A STRATEGIC AUDIT OF MANUFACTURING IN THE NEW YORK-NEW JERSEY METROPOLITAN REGION

CONDUCTED FOR
THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

SEPTEMBER 1989

TELESIS

FOREWORD

This report results from a strategic economic audit of the manufacturing sector of the New York-New Jersey metropolitan region sponsored by the Port Authority of New York & New Jersey. The study was conducted by consultants from Telesis, a business strategy consulting firm, assisted by a team of analysts from the Office of Business Development of the Port Authority.

The goals of the study included the following:

- Creation of a strategic profile of the region's manufacturing base.
- Explanation of the critical factors which affect the ability of regional manufacturers to be competitive in the global economy.
- Determination of the key manufacturing segments in which the region has a strong -- or weak -- competitive position.
- Identification of industrial segments which have growth potential, which are stable, or which are vulnerable to relocation pressures in the coming decade.

This draft of the report is intended to serve as background for discussions among Port Authority agency representatives regarding programs and policy initiatives which could benefit the regional economy. It does not, at this time, include strategy recommendations.

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CHAPTER 1
INTRODUCTION AND METHODOLOGY

Manufacturing is the only sector of the New York-New Jersey regional economy which has not shared in the employment growth of the past decade.

While overall employment reached a new record during the 1980s, manufacturing jobs in the metropolitan region* fell by 377,000 from 1978 to 1988. During the same period, services added 660,000 jobs in the regional economy, trade jobs rose by 245,000 and finance employment increased by 230,000.

This continuing loss of manufacturing jobs -- two thirds of a million jobs have disappeared from the region since 1970 -- occurred in the face of a stable or growing manufacturing job base in the nation as a whole and strong growth in many other large metropolitan areas, such as Los Angeles (Exhibit 1-1).

A strategic audit of regional manufacturing, undertaken by Telesis at the request of the Port Authority of New York and New Jersey, indicates that another 270,000 manufacturing jobs are likely to be lost within the next few years if nothing is done to stem the flow.

The audit also found that the manufacturing base which the region takes into the 1990s is unlike any other in the world: it is heavily white collar, dominated by the headquarters and research facilities of large firms, and derives much of its stength from the region's role as a marketing, design and services center.

The erosion of the region's manufacturing base has not, as one might expect, left a core of relatively stronger firms with enduring ties to the region. Our interviews with hundreds of employers in the manufacturing sector indicate that fully a third of all the remaining jobs classified as manufacturing are in vulnerable firms which face an uncertain future. If you consider just production jobs, the figure is closer to 40%.

*Throughout this report we will refer to a metropolitan region comprised of 17 counties including the five counties of New York City; Nassau and Suffolk counties on Long Island; suburban Westchester & Rockland counties and 8 counties of Northeast New Jersey: Bergen, Essex, Hudson, Middlesex, Morris, Passaic, Somerset, and Union.

Unless current trends are arrested, by the end of the next decade manufacturing in the region will be almost an afterthought, employing a third less than the government and less than half the number working in retail and wholesale trade. This would be a dramatic turnabout for what was for many years one of the most powerful manufacturing economies in the world.

THE REGION'S DECLINE AS A MANUFACTURING CENTER

While the skyscrapers of New York City speak of commerce and finance, of bankers and lawyers and office workers, for much of the city's history these office towers belied what most people in the region actually did for a living.

Well into this century, manufacturing employed the most people and produced the greatest share of income for the city's residents. Half of New York City's residents were employed in goods-producing industries as late as 1900, declining to about one-third by 1940. Today manufacturing accounts for barely 10 percent of the city's employment, and for about 15 percent of the New York-New Jersey metropolitan region's employment as a whole.

The region's manufacturing employment peaked in 1960 at 1.75 million workers. At that time, manufacturing employment in the region as a percent of total employment matched exactly the national average of 31 percent. Since then it has fallen steadily, both in terms of absolute numbers and as a share of total employment (Exhibits 1-2 and 1-3).

Throughout the 1960s, regional manufacturing employment trended downward at an average rate of about 0.7% annually. Beginning in 1969, however, it took a freefall that saw the region lose almost a quarter of its manufacturing employment base in five years. The region's performance in this recession reflected what was happening in the nation as a whole.

However, instead of recovering in the late 1970s, as did most of the nation, the region gained back only 12 percent of the manufacturing jobs it had lost in the previous half decade. In the 1980s, it has again experienced annual declines in the range of 2-3 percent, much steeper than the nation or other regions.

The key factor which has distinguished the region from the nation as a whole and from key competitive regions such as Los Angeles and Boston is that the decline of manufacturing has been inexorable since 1960 (Exhibit 1-4). While other regions have had years of job losses followed by years of recovery, the rate of decline has increased in the New York-New Jersey metropolitan region in each succeeding decade for 30 years.

SEGMENTING AN ECONOMY: THE METHODOLOGY

The key to developing a strategy for increasing or maintaining manufacturing employment in metropolitan New York-New Jersey is to understand the nature of the 1.1 million manufacturing jobs which still exist in the region.

Why have these jobs survived while so many others have been lost? Are there unique aspects about doing business in the region which have allowed some firms to prosper while others decline? Do regional workers have skills or other characteristics which make them especially suited for certain manufacturing occupations and ill-suited for others?

The primary emphasis of this study has been on answering these and similar questions about the current manufacturing base of the New York-New Jersey metropolitan region. An understanding of firms now located here and the jobs they have created must provide the base for public policies aimed at future improvements.

The economic health of any region, whether defined as a whole nation, a state or province, or as in this case a regional collection of communities, is a reflection of the characteristics of the firms which make up that economy. The core of our study has therefore been a systematic strategic audit of the firms in the region's manufacturing sector, probing beneath the usual aggregate economic indicators which provide only a snapshot of the state of an economy at a point in time.

During the course of the audit, consultants experienced in competitive strategic analysis conducted interviews with the managers of hundreds of businesses in the region to identify the competitive factors which determine success or failure. Information from the interviews has been used to create a segmentation scheme of the region's manufacturing economy for use as the basis for pragmatic and effective policy formulation.

Segmenting an economy requires analysis of the major drivers which govern economic activity in a region. In our analysis of the New York-New Jersey metropolitan region, we have focused on the drivers which tie specific manufacturing firms and their industrial sectors to a location within the region. The segmentation provides a structure for grouping firms on the basis of common drivers, and simplifies the task of drawing generalizations about the thousands of firms which make up the region's economy.

The segmentation scheme highlights the vulnerabilities to which certain firms, and thus the economy, can fall victim if no actions are taken to correct or reduce weaknesses and to promote strengths. It can therefore be used by policy makers to determine whether interventions are necessary or advisable, and if so, what form such interventions should take.

Segmenting the Regional Economy: The Approach

The standard method of analyzing a manufacturing economy is to divide employment into industrial sectors, such as apparel, or pharmaceuticals, or plastics. This type of analysis has some advantages: considerable data are readily available from labor statistics collected using the Standard Industrial Classification (SIC) codes; and the SIC categorization of industries is widely familiar to economists and other analysts. As a tool for helping us understand the competitive strengths and weaknesses of an economic region, however, these aggregate statistics have serious shortcomings.

One shortcoming arises from the fact that SIC code groupings are based on broadly-defined product lines, with no regard for the different competitive dynamics that usually exist among firms within a group. For example, the pharmaceuticals industry is composed of several different businesses. One of these businesses, patented ethical prescription drugs, involves large outlays for research, detailed marketing programs directed to individual physicians, and very high margins on successful product introductions. However, the industry also includes generic prescription drugs for which original patents have lapsed. This business relies on cost-competitive manufacturing processes and skill in marketing to pharmacy retailers, increasingly a highly concentrated marketplace as multi-store retail chains replace the corner druggist. Price competition is severe in this business, and margins are low. (Exhibit 1-5 shows comparative cost structures for typical drug products.) Finally, the third

major business group within the pharmaceutical industry is over-the-counter drugs, which rely on popular brand names and large national advertising budgets to market products directly to the consumer. In terms of their competitive dynamics, these three business segments have little in common, and yet analysis based on SIC groupings would lump them together.

Another shortcoming of the SIC code approach is that it combines all activities of an industry into one category. The pharmaceutical industry, for example, is comprised of many important activities, including the headquarters and marketing functions, research and development efforts, the actual manufacturing of the drugs, and warehousing and distribution facilities. These varied activities may be co-located in a particular region, but more likely in today's global economy they will be carried out in widely dispersed facilities. Even within the manufacturing function, the basic compound may be produced offshore in Puerto Rico or Ireland, formed into capsules within the New Jersey industrial corridor, and sent to a Midwest location for packaging and distribution.

It is not possible to understand the effect of the pharmaceutical industry on a region without understanding which types of pharmaceutical businesses and which functions within those businesses are located within the region.

Similarly, the electronics industrial sector includes many different types of business activities with widely different competitive drivers -- from the manufacture and marketing of portable radios to the design and assembly of sophisticated electronic countermeasure systems for fighter aircraft. And while the defense systems work might all be carried out in a few neighboring locations, an American manufacturer of personal electronics items might design the product in Taiwan, source semiconductors from Japan, have boards stuffed automatically in Singapore, make plastic cabinets in Hong Kong, and send everything to China for final assembly by the lowest wage labor. A given regional economy could be affected by such a business through operations as diverse as a warehouse and distribution center or a head-quarters office.

When seen from the point of view of cost structure, some pharmaceutical businesses actually have more in common with specific electronics businesses than with other segments of the pharmaceutical industry. For example, a patented ethical drug company with its emphasis on research and development has a closer resemblance to a defense-oriented

electronics manufacturer with most of its costs wrapped up in design than to a generic drug company. A consumer electronics company making name-brand televisions or portable radios, on the other hand, has a cost structure heavily influenced by national advertising and production and distribution costs -- more like the cost structure of an over-the-counter drug company than that of another electronics company which develops products for the defense establishment. This is why it is important for policy makers to analyze an entire economy by grouping (or segmenting) businesses according to their common competitive factors, and then determining the relative strengths or weaknesses of a region in relation to the competitive drivers of the most important segments.

