence of existing older buildings, zoning and permitting restrictions, and development competition from “higher and better” uses. All of these factors have combined to create a very tight market for manufacturers hoping to expand or locate new facilities in Massachusetts (*see table*).

Location decisions in urban areas can be especially complicated. The urban advantage of ready access to a skilled labor force is often overwhelmed by re-use limitations, land parcels that are too small, complicated approval and permitting processes, and the effects of environmental contamination. As highlighted in Mass Insight’s 1997 report, *Business Operations Expansion in Boston*, there is a pressing need for pre-permitted manufacturing sites.

For all manufacturers, the time it takes to permit and build a facility is one of the most crucial elements of the location decision. Almost all interviewees mentioned the impact of the permitting and approval process on completed or anticipated new construction.

Profiles of two model programs.

Based on our interviews and the data, Massachusetts has a good story to tell. And on the ground, there is work being done around the state to make sites available and to enhance the competitiveness of manufacturing in the Commonwealth. We profile two model programs on these pages: MassDevelopment’s efforts to bring manufacturing to the former site of Fort Devens and the Manufacturing Assistance Center of Worcester.

MassDevelopment is the economic development bank of Massachusetts, and offers a wide range of services and support to stimulate economic development and job creation. The Manufacturing Assistance Center is focused on skill development and networking to enhance and support existing businesses (particularly smaller manufacturers and employees). These are only two of many organizations working along the same lines in Massachusetts.

VACANCY RATES IN BOSTON AND SPRINGFIELD FOR MANUFACTURING

In Boston and across the state, manufacturers are finding suitable sites a challenge to find.

Greater Boston Vacancy Report <i>R&D/Light Industrial</i>	Total Supply	Vacant Space	Percent Vacant
Greater Boston	40,183,780	4,016,949	10.0%
Cambridge	715,625	0	0.0%
Suburbs, to I-495	39,468,155	4,015,949	10.2%
<i>Industrial Market</i>			
Greater Boston	47,817,462	3,572,769	7.5%
Cambridge	423,800	18,000	4.2%
Suburbs, to I-495	47,393,662	3,554,769	7.5%

Source: *The Spaulding & Slye Report, Greater Boston, July 1999*

Greater Springfield Industrial Availability Index	Total Supply	Vacant Space	Percent Vacant
All markets, Westfield to Palmer to Enfield	50,563,148	3,364,226	6.7%

Source: *CB Richard Ellis—N.E. Partners, 3rd Quarter, 1999*

DEVENS: A “YANKEE” RESEARCH TRIANGLE PARK

**Site
PROFILE**

When Fort Devens—in the towns of Ayer, Shirley, and Harvard—closed over four years ago, 15,000 jobs were lost directly due to the closing, and many more indirectly, affecting 46 surrounding communities in central Massachusetts and southern New Hampshire. The former 4,400-acre military site is being developed by MassDevelopment, a quasi-public authority that serves as the state’s chief development bank. The goal is to fill nine million square feet of plant and office space with 9,000 jobs. In the last two and one-half years, a total of two million square feet have been occupied or are under construction, representing 70 companies and the full-time equivalent of 3,000 jobs.

Like Research Triangle Park in North Carolina, the triangle formed by Cambridge, Worcester, and Devens surrounds a place where brainpower is a valued commodity, and people are the key to the region’s economy. The development strategy is to compete directly with such areas as Research Triangle Park in North Carolina by offering large open sites; competitively priced land, buildings, and utilities; financial and tax incentives; and one-stop permitting.

Companies have to deal with just a single umbrella permit with a short, 75-day turnaround time. Since Devens is in one of the Commonwealth’s 36 Economic Target Areas defined by the Massachusetts Office of Business Development, several tax incentives are available, including:

- An investment tax credit of 5 percent for 10 years (add 10 percent for developing an abandoned building);
- An additional research and development credit of 10 percent; and
- Local property tax breaks of between 5 and 20 years, negotiated with the municipality.

In addition, there is one low municipal services fee, and there are no personal property or excise taxes at Devens. Electricity rates are the lowest in New England.

These advantages were instrumental in persuading a paper manufacturer from Maine to move to Devens, and in the relocation of a biotech company from New York. Other companies that have started operations at Devens include Gillette, Parker Hannifin, Comco Graphics, and several other software and high-tech companies.

THE MANUFACTURING ASSISTANCE CENTER: HELPING THE BIRD IN THE HAND

Program PROFILE

The Manufacturing Assistance Center is a small but effective non-profit organization based on an “industry cluster” model, a concept popularized by Michael Porter. Its focus is to help existing industries in the Worcester area to thrive. Started by local manufacturers in 1998, the MAC serves manufacturers in the cen-

tral Massachusetts area (primarily Worcester) in three ways:

1. *Training:* In 1985, less than 15% of manufacturing positions required technical or professional training. Today, 50% do. MAC holds training classes, for example, in CAD/CAM and other computer skills. These classes serve current manufacturing company employees.
2. *Networking:* Networking revolves around industry clusters—for example, a printing cluster. The members of a network meet and collaborate to solve mutual problems. For example, printers need workers trained in various print production processes, so the printing cluster makes connections with all of the high schools in the Worcester area to provide related training to interested students.

MAC also networks with other organizations, including the Massachusetts Manufacturing Extension Partnership and the National Laboratory System of the U.S. Department of Energy. These labs provide “off-the-shelf” solutions for local manufacturers needing expert assistance.

3. *Product Development:* In its product development function, MAC serves to facilitate incubators, or virtual incubators, for product development. The idea is to link local manufacturing suppliers of components into supply chains to serve other manufacturers. For example, 40 percent of electronic assembly is done through contractors, who deal with component manufacturers. In the absence of such contractor supply chains, it would take 18 months to build the capacity to produce a new product. These days, the product life cycle is too short for this to be feasible, so a pre-existing network of contractors is critical to a product’s success. MAC’s involvement is to connect the small manufacturer to a large one and to facilitate the creation of a dynamic supply chain. This function fills a need created by the recent trend towards outsourcing product development and production to smaller, more agile contractors.

We have seen how manufacturing executives in our state assess the advantages and disadvantages of Massachusetts as a place to do business. How do their perceptions compare to those of professional location consultants? And how, specifically, do costs in Massachusetts compare to those of our competitor states?

We interviewed four experts to get their perspectives: an economic development consultant, a real estate specialist, and two site analysts. The site analysts were from New Jersey and therefore provide a valuable out-of-state perspective. Here's what they told us.

Improvements on competitiveness are still a state secret.

Massachusetts is still generally perceived by many not located here to be a high-tax, high-cost state with strong unions and a long, difficult permitting process. This perception is not based on analysis, but simply on old information. The state, interviewees told us, does a poor job of marketing itself. This was a comment we heard from executives headquartered in Massachusetts and outside of the state as well. It is also a recurring theme, as this is now the second year that executives interviewed for the *Massachusetts Expansion Report* have called on the state to market its advantages more effectively.

At least partly as a result, some companies have chosen to locate new manufacturing facilities in upstate New York, Rhode Island, and New Hampshire, even though Massachusetts is the most centrally located state in New England, with several areas of competitive labor markets (for example, Fall River, New Bedford, and Haverhill).

The consultants agreed on two other points:

- Massachusetts is well situated for serving customers in New England and Europe.
- Better business incentives are available elsewhere, or are marketed more widely—for example, bigger tax and utility setoffs, and job creation and training tax credits. That perception fed the analysts' view that Massachusetts is not as pro-actively pro-business as some of our competitor states.

HOW OUTSIDERS VIEW MASSACHUSETTS

While in-state interviewees for this report expressed enthusiasm over Massachusetts' competitiveness on a range of location issues, we heard a different story from experts outside of the state.