The major effort of this study has therefore been to identify the competitive forces in the region that have either allowed companies to prosper here, or are pushing them towards relocation or extinction. The effort has involved in-person interviews with the leaders of more than 300 manufacturing concerns active in the region representing about a quarter of the manufacturing workers remaining in the region. Exhibit 1-6 shows the distribution of companies interviewed for the study. In addition, we have contacted more than 1,300 other companies by telephone to extend and confirm the information gathered in the in-person interviews.

Throughout the interview process we tried to move beyond the traditional employment categories to look at the region's manufacturing base from a more strategic perspective. As part of this effort we conducted several specific pieces of analysis: an investigation of the relative importance of traded versus non-traded industries in the region; a study of three important multi-sector sources of employment; and, finally, the construction of a segmentation scheme for the manufacturing firms and businesses of the New York-New Jersey metropolitan region which we feel can serve as a sound basis for future policy decision making.

Traded and Non-Traded Industries

The first analysis we attempted involved quantifying employment in traded versus non-traded businesses within the region.

Not all businesses in an economy play the same role in economic development. In an open economy some businesses play a key role in creating wealth for the citizens of the economic

unit, while others play a derivative role. To visualize the difference, imagine an isolated community made up of a very large textile mill together with various retail stores, restaurants, banks and business services firms. If one of the restaurants or a window washing company runs into trouble and fails, most likely another business will eventually expand to take up the slack, hiring some of the workers who lost their jobs from the failure. Since the town's retail market is a closed system, as long as the economy is robust enough to support restaurants and services such as window washing, there are no major effects if a particular business is poorly run and fails.

If the textile mill fails, however, everyone in town will be seriously affected, because it is the mill which is actually bringing wealth into the town by adding value to the materials it purchases and selling the final product outside the town's borders. This wealth is spread throughout the town as the workers and the mill itself spend it at restaurants or on other services.

The mill is a traded business; the retail stores and service businesses are non-traded businesses.

In a similar sense, the entire economy of a nation, a state, or a region such as metropolitan New York and New Jersey is made up of both traded and non-traded businesses. Non-traded businesses often include such services as local health care, goods distribution, public transportation and housing construction. They also include certain manufactured goods such as food products, or some construction materials, where the cost improvements available through increased scale are not great enough to offset the costs of transportation between regions or countries.

While increasing the productivity of non-traded businesses increases wealth, a loss of productivity relative to other areas will not jeopardize local living standards. If New York barbers are less productive than those in other states, consumers may pay more for haircuts. But because there is no substantial trade in haircuts, New York does not risk losing many jobs in this area to other regions of the country or to overseas barbers.

Although this study did not analyze service industries, it is interesting to note that the New York-New Jersey metropolitan region is unusual in having a large number of service businesses which are traded nationally or

internationally. Unlike the local bank in our example of a one-industry town, New York banks do not just serve the local community. They trade their services around the world, as do the advertising agencies and many of its law and insurance firms. Many businesses which are almost totally non-traded in other parts of the country must be regarded primarily as traded when analyzing the metropolitan region.

The long term economic health of a region relies upon its having competitive traded businesses. Since the non-traded sectors in aggregate are dependent upon the success of the traded sectors, they are not the primary focus of this study.

One way we have categorized the manufacturing businesses of the region, then, is by classifying them into traded and non-traded. In the New York-New Jersey metropolitan region, because of the extremely large market represented by its 15 million inhabitants, there are many manufacturers in the non-traded category which could probably exist only as traded businesses in most regions of the country. They include food processors, drapery and upholstery manufacturers who specialize in serving the local office furnishings market; metal fabricators supplying building materials ranging from wrought iron to steel beams; and apparel manufacturers who make uniforms or custom-tailored suits primarily for residents of the region. Most of these firms are small, and the metropolitan region offers them a large enough market to reach a competitive scale without the necessity of trading their products outside the region -- not likely to be the case with manufacturers of these products in smaller metropolitan regions.

Some manufacturers, notably in the printing industry, sell exclusively within the region, but their products are used by firms in traded businesses such as advertising agencies or securities firms. Other firms may subcontract exclusively to regional producers who use their components in products which are traded nationally or internationally. For the purposes of this study, we have classified these firms as traded even though most of their sales take place within the region.

Of the 1.1 million manufacturing jobs remaining in the region, about 950,000 or 86% percent, are provided by traded industries (Exhibit 1-7). Non-traded employment is heavier in small firms of fewer than 100 employees. Virtually the only firms in non-traded sectors with over 500 employees are food processing companies and regional daily newspapers.

Multi-Sector Analyses

Because of their special importance to the region, we conducted separate analyses in three areas which cut across several traditional industrial sectors: the impact of the defense industry on the region, the extent of foreign ownership in the region; and the consequences of manufacturing companies locating headquarters functions in the region.

The defense industry, including parts of the aircraft, electronics, metal fabrication and machinery sectors, has a tremendous influence on the region, employing more than 10 percent of the manufacturing work force in what is usually considered a high-paying, high value-added segment of the economy. Defense manufacturers have been an important part of the regional economy since the 1930s. About 15 percent of the defense jobs in the region have been lost since 1986, however, with closures or cutbacks at Fairchild Republic, Grumman, and Allied Signal alone accounting for about 18,000 lost jobs.

Foreign ownership in the region has increased dramatically in recent years. We believe that the survey we conducted to determine the extent of foreign participation in the region's manufacturing industries is the most exhaustive ever attempted. The results show that about eight percent of total manufacturing employment in the New York-New Jersey metropolitan region is in foreign owned companies. More than 60 percent of this employment is split between pharmaceutical companies (foreign companies represent 21 percent of the chemical/pharmaceutical employment in the region) and electronics firms, with about 28,000 employees in each of these sectors.

Finally, more than 15 percent of manufacturing employment is accounted for by headquarters locations for companies which have virtually no production activities in the region, although as a group they account for millions of production jobs across the country and around the world. These are companies which in most cases originally had integrated design, manufacturing, marketing and administrative facilities within the region, of which now there remains only headquarters or research functions. These remaining activities range from 20-person top management units of highly decentralized companies, to large integrated administrative, marketing and R&D facilities of several thousand people. As a group, these companies represent one of the most potentially dynamic forces in the metropolitan region.

The findings of these three multi-sector reviews will be discussed throughout the remainder of the report.

Segmentation -- A Strategic Profile of Regional Manufacturing

The major output of the analysis has been a division of the regional manufacturing base into segments reflecting the key areas of competitive forces which bind firms to the New York-New Jersey metropolitan region. In effect, the study team has taken the 20 or so Standard Industrial Classification codes of industries which have significant employment in the region, analyzed the competitive dynamics acting on each of the various activities which comprise those industries, and re-categorized the manufacturing base into segments which cut across the normal industrial groupings.

The result is a strategic profile of regional manufacturing which recognizes five main segments, each of which has a separate set of competitive characteristics. The segmentation is a tool for understanding the competitive forces which helped shape the manufacturing firms which grew up in the region, and which over time have caused firms to find success or experience failure here. As such, it provides the basis for strategic policy formation.

The segmentation scheme is comprised of the following categories:

Residual Manufacturing Firms

Professional Nucleus Firms

These are firms which are bound to the region by a nucleus of professional staff, primarily in headquarters and research and design facilities. This segment is relatively stable within the region, but does not show much evidence of overall growth in the coming decade.

Residual Subsuppliers

This segment is made up of firms whose primary customers are final product producers within the region. It is a segment which has declined significantly in numbers since World War II, and which has a large number of firms still in jeopardy

of either going out of business or being forced to follow their customers to other locales. We estimate that 123,000 jobs could be at risk in the next few years.

Independent Final Producers

In a healthy manufacturing economy these firms are the core which creates subsupplier clusters, spins off new manufacturing operations, and supports the surrounding services sector. In the metropolitan region, the integrated firms which make up this sector have been in decline for two decades. Our interviews indicate few firms in the segment are growing, and that firms employing about 40,000 people are in a vulnerable position.

Marketing Related Firms

Marketing Infrastructure

Firms which are tied to the region's marketing infrastructure, primarily apparel and cosmetics companies, fall into this segment. A movement to Southern locations, followed by strong international competition, caused employment in this segment to plummet in recent years. The industries which are left have competitive strengths which are difficult to duplicate outside the region.

Serving the Services Sector

This group of firms, primarily printing and paper product producers, appears to exist to provide products to the region's services sector. Closer analysis indicates, however, that the majority of healthy firms in the segment derive more business from the creative marketing side of the services sector, than from the financial and legal side.

Exhibit 1-8 shows the region's manufacturing employment by major industrial sector, and how those sectors are divided among the above segmentation scheme. Each element of the segmentation is discussed in detail in the following chapters.

Exhibit 1-9 shows the major functional roles of workers employed by manufacturing firms within the region. Exhibits 1-10 and 1-11 show the white-collar distribution of workers in the region. Exhibits 1-12 and 1-13 break down the region's manufacturing employment according to how vulnerable firms are to either going out of business or leaving the region. Finally, Exhibit 1-14 categorizes manufacturing firms by the primary competitive drivers which tend to keep them within the region.

CHAPTER 2
THE PROFESSIONAL NUCLEUS SEGMENT

For decades, New York's strength as a center for banking, finance, insurance, media and advertising, legal and other services has masked the importance of the region as one of the nation's leading manufacturing centers. The high paying, professional "white-collar" jobs spawned by these service businesses are of a far different nature than the hands-on "blue-collar" production jobs usually associated with a manufacturing economy. Increasingly, however, employees of the manufacturing sector in the New York-New Jersey metropolitan region wear collars as white as those who toil in the service industries.