On a competitive basis, we learned, key states competing for new businesses are perceived to have some significant advantages over Massachusetts. Our interviews hinted at some of these, for which we could not develop accurate data, but they include:

- Substantially larger budgets for marketing industrial sites (one interviewee said "Massachusetts is out-spent 10 to 1 on marketing for economic development projects");
- Funds and processes in place for granting significant tax incentives on a fast track basis; and
- Substantial utility subsidies.

As one site analyst told us: "For those non-Massachusetts companies considering expansion in New England, Massachusetts is not even on the radar screen. You have some significant advantages [central location in New England, labor supply, lowered tax rates], but no one knows the story. Without a coordinated marketing effort, the businessman looking for space has to talk with leaders on the community level, and they just can't compete with the coordinated efforts of the competing states."

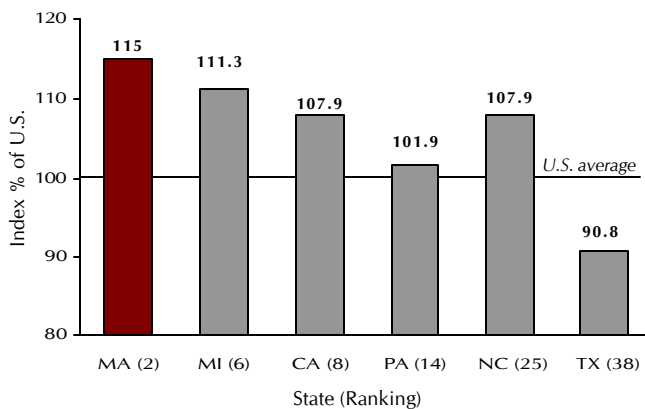
We're winners on skills and competitive on costs. But are we losing the marketing race?

High costs, but more moderate corporate taxes.

Massachusetts's cost problem has more to do with living costs than with corporate taxes. The entire state, and the Boston metropolitan area in particular, is a relatively expensive place to live, according to several measures.

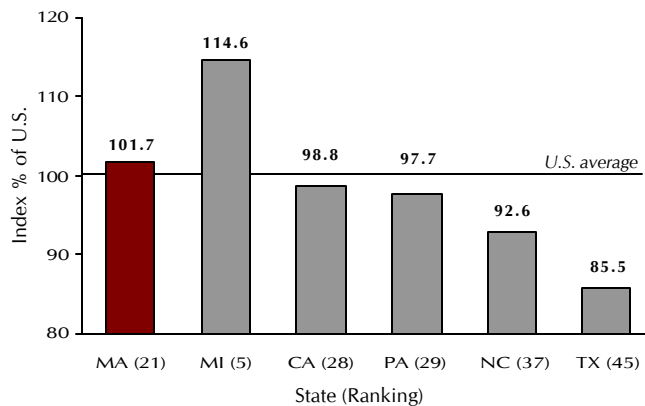
Regional Financial Associates' cost-of-doing-business indices for states and metropolitan areas shows Massachusetts at the high end overall. Perhaps surprisingly, though, the indices do not support the view that Massachusetts' state taxes are high. Combined state and

MASS. VS. COMPETITOR STATES: OVERALL COST INDEX
While Massachusetts ranks near the top in terms of overall costs for doing business...



Source: Regional Financial Associates

MASS. VS. COMPETITOR STATES: TAX BURDEN INDEX
...The principal cause of that high cost ranking is not the state's tax burden, as shown in this chart.



Source: Regional Financial Associates

local taxes for Massachusetts are only 1.7 percent above the national average. In Boston, they are 0.9 percent below the average for metropolitan areas.

A tax analysis by the Massachusetts Taxpayers Foundation (MTF) shows that, for 1998, all state taxes amounted to \$73.07 per \$1,000 of personal income, or 109 percent of the national average state tax rate. On this measure, taxes pose a lower burden than in Michigan, California, North Carolina, Maine, and Connecticut but are still higher than in Pennsylvania, Texas, and the other New England states. In Texas, state taxes were 67 percent of the national average, and in New Hampshire, only 45 percent.