There are hundreds of manufacturing companies in the region which remain here not because it is a competitive base for production, but because the people who produce the ideas that become products or who manage the production and marketing processes are located here.

We have segmented companies such as these, whose primary tie to the region derives from its attractiveness as a place to locate headquarters or research and design personnel, into a "professional nucleus" category. This segment of the metropolitan region economy accounts for some 226,000 workers and is the largest segment of manufacturing employment in the region, representing more than a quarter of the total 952,000 jobholders in traded manufacturing industries.

The firms in the professional nucleus segment are a stabilizing force in the region's economy, and it is estimated that 87% of the segment's employment is in firms that are either growing or stable. Only 13%, or some 29,000 jobs, are in firms which appear vulnerable to forces which could cause them to relocate out of the region.

THE PROFESSIONAL NUCLEUS DRIVEN FIRMS: A UNIQUE STRENGTH FOR THE NEW YORK-NEW JERSEY REGION

While the metropolitan region has lost much of its strength as a production location since World War II, the strength and diversity of the headquarters and R&D functions of manufacturing companies located here differentiate it from any other area of the country. The concentration of decision making and product development power sited in the New York-New Jersey metropolitan region is unique, and should be highly valued by policy makers.

For comparative purposes, we surveyed the Los Angeles metropolitan region -- the region closest in scale and national importance to the New York-New Jersey area -- and the state of Tennessee, one of the fastest growing manufacturing areas in recent years. As Exhibit 2-1 shows, the New York-New Jersey area has more than five times the employment in headquarters and R&D firms as Los Angeles, whether measured in total numbers or as a percent of manufacturing employment.

Another significant and unique feature of the New York-New Jersey area is the preponderance of U.S. headquarters for foreign manufacturing firms, which employ approximately 63,000 people in the region. This represents about a third of the region's total headquarters operations, and two-thirds of the total foreign firm employment in the region.

In this respect also, the region stands out when compared to Los Angeles, having six times the employment in foreign manufacturing headquarters as the West Coast area. The Los Angeles foreign headquarters sector is heavily concentrated in the auto and electronics industry (Exhibit 2-2), accounting for 70% of its total foreign headquarters employment, while the New York-New Jersey region's is more widely spread across publishing, pharmaceuticals, and other sectors.

There is little evidence, however, of substantial growth in foreign headquarters locations in the region in recent years. Most of the employment is either in facilities established before World War II, or in existing operations which were acquired by foreign companies (Exhibit 2-3). New investments in the 1980s were rare.

There are a number of explanations, some reflecting competitive realities and others personal preference, as to why professional nucleus firms are particularly tied to this region:

- Companies in this segment consider the skills and accomplishments of their professional work force a critical component of their competitive success.

- While the relocation of any subdivision of a manufacturing firm will entail the loss of personnel, production-related workers can usually be replaced without undue disruption. When companies consider moving a part of their professional nucleus, however, they face the possibility of losing key people who can make a real difference in their competitive position.

- Proximity to New York's "headquarters complex" of financial, legal, advertising and other business services is considered important by many top executives of companies who keep their headquarters in the New York-New Jersey metropolitan region.

- The strength of the overall professional nucleus provides a pool of white-collar workers from which companies can replace or enlarge their own nucleus more readily than if they were located in isolated corporate outposts.

- New York's reputation as one of the world's great cosmopolitan centers of business, culture and design is attractive to senior level executives, an especially important consideration for foreign-owned companies.

- Decision-making top managers have the ability to locate headquarters functions where they want to live, and many prefer to stay in the New York-New Jersey metropolitan region.

Companies in the professional nucleus segment can be generally classified into three groups: headquarters companies, research and design driven companies, and creative companies.

THE HEADQUARTERS COMPANIES

The New York-New Jersey metropolitan region has been the favored location for headquarters of large manufacturing companies since the industrial revolution. For more than half a century, until a steep decline began in the 1960s, about 40% of the nation's largest manufacturing firms as classified by the Fortune 500 list were located here. If nearby Connecticut is included, the region still is home to one-fifth of these corporations -- more than twice as many as any other metropolitan region.

The Declining Presence of the Fortune 500

While the region remains a powerful hub for headquarters firms, the overall decline in Fortune 500 headquarters during the past two decades has been inexorable, with New York City bearing by far the largest losses:

	Number of Fortune 500 Firms	
	1967	1988
New York City	139	48
New Jersey Counties	15	19
New York Counties	7	7
Metropolitan Region	161	74

Although much media attention has been paid to the movement of firms out of New York City to Connecticut or other areas of the country, from a regional perspective such relocations are not the primary reason for the reduction of headquarters companies. As Exhibit 2-4 shows, most of the losses are accounted for by mergers or acquisitions: a total of 59 firms have been dropped from the list since 1967 because their corporate identity was lost due to a merger or acquisition. Another nine companies were dropped because they were reclassified as service companies, or their total sales did not stay high enough to keep them on the list of the largest 500 companies. Most of the 68 firms in these two categories continue to have a major presence in the area, although a merger or acquisition usually has resulted in a net reduction in employment.

For example, General Foods was dropped from the list of headquarters firms in the region after it was purchased by Philip Morris in 1986. The company continues to have some 2,500 employees in its White Plains, New York administrative headquarters and about 1,000 research employees in Tarrytown, New York and Cranbury, New Jersey. Similarly, in 1988 three companies previously on the list -- Lever Bros., National Starch and Chemical, and Lipton -- were combined into one foreign-owned entity, Unilever. All three headquarters locations continue to supply significant employment and activity to the region, however.

Another 24 companies moved out of the New York-New Jersey metropolitan region, but continue to have a regional impact from bases in Fairfield County, Connecticut, or adjacent counties in New York or New Jersey. In fact, of the 84 headquarters locations apparently "lost" since 1967, only 24 companies actually pulled up stakes and moved completely out of the region.

The Slimming Down of Headquarters Firms

Counting the number of firms is not necessarily the best way to explain what is happening to headquarters companies in the region. Since the 1970s, many firms have severely restricted the number of employees in their headquarters locations by both downsizing and decentralizing. The result is that the regional employment of many of these giant manufacturing companies has declined, with more than a third of them now employing fewer than 200 people.

A handful of the headquarters companies are major employers, with IBM's 12,000 workers in Westchester County topping the list. The next largest, however, has fewer than 4,000, and only about a dozen employ more than 1,000 people in the region. More common are companies such as Colt Industries with 16,000 employees worldwide and about 90 in its New York City headquarters, or International Paper with 45,000 total employees and 120 in Westchester County, or Borden with a 20-person headquarters outpost of top management in the city and 39,000 employees worldwide.

Three major factors account for the reduction in employment within headquarters still located in the region:

- Corporations have improved productivity by cutting the total number of workers engaged in administrative activities.

- Companies have cut the size of central headquarters by transferring responsibility to subsidiary divisions.

- Companies have split their headquarters by keeping top management and a few key finance people near New York City while transferring production supervisors, distribution people, and back office support workers to locations closer to production facilities.

Exhibit 2-5 shows how three companies cut their work force in New York City by 77% during the 1980s, using all three of these methods.

International Paper is an example of a company which split its headquarters in order to cut costs. The chairman, three executive vice presidents, the top corporate finance people, and a small number of key staff people left the Park

Avenue headquarters in 1987 for new quarters in Purchase, New York. At the same time, about 1,100 jobs related to production supervision, administration and financial support were transferred to Tennessee.

"International Paper had been a New York corporation since 1898. A decision was made to keep our corporate headquarters in New York. It was important to the executives to keep up contact with the finance community and with other people in the New York area. But we just couldn't justify keeping others here who had no reason to be here. It is just much cheaper to locate people in Tennessee who have no reason to work in the metropolitan area," a corporate executive explained.

The Corporate Headquarters Complex

A key factor in tying the top echelon of executives to the New York-New Jersey metropolitan region is what others have called the "corporate headquarters complex." In a 1967 study, The Conservation of Human Resources Project described this complex as an agglomeration of companies and individuals who gain from being in close proximity to each other. This headquarters complex is composed of three components: corporate headquarters themselves; corporate services firms; and corporate ancillary services.

The study found that in terms of numbers employed, the headquarters themselves were the least important of these components. Corporate service-related organizations such as the finance community, law firms, accountants and consultants, and the like employed 2.5 times as many people as the headquarters themselves. The region's ancillary services, including a portion of entertainment, cultural activities, hotels, restaurants, and retail stores, had almost about as many employees as the headquarters firms.

Updating the 1967 study and applying it to the New York-New Jersey metropolitan region as a whole (Exhibit 2-6) shows that the corporate service segment of the headquarters complex has continued to increase in importance even as the number of headquarters firms and their employment has fallen. The business services sector of the region's economy, which in large measure came into existence because of the strength of New York's manufacturing sector, now has an independent worldwide role.

The Current Status: Concern About Stability

Even though advances in communication and transportation systems have allowed dispersal of headquarters functions, the New York-New Jersey metropolitan region still benefits from a significant number of companies who feel it is an advantage to keep their headquarters -- and thus a professional nucleus of employees -- in the region. The wholesale movement of firms out of New York City in the 1960s, partially engendered by the city's financial problems, has not recurred; in each of the years 1987 and 1988, in fact, only one Fortune 500 company moved its headquarters out of the region, and they were replaced by two companies moving into the region. Headquarters which are anchored to the region by professionals who put a high value on their ties to the corporate services sector seem relatively secure. And most firms have already undergone reorganizations to trim their administrative workforces. In sum, the headquarters segment appears to have stabilized considerably in recent years.

Nevertheless, the area's particular problems mean that vulnerabilities remain. The high expense of moving into and living in the area, for example, is a serious concern for manufacturing companies which still have large numbers of operating people in their centralized headquarters here, including managers with direct production responsibilities and little need to interact with the corporate services community.

"This is a city of the very rich and the very poor," said an executive of one company which is considering relocating. "It is attractive to the better paid professionals in advertising, banking and law. But it is a very difficult location for a company like ours which wants to circulate a lot of mid-career engineers and production people through a headquarters assignment.

"A $50,000 salary provides a comfortable living at one of our plants in Michigan or Tennessee. But it is a major problem for someone who gets notice he is being transferred to headquarters in New York City for two years. He goes from being upper middle class, to barely able to make it," he said.

Another major concern continues to be the region's problems with its social and physical infrastructure.

"We are committed to New York City; we have to be here," said one CEO. "But I have to tell you, the four big worries are safety, the education system, housing, and health

care. They are of great concern, and have to be improved if companies like ours are to stay for the long term."

Other executives worry about who is going to pay for the improvements, as well as whether they will be made. "Just look around you at the need to rebuild bridges, roads, the water supply system -- to say nothing of housing, and hospitals, and schools. Who is going to pay for it? It is tempting to get out before the bills become due," said a vice president of one of the nation's largest companies.

A Company Decides to Leave: The Mobil Example

Executives at Mobil Oil, which has announced it will begin a total relocation of its 3,000 headquarters employees to Virginia this year, noted four major reasons behind the decision:

- A Japanese "feeding frenzy" on New York real estate which brought it $250 million for its 42nd Street building. Executives felt the price might never get that high again, and it was enough to cover construction of a new, more efficient building in Virginia with money left over to pay for relocation costs.

- Operating savings of $40 million annually, chiefly because of lower utility and maintenance costs and more efficient utilization of space in modern buildings.

- The increasing difficulty of transferring mid-level executives in and out of New York.

- A general feeling that New York City is more conducive to services sector activities than to a manufacturing culture.

There are few large, integrated headquarters of manufacturing companies left in Manhattan. Most headquarters that remain include mainly people with a finance, legal, strategy or marketing orientation. Most of the numerous engineering and production-oriented employees which are necessary to operate a huge manufacturing company have already been dispersed to production sites or to separate split-headquarters sites in less urbanized surroundings. The lesson from Mobil's relocation is that the few who remain in midtown are probably an endangered species.

RESEARCH AND DESIGN COMPANIES IN THE REGION

While Mobil will move its accountants, engineers, marketing executives and other headquarters personnel from its midtown office headquarters, more than 2,000 other Mobil employees will be staying in the region. These are the scientists and engineers who work in Mobil's Princeton laboratories to keep the company's products and manufacturing processes at state-of-the-art levels.

Why didn't Mobil choose to move these people to Virginia as well?

"With research facilities you have a tremendous sunk investment," an executive explained. "But more importantly, we just didn't want to take any chances with losing that PhD who is going to make the next big discovery for us."

Mobil, like most companies contemplating a headquarters move, offered to relocate any employee who was willing to move. They estimate now that nearly all management personnel will go to Virginia, that very few clerical or entry-level workers will go, and that about 60 percent of middle management will go. This level of losses, although imposing temporary costs in efficiency and performance, is acceptable to most companies considering a relocation of administrative headquarters. Losing employees from research and design operations, however, may well be unacceptable, even at a much lower level.

The Region as a World Leader in R&D Activities

While first production and then headquarters functions have left the region since World War II, research and design facilities have usually stayed. Like many of the manufacturing activities in the region, these R&D activities have not been as visible over the years as the activities which make New York a finance, legal, media and cultural capital. Nevertheless, it is clear that one legacy of the region's history as a manufacturing center is a concentration of R&D facilities and personnel as large as any in the world.

The R&D activities rooted here constitute the largest and the most competitively significant component of the region's professional nucleus segment. More than 135,000 people are employed in the region by firms for which R&D constitutes a major competitive driver, and whose primary

activity in the region -- and primary reason for remaining here -- involves scientists, engineers, and related personnel. Interestingly, this is more than the total number of people employed in securities and brokerage firms in the region, a sector commonly credited with being one of the major drivers behind the strong 1980s economy.

The major categories of R&D-driven firms within the region are chemical and pharmaceutical companies, firms involved in defense aircraft production, electronics firms, and food processing companies. These companies typically were founded within the region and at one time had significant production facilities here. Production activity for most of them now has either completely left the area, or is much reduced.

Despite relocations of headquarters, production and distribution facilities, companies tend to leave R&D facilities in place. Examples in the region include Shell Oil, which moved all its headquarters activities to Texas but kept its R&D in New Jersey, 1,500 miles away. Colgate Palmolive has closed the last of its production facilities in the region but keeps its headquarters on Park Avenue and a significant research facility employing about 1,000 people in New Jersey, supporting production activities in more than 50 plants spread around the world.

Warner Lambert's history demonstrates another aspect of the pattern. In the 1970s, the firm bought Parke Davis, a major ethical pharmaceutical firm located in the Detroit area, and began to combine operations. In 1978 headquarters were consolidated in Morris Plains, New Jersey, and all the Parke Davis production facilities were eventually moved there as well. The company has never combined its R&D efforts, however, is still maintaining large facilities both in New Jersey and in Ann Arbor, Michigan. With all production facilities now gone from New Jersey, the company's overall regional employment has stablized at about 2,500 people -- but the composition of its workforce has changed from being almost half production jobs in the 1970s to being all headquarters and R&D personnel today.

Three Key Regional R&D Sectors

As Exhibit 2-7 indicates, the pattern at Warner Lambert is reflected in three of the key industrial sectors for the region: pharmaceuticals, defense avionics and specialty chemicals. Total employment in all three sectors has remained

relatively stable while the composition has shifted from production-related, blue-collar jobs to white-collar headquarters, R&D or administrative jobs.

Production-related employment has dropped to only 27% of total employment in defense-related industries, and to 28% in the pharmaceutical sector (Exhibit 2-8). These are significant figures, since both industries have deep historical roots in the region, and the perception persists that the region is a hub for both defense and pharmaceutical production. The competitive dynamics in these industries have changed, however, such that the actual manufacturing of either pharmaceuticals or defense avionics in the region is increasingly hard to justify. The employment which remains represents primarily professional nuclei of research and design people who are difficult to move, while in large measure the actual production jobs have already been relocated elsewhere.

Specialty chemicals, the third industry, also has about 28 percent of its total employees in production-related jobs, including those involved in making hard-to-transport products for the Northeast market. The chemical industry in its entirety provides a good example of how changes in the competitive dynamics of an industry determine which businesses will stay in a region and which have to leave.

The Chemical Industry: An Example of Professional Nucleus Effects

The chemical industry has been an important element of New Jersey's economy since before World War II, encouraged by the relative proximity of markets, the availability of land and deep water port facilities, and the ability to co-locate petrochemical plants next to the region's refineries.

Since the war, the chemical industry has tended to divide worldwide into two different businesses -- commodities and specialties. The commodity chemical business sells its products almost totally on a lowest-cost basis with little differentiation between the producers' quality or the users' technical specifications. The competitive drivers for the commodity business are plant scale, energy costs, and proximity to the raw material. On the other hand, the specialty chemical business emphasizes product quality and applications engineering (developing or adapting of a specific product to a customer's unique specifications). R&D and customer service costs are major drivers of the specialty chemical business, and products are highly differentiated based on technical performance.

These differences in competitive dynamics are reflected in very different cost structures for the two businesses (Exhibit 2-9), with specialty chemicals devoting four times as much as commodity chemicals to research and applications engineering, expressed as a percent of sales; and being rewarded with higher profits. The cost structure for specialty chemicals seems to fit with a region with a large and highly-skilled research and engineering-oriented work force. The cost structure for commodity chemicals looks like one which will spell success in a different type of region, one where raw materials are close at hand, energy costs are low, or blue-collar labor is plentiful and low cost.

It is not surprising, then, that during the decade which ended in 1985 the commodity chemical business essentially vanished from the New York-New Jersey metropolitan region, with a loss of some 20,000 jobs. During the 1970s and early 1980s, the twin pressures of oil price increases and the recession forced a restructuring of the commodities business in which plants were modernized and consolidated to cut costs and reduce excess capacity. The aging plants of New Jersey were prime candidates for closure for several reasons:

- The large refineries, a key source of raw materials, had already moved to the Gulf Coast.
- Energy rates in New Jersey were up to 50 percent higher than in the Gulf states.
- Tougher environmental laws and greater public scrutiny in the Northeast could cause construction delays and drive up both capital and operating costs.
- Labor rates were significantly lower in the Gulf region.

As a result, a chemical business which was dependent on raw materials and factor costs left the region, while the chemical businesses dependent on the skill of a professional nucleus stayed.

The Pharmaceutical Industry: A Production Wasteland

Nowhere is the importance of the research and design component of the region's professional nucleus more pronounced than in the pharmaceutical industry. Among the 13 largest pharmaceutical firms which comprise over 90% of the industry's

total employment in the region, all but four have increased their R&D employment in the past five years. By contrast, all but five have significantly decreased their manufacturing production employment during the same period.

For one of these 13 pharmaceutical firms, manufacturing employment in the region was about 2,000 back in 1973; by 1983, it had been cut to 600 and today only 200 manufacturing jobs remain there as the firm completes its phaseout of all production employment by 1990. The trend in research and development employment has been quite the opposite. In 1973, there existed but a few hundred R&D jobs; in 1983, there were about 900 such jobs; and today there are approximately 1,700, with R&D employment almost doubling in just five years.

For these major pharmaceutical firms, there are a number of reasons behind this dramatic shift in job composition. Very strong, tax-based financial incentives to manufacture in Puerto Rico, difficult New Jersey environmental regulations, an increase in the potency of products enabling firms to downsize plants, and production costs representing a smaller element in the overall cost structure have all contributed to the relocation of manufactur- ing elsewhere.

On the other hand, existing R&D facilities are difficult to move since ample job opportunities with competitors exist for key R&D professionals unwilling to relocate elsewhere. Faced with the prospect of losing key employees who are loyal to the region, few companies have risked a move. In addition, there are increasing incentives to co-locate R&D and marketing. And yet another disincentive for moving is the significant capital investment involved in relocating R&D facilities.