Other related costs: Some progress, but a ways to go.

MTF also analyzed unemployment insurance costs, workers' compensation costs, and electricity costs.

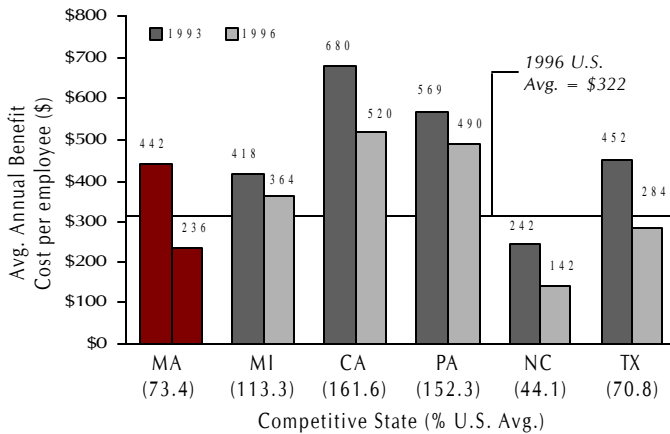
The state has made substantial progress on **workers' compensation costs** and compares favorably with most competitor states on these costs (*see chart, page 24*). Its insurance adjusted manual rates in 1999 were on a par with the national average, and below all competitor states except North Carolina and Vermont.

Unemployment insurance costs are still comparatively high. Costs per employee were \$308 in 1998, 59.7 percent higher than the national average, and higher than all competitor states except Pennsylvania, Rhode Island, and Connecticut. The differential between Massachusetts and the lowest competitor state, New Hampshire, amounts to roughly one percent of average production worker wages or \$63 per employee per year.

In 1998, although significant gains have been made through deregulation, manufacturers continued to pay substantially more for **electricity** than their counterparts in competitor states. The average price per kilowatt-hour was 8.1 cents for industrial users, 44.6 percent higher than the competitor state average of 5.6 cents. Michigan, North Carolina and Texas had the lowest rates of our competitors. Natural gas costs for manufacturers have improved, dropping 14%, by some estimates, since deregulation.

**WORKERS' COMPENSATION COSTS:
LOOKING GOOD**

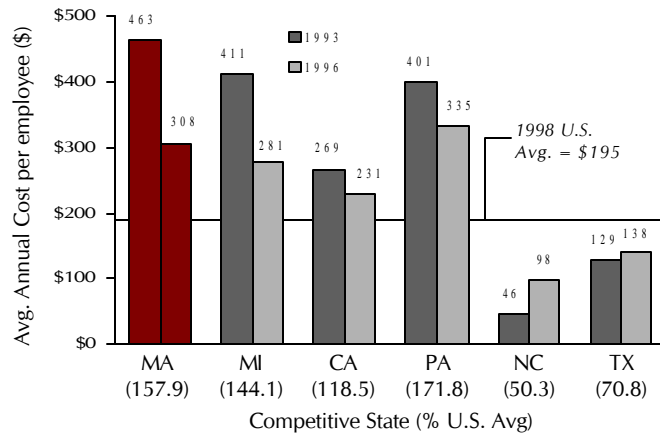
Massachusetts performs well for manufacturers on the cost of providing workers' compensation.



Source: UWC and the National Foundation for Unemployment Compensation & Workers' Compensation, August 1999

**UNEMPLOYMENT INSURANCE COSTS:
SHOWING IMPROVEMENT**

Massachusetts has moved within the range of competitive states on the costs of providing unemployment insurance to workers.