Not only have R&D facilities been retained in the region, but employment has grown, fueled by the incentives for drug companies to centralize R&D at a single location. Since the average cost to develop a new drug is over $120 million and the average time from innovation to market is about 12 years, a critical mass of R&D resources built up over time is important to gain the advantages of scale economies. This is especially true in basic discovery research, where hundreds of compounds will be examined but only a handful will be selected for further testing and eventual clinical trials on humans.

In effect, the scale requirements of R&D efforts have made research the most centralized activity among these pharmaceutical firms. None of the top pharmaceutical firms interviewed had more than two U.S.-based R&D facilities. And those that retained two facilities identified the second location as the result of an acquisition. Since centralized R&D facilities have proven to be a significant competitive factor in new product development, the region's pharmaceutical industry has become to some degree a captive of its own previous R&D investments.

Defense and Electronics: The Transition to Systems Integration

Over the past fifty years, the metropolitan region developed a strong base of defense and electronics technology, originating in the aviation industry on Long Island and around Teterboro, New Jersey, and in the development of consumer electronics by RCA and Bell Laboratories. Exhibit 2-10 shows a schematic of company evolution in this sector.

The group of companies which emerged in the region to produce avionics and other defense electronics systems formed one of the nation's major electronics clusters, along with California and Massachusetts. As unionization became more prevalent and the costs for manufacturing in the region rose, companies began moving production activities from the metropolitan region to the Southern states, mainly Florida and Texas.

During each of the downturns following the Korean War, Vietnam, and the recent 1980-85 build-up, production has been relocated from the region. Over the past three years, more than 20,000 jobs have been lost as the major contractors reduced their work forces. Most of the employment loss has resulted from companies relocating outside the region or losing share to defense contractors located elsewhere, rather than from an overall industry decline.

Concurrent with the absolute decline in employment, there has also been considerable change in employment composition. Companies have chosen to retain design activities in the region even though production has been relocated. The goal invariably has been to retain key engineering talent.

Restructuring has been driven by factors other than comparative costs between regions. As weapons have become increasingly complex a new function has been added to the

design and production process, that of systems integration. The role of the systems integrator is to design, coordinate and test an overall system. Often the systems integrator does not produce any of the subsystems, but simply ensures that those various subsystems will combine into a coordinated whole.

For example, Grumman has been awarded the contract for management and integration of systems for NASA's space station project. Grumman is not actually manufacturing any of the systems, and advertises its role as "the science of mixing apples and oranges."

The personnel required for systems integration are white-collar engineers specialized in software, systems integration and project management, rather than the blue-collar workers used in Grumman's traditional regional activity, aircraft assembly.

Other companies in the systems integration field have expanded their regional activities, utilizing an existing engineering base. Both Unisys in its NEXRAD weather forecasting system and Harris in its design of support systems for the advanced tactical fighter are basing these projects in the region; neither project requires significant blue-collar employment.

The dominance of engineering in a systems integrator's cost structure can be seen in Exhibit 2-11. The division of the radar producer used in this example is acting as the overall systems manager for the project, purchasing subsystems from suppliers or from the firm's own manufacturing plant in Virginia. It tests the system in the region, but does not undertake subassembly or final assembly operations locally. The degree to which the system's contents are engineering rather than production-dependent is reflected in the fact that product design and engineering comprise more than half of the value-added to the product in the region. By contrast, the computer peripheral producer in Exhibit 2-11 is more of an integrated manufacturer in the region, although it also sources fabrications from a sister plant. Assembly is the largest cost element at 45% of the regional value-added.

Both of these companies are typical of the region's defense firms, in that the professional engineering staff constitutes the primary tie to the region. Of the total regional defense employment of 102,000, there are some 42,000 employees in companies whose activities in the region are related more to design than to production. Included within

this group are such major defense employers in the region as Grumman, Allied-Signal, Unisys, Harris and Lockheed. These companies have less than 30% of their employment in blue-collar jobs; and companies specializing in systems integration have less than 20% blue-collar employment.

THE CREATIVE PROFESSIONAL NUCLEUS

"If this city goes to hell, we'll go to hell with it. With all the problems of living in New York City, we still have people from all over the country lined up for any job that opens up," said the chief executive officer of a major publishing company. "There is no other place for a company like ours. We moved (a division) South a few years ago and it has turned out to be a big mistake. They are just in a creative vacuum down there."

The final group of businesses which belong in the professional nucleus segment of the region's manufacturing base are those which have made the region a world center for creative media activity. The vast majority of the nation's book and magazine publishers keep their headquarters and most of their workers in the region. In common with several other industrial sectors, however, their production activities -- in this case printing, binding and distributing the final product -- are not located in the region. For the most part, unlike the case with other industrial sectors, these production activities were never located in the region.

"We have never owned a printing press, and we hope never to own one," said an executive of Time Inc. Printing is an important employer in the region, particularly within New York City; however, New York's printers have traditionally been small job shops who act as subsuppliers to the service industries, as we shall discuss in Chapter 6 of this report. The large scale printers of books and national circulation magazines -- created almost exclusively in the region -- have never been located here. The absence of printing production facilities for the publishing industry, however, should not minimize the impact which this important industry exerts on the overall economic health of the region through its professional nucleus.

If the pharmaceutical and defense companies are tied to the region by the research and development professional nucleus, it is the creative infrastructure of writers, graphics designers, agents, marketers, etc., that keeps the book and magazine publishers here.

For most of these firms, "here" means Manhattan. These businesses are the most Manhattan-focused of all the various professional nuclei. In fact, 70% of regional employment in this category is in New York City. According to the Magazine Publishers Association, 80% of the nation's general publishers are headquartered in New York City. One of the prime reasons for this concentration is that advertising revenues drive magazine operations; and the concentration of media buying in New York makes it logical to concentrate advertising space sales and related operations in the same place. As Exhibit 2-12 shows, about 28% of the cost structure for a typical periodical is likely to be related to its New York operations.

Publishers' ties with the region are extensive and intricate. When asked about the success factors in their business, many publishers replied, "Talent." One publishing executive said, "Our success is in large part a function of the quality of our editorial staff. I believe these people thrive on the arts in New York. If we moved to Wichita, we would lose our editorial staff and therefore much of what makes this place tick." Most publishers noted a heavy use of the free-lance editorial, graphic and other talent which gravitates to the region. These free-lance employees may be actors, dancers and singers who have located in New York to pursue their careers, but do free-lance work for publishers, typesetters, or graphic arts firms while they wait for the big break in their chosen field. Some rather specialized talent pools also serve to tighten the regional bonds.

Publishers with fashion-oriented products noted the concentration of photographers and top models in New York as a major reason for their New York location. As one executive said, "There has never been any discussion of leaving New York -- we started in the fashion business and we're still in the fashion business. We would never consider moving."

A music publishing executive added: "When we looked at moving, we determined that we weren't going anywhere north of 59th Street or south of 34th Street. This is where we feel we need to be -- in the heart of Manhattan. Our success is wrapped up in our ability to attract quality talent -- this means having access to the agents, the managers, etc., and this means you want to be central. We will never leave this area of our own free will."

Interestingly enough, publishing is one of the few businesses in the region in which our interviews did not raise the issue of labor shortages -- particularly in the creative areas.

In fact, one executive noted that "Publishing is known as one of those businesses where you start as a PhD working as a secretary and maybe one day you'll get to move up the editorial ranks . . . people come to us in this business. The pay is low, yet we always have people knocking on our doors."

There are some firms which have already moved lower wage jobs such as order fulfillment out of the region, and some labor shortages or difficulties were noted in this area. So while overall the large publishing firms will be a source of stable white-collar employment in the region for the foreseeable future, there may be further reductions in lower-wage jobs.

SUMMARY

The overall economy of the New York-New Jersey metropolitan region derives a large but relatively unappreciated measure of its vitality from its professional nucleus. This segment is comprised of firms whose primary incentive to remain in the region is related to its attractiveness as a location for headquarters or research and design activities. The jobs this segment provides are highly paid, stable, and reflective of the region's competitive strengths. Despite common problems associated with bringing middle-level supervisors into the region because of the high cost of living, few of the firms seem to be at risk of relocation. The decision making power concentrated in these firms is an untapped resource for economic development policy makers, who need to understand and utilize the potential inherent in the quarter-million professional nucleus employees within the metropolitan region.

CHAPTER 3
THE RESIDUAL SUBSUPPLIERS SEGMENT

When the New York-New Jersey metropolitan region was a major manufacturing center, suppliers providing both components and services developed in clusters around a number of large final producers. As the final product manufacturers moved away from the region, many of their suppliers either followed them or went out of business. These surviving suppliers which still manufacture in the region constitute the "residual subsupplier" segment.

This segment of the regional economy has declined significantly in the years since World War II, and is currently experiencing the sharpest decline of all segments. Its special characteristics present a number of opportunities as well as challenges for the region:

- With 210,000 employees, it constitutes a large employment category and accounts for more than a third of the production workers left in the region.
- It is the most vulnerable of the segments, with fully 65% of the current jobs estimated to be at risk in the next few years -- compared to 35% for the region's manufacturing base as a whole.
- The segment is dominated by small companies; firms with fewer than 100 employees account for 90% of the segment's employment.
- Employers in this category are more reliant upon a skilled workforce than those in any other segment, a characteristic which binds firms to the region only as long as the supply of skilled workers holds up.

The firms now remaining in the region span the range of industrial classifications (a breakdown of employment by industrial sector is included as Exhibit 3-1). The largest groupings are in the defense-related sector, machinery and metal fabrication, apparel, and plastics. Products manufactured run the gamut from electronics counter-measures subsystems to plastic extrusions for packaging.

The strength of the firms' ties to the region also varies widely. While a large proportion of the residual subsuppliers retain only weak ties to the region, there is a sizable group of successful manufacturers who have used their regional base to achieve a sustainable competitive position.