Source: U.S. Department of Labor, Unemployment Insurance Service, First Quarter CY 1999

INTEL: CHOOSING TO EXPAND IN MASSACHUSETTS

Intel Corporation has two major initiatives in Massachusetts. The Massachusetts Development Center includes design and engineering operations in Hudson and Bedford. The manufacturing facility in Hudson was part of the acquisition of Digital Equipment Corporation's Semiconductor Operations in May 1998, while Bedford was acquired with Shiva Corporation in March 1999. Intel wants to invest \$500-\$700 million over the next 2-4 years to upgrade and retool the existing semiconductor fabrication facility in Hudson.

Most of the investment will go to purchase and install new tool sets to enable Intel to manufacture microprocessors and related electronic devices using the latest processing technology. The semiconductor industry is heavily capital intensive, and requires constant investment and periodic retooling as new chips and chip-making technology are developed.

The corporate tax structure in Massachusetts is an important part of the decision to expand here. Intel plans to take advantage of the 5% ITC through the Economic Development Investment Program and also calculated the benefits of the manufacturing exemption from personal property taxes. These programs, along with the single sales factor for corporate income tax, create a particularly strong advantage for Massachusetts in attracting highly capital-intensive companies like Intel.

Since Massachusetts does not have the concentration of semiconductor workers that is available in Silicon Valley, training new workers for the expected 700 job openings is crucial. Intel is working with area community colleges to train the semiconductor-manufacturing technicians that it needs.

Recruit more skilled workers. Invest in education. Control costs.
Make taxation predictable. And market, market, market.

High value-added manufacturing, in traditional and high-tech sectors, is thriving in Massachusetts. Our interviews and the data support that story. It is important because manufacturing represents half of the base economy of the state, the part that exports out-of-state and generates real growth. And it is not surprising because these companies are adopting high-tech innovations that play to the nation's and region's comparative advantage: producing with highly-skilled human capital.

For manufacturing, like services, the major constraint on growth is primarily the finite supply of skilled labor. To do nothing to address that constraint is to risk losing not only current, but also future growth.

The state is a magnet for attracting investment in high-tech fields such as information technology and biotechnology. World-wide growth prospects for these sectors, including their manufacturing components, are extremely favorable; continued growth is also expected for traditional manufacturers that have adopted more efficient, high-tech processes. Massachusetts is among the world's most desirable locations for both kinds of manufacturers.

The state's expansion prospects for many operations was well represented by Amgen's chairman, quoted recently in the *Globe* regarding the company's decision to build a new facility: "Frankly, when we had to decide where to go, it took us probably a millisecond to say Boston."

With these findings in mind, we asked the manufacturing executives what the state should do to retain and build on its competitive advantages. Following are their public policy recommendations:

Recruit more skilled labor.

For manufacturing, like services, the major constraint on growth is primarily the finite supply of skilled labor.

To do nothing to address that constraint is to risk losing not only current, but also future growth.

We are doing well because we have achieved critical mass in key growth sectors. The concentration of universities, leading companies, skilled workers, suppliers and professional firms attracts other firms and new recruits to Massachusetts.

But investment goes primarily to areas that continue to grow. To keep growing, we must expand the skilled labor force faster than our current natural rate of population growth of only one-half percent per annum, one half of the national average.

The policy prescription is simple: *If you give them skilled labor, they will come.* This is the development strategy that Atlanta is following in an advertising and recruiting campaign called "Industries of the Mind." The group, composed of the Atlanta Chamber of Commerce and scores of high-tech companies in Georgia, decided that rather than focus on attracting new businesses, the best strategy was to attract high-tech labor. Key competitor states are also adopting this strategy.

For its part, Massachusetts needs to pour its energies into long-term strategies (through K-12 school reform and effective use of its community colleges; see below); and policies that will shore up our pool of skilled labor in the short run (such as the H1B visa program). This latter effort will not succeed without better marketing of the state's many strengths, especially the overall quality of life, to help support companies' efforts to recruit skilled labor from Massachusetts colleges and from outside of the state. This recommendation repeats the call to action issued by executives interviewed for last year's *Expansion Report*.