The ability of these successful companies to survive in a much reduced market for subsuppliers has usually relied upon one of the following strategies, or often a combination of all three:

- Increasing the value-added of a firm's production by upgrading from a simple manufacturing process to a more complex one, such as shifting from making simple parts for home appliances to precision machining of components for the aerospace industry.

- Redefining the potential market by exporting either to a wider domestic area or to overseas customers.

- Diversifying from a declining product line or industry into a growing market, by developing new products and changing customer focus.

These survival strategies are often interconnected. For example, the firms which have successfully made the transition from dependence on regional customers to a national or international orientation are generally those which produce higher value-added, customized products rather than the lower value-added products for which production can be standardized. The region's strength is in manufacturing products with sophisticated design, assembly and testing requirements; therefore, products for which manufacturing can be broken down to simple repetitive tasks either have moved to a lower-wage location or are likely to do so.

Survival for firms in this segment depends to a large degree on their ability to exploit the region's special strengths. Firms that are driven primarily by the skills of their workforce have a strong tie to the region, as long as it continues to provide workers with those skills.

As Exhibit 3-2 shows, however, less than a quarter of the employment remains in companies which fit this description. Of the remainder, 40%, or some 84,000 workers, depends not on specific worker skills but on the market for components or services sold to final assembly manufacturers in the region. Over time, many of these final assembly firms will relocate or decrease their production capacity in the region. A further 37% of employment is in firms that have no visible ties to the region beyond their presence here, a characteristic we have labeled "residual inertia."

Subsuppliers held to the region by residual inertia and those dependent on regional final assemblers are at the greatest risk of relocating or going out of business. Since almost 80% of the segment's employment is in these two categories, the overall outlook for the subsupplier segment is not optimistic, unless firms successfully make at least one of the three transitions mentioned above: from lower value-added product lines to more complex products, from dependence on regional customers to exports out of the region, and/or from declining markets into growth markets.

This chapter will first look at the process of subsupplier clustering which engendered this segment, as illustrated by a group of subsuppliers to the defense aircraft industry. We will then look in turn at the three successful strategies which regional firms have used to complete the transitions noted above.

THE HISTORY OF SUBSUPPLIER CLUSTERING: AN ILLUSTRATION

The clustering of suppliers around final product manufacturers is responsible for the existence of the residual subsupplier segment. This clustering is particularly prevalent around industries for which subcontracting and manufactured component purchases represent a large part of the cost structure. In the aircraft industry, for example, subcontracted parts and subassemblies represent the majority of the cost. The defense and electronics industries -- both closely linked to the aircraft industry -- therefore provide good examples of the kinds of firms which make up the residual subsupplier segment.

The metropolitan region has been a center of aircraft manufacture since the early days of flight. Exhibit 3-3 shows the evolution of the main companies in the industry. By 1938, Long Island employment accounted for 20% of the U.S. aircraft industry. During the war, U.S. aircraft industry employment grew dramatically from 63,000 employees in 1939 to 1.3 million in 1944. New production centers were formed, in Linden, New Jersey for example, and in the Midwest, as automotive firms joined the war production effort. During the same period, the use of subcontracted components was growing rapidly, from 10% of aircraft cost in the late 1930s to 30-40% by the end of the war and to over 50% by the 1950s. Subsupplier firms were formed, often as spinoffs from the major aircraft companies, and clustered around the assembly plants.

Regional aircraft-related employment was subject to the same contractions and expansions as the overall aircraft industry through the build-ups of World War II, the Korean War, Vietnam, and the run-downs in between. Despite many attempts to develop commercial aircraft production in the region, producers continued to be focused on defense requirements. Long Island's employment accounted for about 6% of total U.S. aircraft employment throughout the post World War II period, until the recent 1980-85 build-up. With the decline of employment at Fairchild-Republic and its subsequent closure in 1987, and the diversification of Grumman's activities into other industries located outside the region, aircraft employment in Long Island fell to 4% of the national total by 1986 and to 3.5% by 1988.

The composition of that employment has changed dramatically. While the region's share of overall defense activity has steadily declined since World War II, there has been a sharp fall in prime contracting, as can be seen in Exhibit 3-4. Prime contract awards to New York and New Jersey fell dramatically from 23% of the nation's total in 1951 to 8% in 1988.

Further declines in regional airframe production are likely, as defense funding is under threat and Grumman's competitive position in aircraft is not strong. Despite the decline in share of prime contracts, however, a number of the suppliers that formed around the producers of aircraft and defense electronics have been able to continue in business by diversifying their product lines and customers bases. As well as specialized aircraft parts, they now manufacture non-aircraft-related component parts and products such as power supplies, printed circuit board assemblies, microwave components, machined parts, and metal fabrications, and perform metal services such as heat treating or anodizing. Many of these subsuppliers now sell their products across the country or even internationally.

Subsupplier Clustering in the Aircraft Industry: The Power Supply Example:

A discussion of Long Island's power supply industry demonstrates the ability of a strong final production sector, such as the region's defense manufacturers, to foster a significant group of specialized subsuppliers. It also shows how companies can overcome the loss of major nearby customers by broadening both their product lines and their sales area, in some cases changing the basic nature of the company.

Most pieces of electronic equipment have some form of power supply, ranging from batteries to large complex power converters. The power supplies produced by companies in the region are generally used to switch current from AC to DC or to change voltages for electronic equipment.

The design and manufacture of power supplies was originally a part of the final product assembly process but as standards were established and as suppliers developed specialized design and manufacturing expertise, power supplies became a purchased component for many electronic systems. As they did, it was common for power supply firms to locate close to the final manufacturers.

The $4 billion U.S. market for power supplies is divided between products designed for a specific application (75% of the business) and standard products which can be sold off the shelf. The two groups differ considerably in their bases for competition. The power supply business requires considerable design skill in meeting detailed specifications for voltage, frequency, phase and waveform. Customized power supplies are typically built in batches of less than 500 units, rather than on high-volume assembly lines, like standard products. The design for standard products can be spread over millions of units, and thus manufacturing costs are more important than design costs. In the specialized segment, design costs can be the major competitive driver. The factories for customized products resemble job shops, where each operator builds and tests products to design specifications, as opposed to the assembly lines that characterize high volume production of standard power supplies.

The combination of small lot sizes, complexity of design, and stringent reliability requirements results in a sales price of up to $6,000 for a military specified product, compared to a price of $200 for a comparable standard product. Exhibit 3-5 provides a comparison of the cost structures of the two kinds of products.

Customers for specialized power supplies want to have their suppliers nearby for quality assurance reasons, to provide quick reaction in case of problems that could impact the performance or delivery of the overall system. As a direct result of its concentration of defense electronics companies, the New York-New Jersey metropolitan region has therefore become one of the nation's centers of specialized power supply manufacturing. (A list of the companies that we interviewed in this study is shown in Exhibit 3-6). Competing clusters of power supply manufacturers have been established in

other regions with defense electronics concentrations, particularly in California, Massachusetts and Florida.

Power supply manufacture was drawn to the region not only by the proximity of customers, but also by the region's pool of specialized personnel: engineering talent trained in defense and electronics production, skilled inspectors and assemblers, and potential entrepreneurs who left larger defense contractors to start supplier companies.

This competitive advantage of the region has allowed a number of firms to survive even though many of the region's customers for specialized power suppliers have moved away. The strength of this advantage will be tested over the next few years as defense budgets are cut and defense contractors face increased cost-based competition, further reducing the customer pool. Already there are signs that a process of rationalization is occurring, with increased acquisition activity in recent years.

Power Supplies: The Nature of the Regional Advantage

The experience of customized and standard power supply business in the region also illustrates the differences between products that have remained here and those that have left. From this illustration, a more general distinction can be drawn about the sustainability in the region of higher value-added, customized products versus lower value-added products for which production can be standardized. Working from the base of what was originally a small subsupplier serving the Long Island defense market, one Long Island company is now a leading worldwide producer of power supplies. But while the business is still controlled from headquarters in the metropolitan region, virtually no products are now manufactured here. The firm is anchored to the region by its professional nucleus, rather than by a production workforce.

As the market for power supplies grew rapidly in the 1970s, companies standardized its production processes and, along with its major customers, began to move production to lower-cost locations throughout the world. Now these are international firms, with plants in Japan as well as Singapore, Israel, Mexico and Malaysia.

Standardization of product and process in this business allowed the transition to offshore production to occur; only a few non-military products have the skill

requirements that can justify using Long Island production workers at wages and benefits of over $13 an hour compared to Malaysian wages of under $1 an hour. Firms in the specialized military power supply market, meanwhile, have been able to continue producing within the region because of the high prices they command for their complex and heavily engineered products. The specialized nature of the products and the high degree of skill used in their design and manufacture have also enabled several of these companies to develop significant export sales, mainly to NATO countries.

The example of power supplies highlights the need to match companies strategies to regional strengths. Over time, many subsupplier companies without strong ties have left the region to follow their customers or have gone out of business. Those companies have been manufacturers of products for which the skill content is inherently low or companies that could not make the transition to supply customers in other regions of the country or abroad. Others that have stayed and built sucessful businesses have adjusted their company strategies to take advantage of the strengths that the region does have. Even though many of their customers have left, they have been able to increase their value-added in production and build sustainable positions in national or international markets.

SURVIVAL STRATEGIES IN THE FACE OF AN ERODING CUSTOMER BASE: INCREASING THE PRODUCTION VALUE-ADDED

The Machine Shop Example

A subset of the suppliers that have clustered around final product manufacturers offers services rather than a manufactured product line to their customers. For example, the contractors who fabricate or machine metal parts offer quick turnaround and the security of proximity in case of design changes or production problems. The parts they work with are often bulky, and proximity also provides a freight cost advantage over competitors outside the region.