The "*commonwealth*" campaign, recently announced and spearheaded by the Massachusetts Software Council, is focused on a more general positioning of the state's innovation advantages and could help achieve this goal.

Improve the quality of K-12 education throughout the Commonwealth.

This year, as has been the case in past *Expansion Reports*, our interviews underscored the need for substantial improvement in K-12 preparation of students, especially in basic math skills.

Better public K-12 education will help in two ways. First, it will increase the native growth of skilled labor by providing a better quality high school graduate—still important in manufacturing; by increasing the college enrollment rate; and by allowing more students to enter math, engineering, and science programs. Math requirements in many programs effectively limit the number of such graduates if entering freshmen have poor math skills.

Second, it will lower effective housing costs for employees being recruited into the state, and for Massachusetts’s graduates deciding whether or not to stay or migrate to lower-cost regions. Why? Consider, for example, the choice that an engineer and his or her household currently faces in deciding whether or not to move to or stay in Massachusetts. The family has the choice of relatively affordable housing in communities with less than desirable school systems, or of very expensive housing in communities with excellent school systems. By expanding the number of good school systems and therefore desirable communities to parents with school-age children, education reform effectively opens up more affordable housing, increases in-migration, and raises the growth rate of the labor force.

Foster close ties between the community college system and businesses.

The new production processes demand skills that can be taught in traditional trade schools or the community college system. In fact, many of our manufacturing contacts reported working closely with local two-year insti-

tutions to provide classes and programs geared to their training needs and the skill requirements of their production and engineering workers. But perhaps this system can work even better. Over one-fifth of manufacturing workers have some college education, but less than a four-year degree. More linkages between businesses and two-year undergraduate programs can help erase the “skill gap” that Massachusetts manufacturers currently face.

Control marginal costs.

For the state’s manufacturing sectors, skilled labor is necessary for their success, but not sufficient by itself.

To keep competitive with other regions of the country, vigilance in controlling the cost of doing business is required. As interviewees reported, tax credits and marginal cost analysis have a direct impact on production allocations for international manufacturers and expansion decisions generally.

Further progress on unemployment insurance and workers’ compensation costs and the expected cost reductions from electricity deregulation are three areas where state policies could affect marginal costs.

Make state tax policies more predictable and simplify the sales tax.

Corporate taxes are now more competitive, and state taxes are not seriously out of line with competitor states, especially when all taxes (including local real estate taxes) are considered. Relatively high personal income taxes do raise the cost of living, making it more difficult to recruit skilled workers. The state’s recently passed budget addresses that issue, lowering the state income tax a small amount over the next three years.

There are two virtually costless ways to improve the competitiveness of the state business tax structure.

One recommendation is to make tax policy more predictable by eliminating sunset provisions. Site location consultants and executives in manufacturing (as well as service professionals in separate interviews) stressed the importance of this issue. Sunset provisions

reinforce the perception that tax cuts are temporary, which increases the risk of investing in Massachusetts and sends a message that the state is uncertain about its competitive policies.

Another proposal is to simplify the sales tax. As noted earlier, several executives expressed frustration over the complexity and compliance costs of this tax.

Speed up the permitting process and make local permitting more uniform across the state.

Time-to-market is more critical now than previously was the case, given faster product development requirements. According to site location analysts, permitting time can determine location decisions. Although manufacturers report improvements in Massachusetts permitting in recent years, there are still concerns raised, particularly about local permitting, and speed seems to vary substantially from one municipality to another.

Sell Massachusetts' manufacturing story better.

Massachusetts is still perceived by too many outside its borders as a high-tax, high-cost state with uncooperative labor. As the interviews and data in this report

demonstrate, this is emphatically not the case. Public policy cannot overlook the strategic importance of keeping Massachusetts manufacturing competitive. Nor should we accept the current dichotomy, where decisionmakers outside the state have failed to register the significant competitive gains the state has made in the last decade.