Typically these are small shops, with contracts subject to competitive bids from many other suppliers. This is an industry with low start-up costs: a shop may be set up by a machinist with used or vendor-financed equipment, little fixed cost burden, and relatively low working capital. Wages are usually significantly lower than those paid to employees of the shop's customers, providing an incentive for larger companies to subcontract work rather than establish or expand an in-house metalworking capability.

With the continued erosion of the region's final producer segment, the challenge facing these suppliers is to develop a sustainable advantage over competitors outside the region. Successful suppliers have done this by increasing the value-added of their offerings.

In the case of machine shops, value-added can be increased by moving up to more complicated products with specifications calling for more accuracy. Exhibit 3-7 shows the value-added structures for a general machine shop and a precision machine shop. Costs for the general machine shop are dominated by wages and benefits paid to the machinists, comprising two-thirds of the shop's total costs. The precision shop incurs engineering costs for machine tool programming and higher depreciation costs for its computer controlled equipment; consequently, wages are less than half of total cost, although the shop's highly skilled employees are earning 25% more than employees of the general machine shop.

Many machine shops and fabricators have focused on developing a specific competence in their field, and have therefore been able to expand their base of customers to a wider geographic market. A typical example is a precision machine shop in Queens, started as a family-owned and managed business in the 1960s. This company has differentiated itself on the basis of highest quality, precision machining work. As a result, few of its jobs are subject to competitive bidding.

Defense cutbacks in the 1970s forced the firm to seek customers outside the metropolitan region and outside the defense industry. In order to compete with the myriad of machine shops in the Northeast and Midwest, the company invested early in sophisticated computer controlled (CNC) equipment. It has been able to develop customer relationships in several industries across the country including semiconductor equipment and electronics, although most of its sales are still in the Northeast.

To offer additional service to its customers, the firm also invested in a sophisticated CAD/CAM system, the same as that used by several of its major customers. The system has more capability than the firm currently needs, but the ability to download parts drawings from its customer's engineering group directly into their workstation provides an advantage that few competitors can match.

As did all the machine shops interviewed, this firm expressed concern over the decline in the number of skilled machinists in the region, and the inadequate training for a new

generation to enter the trade. Although the family is originally from New York, the second generation, which will take over the business, has fewer ties to the region. An inability to find experienced machinists would force them to consider leaving.

Another threat to the viability of a metalworking sector in the region is the continued disappearance of subcontracted services used by machine shops and metal fabricators, such as heat treating, plating, anodizing, and lapping. Although the basic services are still readily available, there are few suppliers of the specialized services used in parts manufacture for industries requiring precision work. The further erosion of these services will force the region's metal-working companies to subcontract from New England or the Midwest, placing them at a competitive disadvantage and potentially accelerating the decline of employment in the sector.

Several metal working companies have also tried to add value to their products by acting as mini "systems integrators" at the mechanical subassembly level. These companies are attempting to create a network of specialized suppliers that can assemble products too complex for any of them to produce alone. While such forms of networking have the potential to add value to regional products, successful examples are still rare. Most of the metal working companies in the region have a more traditional subcontracting relationship with their customers.

Companies in the metalworking industry, not including those producing mechanical subassemblies, can be categorized according to whether they provide a service or a product; and by the degree of skill and sophistication necessary for the work they do. Exhibits 3-8 and 3-9 provide a framework for looking at regional companies in this way -- in effect, a sub-segmentation scheme to assess the degree of survivability of firms within this sector.

The lower left quadrant includes the subsuppliers who provide general services to final producers. These services are rarely traded outside the region. Companies in this quadrant are heavily dependent on local sales, and are vulnerable to the continued decline of their final producer customer base. The top left quadrant includes firms that have developed a service specialization to add further value to their offering. These firms generally trade their services throughout the Northeast.

The top right quadrant includes manufacturers of sophisticated metal products such as precision valves or precision ball bearings. These products are frequently traded nationally or even internationally. Finally, in the lower right quadrant are the suppliers of simple product parts such as electrical components and construction materials. These products are often traded outside the region, but are subject to lower-wage competition. Companies in this quadrant have weak regional ties and are particularly likely to leave the region.

The employment totals for the region shown in Exhibit 3-9 indicate that 83% of the region's metalworking employees are in firms at the low end of the scale in terms of skill and sophistication. For metalworking companies, vulnerability is closely related not only to the health of the final producers, but also to the companies' success in creating a sustainable competitive position by adding value to their production. Since this transition usually depends on the skills of their employees, the extent to which many companies remain vulnerable is shown by the high proportion of employment (38,000) found in the lower right quadrant.

The Tag-Maker Example

Subsuppliers to the apparel industry have also been forced to look for a distinctive advantage that will allow them to compete beyond their regional customer base. One of the last of the tag makers left in the region, for example, is in the New York City garment district. Over the past decade it has faced intensified competition from lower-cost Southern competitors who have targeted the remaining final assemblers in the New York-New Jersey metropolitan region. Being unable to match competitors' prices from a New York City production base, the firm decided to compete on the basis of superior service in order to maintain its local market and even expand beyond the region's declining apparel industry.

As part of its strategy, the company invested in advertising, brochures, trade shows and a marketing staff to build brand image. An important component of this strategy has been close relationships with key customers, which the company developed by offering rapid turnaround of new designs and just-in-time deliveries. For this company, differentiation from lower-priced competitors has achieved a price premium and has reduced independence on regional sales from 80% to 40%.

Increasing the production value added will be a necessity for many subsuppliers who have previously been able

to compete solely on proximity to regional customers. The higher cost structure inherent in the metropolitan region does not allow them to compete on the basis of price alone. Both the strategies of subsuppliers and supporting public policies should therefore be directed towards building competitive advantage from the special strengths of the region -- in this case, primarily the skills of the region's labor force.

SURVIVAL STRATEGIES IN THE FACE OF AN ERODING CUSTOMER BASE: REDEFINING THE POTENTIAL MARKET

In each of the preceding examples, companies which succeeded in adding more value to their products or services also broadened the geographic boundaries of their market. Indeed, most of the regional subsuppliers surviving the dispersion of final producers have done so in part by securing customers in a wider domestic region. The challenge that faces companies now aiming for additional growth from their regional base is to broaden the target market further, to the national or international marketplace. Following are illustrations of two companies' successful efforts to expand into the export markets for packaging machinery.

Situated among the warehouses of the Red Hook area of Brooklyn there is one of the last factories for specialized packaging machinery left in the area. Brooklyn was once the thriving center of customized machinery manufacturing for the many final packagers in the region, during the period when New York sent products such as food, beer, wines, liquors, and oils around the world. The Red Hook company has seen first the final producers disperse across the country, and then the machinery producers.

The U.S. packaging machinery industry is highly fragmented: in an industry with sales of $385 million, the largest manufacturer has only $65 million in revenues. This fragmentation results from the need to customize each system to the requirements of the product packager. Design of the system is usually more important than price, since the packager can realize large cost savings from productivity improvements or quick change-over times.

The Red Hook company has made the transition from being a regional supplier to manufacturing for firms across the country, with 20% of its sales now in foreign markets. The firm started at the turn of the century with a narrow product focus, supplying corking to wineries, and over time expanded its product line to a full range of closure machines. Although

it is meeting more competition from European producers, its ability to solve customers' problems provides a strong competitive advantage and builds long term business relationships.

Another company, based in New Jersey since the early 1920s, also started as a supplier to wineries. Its experience in filling bottles soon led to work for the growing New Jersey pharmaceutical industry. When the market for pharmaceutical packaging in the region declined, due primarily to production moving offshore, the company aggressively moved to diversify its product line into other filling technologies and other packaging-related operations. It also began an effort to expand its target market, by establishing an export marketing group and funding trade show attendance, advertisements and numerous trips abroad. Today the company earns 50% of its revenues from overseas markets.

Its primary target has been Pacific Rim countries, especially Japan, South Korea and China. The next major push will be into European markets, with plans to be established in those markets before 1992. The company feels that several types of export assistance would be valuable:

- Advice and contacts in new, unfamiliar markets;
- Assistance with bringing potential buyers to the metropolitan region to give local firms an opportunity to showcase manufacturing capability;
- Provision of information about trade shows and upcoming contracts, primarily for local small companies.

This company's success is largely due to the strong commitment that it made to invest in export markets for the long term. Although exchange rates have moved dramatically over the past decade, the company has maintained its premium position in foreign markets through tight quality control and a willingness to absorb some of the foreign exchange costs in the short term.

There are many examples of subsuppliers that have built export businesses from a base in the metropolitan region (Exhibit 3-10). Common to each of the successful exporters interviewed has been a long-term investment in export markets similar to that made by the packaging company discussed above. Few of the companies that exported opportunistically when exchange rates were favorable have been able to build sustainable positions in overseas markets.

SURVIVAL STRATEGIES IN THE FACE OF AN ERODING CUSTOMER BASE: PRODUCT DIVERSIFICATION

In contrast to the companies that increase their value added by repositioning their products into market niches, a more fundamental change is often required when an overall sector is in decline. Companies are forced to make changes not only in the types of products they produce, but also in the market they serve, the way they compete and in their cost structure. These changes impact employees throughout the company, from management to production workers.

The defense sector provides the most striking example of a regional industry in decline. The departure of Fairchild, the continued relocation of Grumman's production activities out of the region, and the acquisition of regional contractors by outside companies, has resulted in the loss of over 20,000 jobs in the major prime contractors since 1986. Regional production of defense components has further declined as the defense electronics companies have shifted to an orientation based on systems integration rather than production.

Companies that depend solely on the defense sector usually rely on a narrow base of existing contracts to sustain their business. The larger defense electronics firms in the region have tried to diversify into long-term, stable contracts, not subject to the budget cycle. Many undertake subcontract work for other prime contractors to provide a base load of work and spread contractual risk among several members of a consortium.