In coordination with initiatives to recruit more skilled labor to the state, a carefully targeted marketing campaign for manufacturing would go a long way towards shifting perspectives among these out-of-state decisionmakers on Massachusetts' manufacturing competitiveness. We should spotlight our success stories, our advantages and available industrial sites. The story is waiting to be told. It is up to the Massachusetts business, policymaker, and education communities to keep the state competitive—and to go out and tell the story.

Massachusetts is still perceived by too many outside its borders as a high-tax, high-cost state with uncooperative labor. As the interviews and data in this report demonstrate, this is emphatically not the case.

appendix

CONSUMER PRODUCTS

The Gillette Company
Michael Cowhig, Senior VP of
Manufacturing and Technical
Operations
Boston

Titleist & Footjoy Worldwide
Raymond Cebula, VP of Engineering
and Technology
Fairhaven

Cider Mill Farms
Joseph Barboza, CFO
Leominster

FOOD PRODUCTION

Ken's Foods, Inc.
Joseph Shay, CFO
Marlboro

INDUSTRIAL MACHINERY

Kennedy Die Castings, Inc.
Paul Kennedy, President
Worcester

GEC Durham Industries, Inc.
Douglas Russell, President
Lebanon, MO

American Saw & Manufacturing
Company
John Davis, Chairman of the Board
and Chief Executive Officer
East Longmeadow

PAPER

Hazen Paper Company
Thomas Hazen, Chairman of the Board
Holyoke

PLASTICS

Bradford Industries
William Larrivee, CFO
Lowell

TEXTILES AND APPAREL

Quaker Fabric Corporation
Lawrence Liebenow, President & CEO
Fall River

BIOTECHNOLOGY/ PHARMACEUTICALS

Genetics Institute
H. Michael Koplove
Vice President of Manufacturing
Andover

Genzyme Corporation
Frank Ollington
Senior Vice President, Operations
Framingham

COMPUTERS/ COMPUTER HARDWARE

EMC Corporation
Richard Egan
Chairman of the Board
Hopkinton

Intel Massachusetts Inc.
Ann Hurd
Public Affairs Manager
Hudson

DEFENSE/ ELECTRONICS

General Dynamics
Gerard DeMuro
President of Communication Systems
Taunton

MEDICAL INSTRUMENTS

Agilent Technologies
Laurel Sweeney, Government Affairs
Manager, Healthcare Solutions Group
Andover

TELECOMMUNICATIONS

HARDWARE

ComVerse Network Systems
John Weaver, Executive VP & General
Manager, Access NP Division
Wakefield

BACKGROUND INTERVIEWS

Manufacturing Assistance Center
John Healy, CEO
Worcester

Dept. of Mechanical Engineering, MIT
David Cochran, Assistant Professor
Cambridge

Ernst & Young
Gordon Carr, Consultant
Boston

MassDevelopment
Michael Hogan, Executive Director
Boston

The Wadley-Donovan Group
Dennis Donovan, Senior Managing
Director
Morristown, NJ

Location Advisory Services, Inc.
Ronald Ruberg, CMC, Partner
Fords, NJ

Spaulding & Slye
William Bailey, Senior VP,
Commercial Brokerage
Boston

Selection of competitor states.

The objective of this report was to cover a wide range of manufacturing sectors. We selected a corresponding set of competitor states to include in our analysis. Of the Leading Technology States (included in the Massachusetts Technology Collaborative's analysis), we chose Texas and California because each has areas to which Greater Boston is directly compared (Austin, Texas and Silicon Valley). North Carolina was included

because of direct competition from the Research Triangle Park in the Raleigh-Durham area.

To incorporate northern states with competitive similarities to Massachusetts, we selected Pennsylvania and Michigan: Pennsylvania because of its industrial base and recent successful manufacturing growth in Pittsburgh and the Lehigh Valley, and Michigan because of the continued preponderance of durables manufacturing.