At the subsupplier level, many companies interviewed remain heavily dependent on a single customer for much of their revenue, making them particularly vulnerable to a downturn if that customer relocates production elsewhere. For example, one of the firms manufacturing power supplies in the region has recently suffered a downturn in its military business with the loss of a customer that accounted for 40% of its sales. Although the customer is headquartered in the region, its power supply needs have been met by subsuppliers closer to its Florida production location.

To diversify its business, this company has invested heavily over the years in commercial products. Several ventures have not succeeded. Now one of its new products, a precision instrument for industrial use, is gaining market acceptance and accounts for over 20% of revenues. This company is realizing some of the benefits of an R&D investment of 5% of sales annually over a decade.

The target market for the product is primarily industrial users of precise measuring instrumentation. The company had learned from previous experience that to market the product it would need to invest in closer relationships with its customers. The company has also had to develop experience in providing applications engineering support which can lead to new and innovative solutions for customer problems.

Another power supply manufacturer, also specialized in military products, has attempted to enter a much larger product market of uninterruptible power supplies. Their innovative new products were developed and funded internally, and are targeted at a segment of the overall market that needs specialized features.

As with many of the other subsuppliers trying to diversify into non-defense business, this company has a strong technology position, but needs to work hard at creating a market position. A crucial need is to create linkages between the market and its product development effort in order to better respond to customer demand. Unlike military supply procedures which entail extensive up-front product specification, documentation and parts tracking, commercial product development needs to be tailored to customer demand that is not specified in great detail. This re-orientation is often the most difficult adjustment for defense subsupplier companies to make.

This power supply manufacturer has achieved some early success in the high end of an extremely competitive market through its technology advantage. Translating that initial foothold into a larger market share will require it to establish a nationwide distribution, sales and service network. Simultaneously, it is working with the Port Authority XPORT group to enter foreign markets.

For this particular company, XPORT has been assisting with export documentation and has acted as an information conduit from foreign markets. XPORT's role varies according to the needs and sophistication of the client, from freight forwarder to export management. Without such assistance, this company and other XPORT clients interviewed would have found the cost of establishing an export business considerably higher and more risky.

There are a number of companies in the region like those described above which have started to make the transition from defense to non-defense orientation. However, most of the remaining subsuppliers that started in defense-related work

still remain heavily dependent on defense subcontracts. While the strong technology base and experience of those residual subsuppliers can provide the basis for successful diversification, the transition is difficult, often requiring a fundamental change in the way companies design, produce and market their products.

One area of stability and potential growth is found among remaining aircraft subsuppliers, particularly of high value-added subsystems, which have expanded into the commercial market. Since requirements for reliability are similar throughout the aircraft industry, a number of regional subsuppliers have been able to share production equipment and facilities between commercial and defense customers. Currently, growth in the commercial aircraft industry is strong, fueled by safety concerns and a requirement for parts replacement on aging fleets. This strong market demand has created an opportunity for many of the aircraft suppliers to diversify away from dependence on the military sector.

There are other subsupplier sectors of potential success in the region, particularly in products where local defense industry requirements have led to a nationally competitive capability. Microwave component manufacture, primarily for defense communications systems, has a long history in the region. Polytechnic, or Brooklyn Polytech as it was then known, was an early pioneer in the development of microwave, and spawned a number of companies.

One of those firms, AIL, was instrumental in grandfathering a group of microwave companies on Long Island; ITT played a similar role in New Jersey. Several of those spin-off companies are growing rapidly, producing components or final products for non-defense markets such as the telecommunications and computer industries as well as for defense companies. Diversification has therefore come about both through the re-orientation of company strategies, and through the commercial focus of many of the spin-off firms. These companies' ties to the region are extremely strong, linked to the experience and expertise of their highly experienced microwave engineering staffs.

Although the term "residual subsupplier" may denote a segment in decline, these areas of stability and growth offer some encouragement. Diversification from the declining customer base represents a difficult challenge for regional subsuppliers, but provides the potential to retain high-skilled blue-collar and technical jobs in the region.

SUMMARY

Employment in the regional subsupplier segment has been in steep decline, a reflection of the loss of the large final product manufacturing facilities around which the segment's firms had originally clustered. While there are pockets of stability and growth, almost 80% of the segment's jobs are in firms with weak ties to the region, and 65% of the employment is considered vulnerable to relocation or firm closings. The areas of strength rely more upon the skills of the work force than on mere physical proximity to final producers, but the difficulty of replacing skilled workers is one of the complaints most frequently voiced by managers of the region's manufacturing companies. The challenges faced by the region revolve around solving the skills problem and helping firms to refocus their production efforts by adding additional value to the product line, expanding the area they market into, or diversifying into new product lines.

CHAPTER 4
THE INDEPENDENT FINAL PRODUCERS SEGMENT

The biggest challenge in stemming the decline in manufacturing employment in the New York-New Jersey metropolitan region will be to create new, independent firms capable of competitively producing goods from a base in the region. This type of firm has been at the heart of powerful manufacturing economies since the industrial revolution, sponsoring clusters of subsuppliers, spinning off new entrepreneurial manufacturers, and creating service sector activity in the surrounding economy.

To a large degree, companies of this sort will determine the degree to which the metropolitan region can remain a goods-producing economy. We have categorized them as the "independent final producers" segment. This segment includes 219,000 workers in the region, of which about 75% are in blue-collar production jobs. It represents a diverse group of manufacturers whose products range from Chevrolet Berettas to aquarium gravel. It is these independent producers which engendered clusters of nearby subsuppliers, and whose decline in the region has resulted in the loss of many of those subsuppliers.

Much of this employment loss has been attributable to the dispersion of production to other areas of the country. The metropolitan region is no longer the giant of aviation, avionics, consumer electronics, packaging, machinery, metalworking, apparel, printing, chemical and pharmaceutical manufacturing that it once was.

However, the loss of older manufacturing industries is only part of the story. Other regions have lost traditional industries, but have been able to build new industrial concentrations to replace them. While some regeneration of manufacturing has occurred in the metropolitan region, it has not been on the scale required to offset the major loss from older industries. None of the new growth industries have been sufficiently concentrated to form new clusters of activity and employment.

The firms currently in this segment therefore fall into two main categories, as outlined in Exhibit 4-1:

- A group of residual companies with relatively stable employment. They remain tied to the region primarily because of the inertia caused by sunk investment, proximity to large consumer markets,

the skills of their blue collar employees, or their engineers and technicians.

- A group of growing companies, the result of spin-offs from the region's generous supply of headquarters and R&D firms, or of entrepreneurial start-ups by residents of the region.

While these characteristics do not correspond exactly to industry groupings, there is a predominance of entrepreneurial activity and spin-offs in the "new" industries, such as non-defense electronics and medical equipment. Exhibit 4-2 summaries the industry grouping for independent final producers. As indicated, over 70% of regional employment in this segment is still in the older companies that are "residual" from the traditional industry concentrations. A third of employment is still in the machinery and chemicals industries, for example -- both of which have suffered sharp declines in recent decades. Most companies in the growth category are still small in terms of revenues and employment. Exhibit 4-3 combines the two preceding types of classification in a matrix format.

Throughout our interviewing, we encountered companies from the residual category which had recently relocated from the region or who were about to. Apart from the recurring story of being wooed by certain Southern states, other common themes were raised by company presidents when discussing the reasons for their company's relocation. The example related in the next section of a New Jersey tool manufacturer's decision process highlights some of those recurring themes.

Following that discussion are three sections which outline the factors that continue to bind residual companies to the region: sunk investment, the existence of a large regional market, and specialized employee skills. The final section of the chapter focuses on the creation of growth businesses through spin-offs and entrepreneurial start-ups.

DECIDING TO LEAVE THE REGION: THE EXAMPLE OF A NEW JERSEY TOOL MANUFACTURER

The current president of a $20 million family-owned manufacturer of tools and hardware was recruited in the 1980s. The firm had previously been managed by family members since its founding in the 1870s. The change to professional management has helped loosen the ties of the company to the

region, since the new president is not as committed as the family to living in New Jersey or keeping the company in its present location.

The company currently has a strong market share in a line of tools for the building trades. Competition from companies in the Northeast and Midwest in its market segment has recently intensified and the firm has been forced to source a line of products from Europe. Due to a combination of factors, the New Jersey company is one of the higher-cost producers, and the president predicts that it will eventually have to stop manufacturing entirely unless it moves aggressively to take costs out of its manufacturing operations.

The biggest cost components are materials and payroll. Most materials cost is in commodity items such as steel and simple wooden parts, and provide little opportunity for cost savings.

Payroll is comprised of salaries for the eight hardware design engineers and technicians and for the office and sales force, and wages for the firm's 150 hourly employees. Average wage rates for the production workers are lower than for other firms in the area, at about $13.50 an hour including benefits. These wage rates are not substantially different from competitors', and the president is concerned that asking for wage concessions would make recruiting even more difficult.

The firm has always had difficulty finding workers, but in recent years the shortage of suitable entry-level employees has become a major problem. Employees start with little knowledge of the basics, such as shop math, blueprint reading, or even, at times, the English language. Although the company has no formal training program, it tries to help employees gain skills on the job; however, once workers gain those skills and some machine operation experience, they often leave for higher paying jobs nearby.

Fortunately, the company has managed to retain a core group of key employees with many years of seniority. Last year, however, one of those employees retired. It took the company six months and several thousand dollars of job advertisements to replace him. This illustrates the company's problem in retaining its current level of skilled employees, let alone building a base to allow for growth. If unskilled entry-level workers need a lot of training in basic job skills, and if experienced machinists are virtually unavailable, how

can the company expect to continue growing as it has in the past, while maintaining the quality that has kept it in a leading market position? As key employees reach retirement age, where will their replacements come from?

The company's cost disadvantage comes mainly from its current facilities configuration. The building was purchased in the 1950s and converted to manufacturing requirements. Unfortunately, the combination of low ceiling height and multi-room layout means that it needs more supervisors, material handlers and inventory controllers than its competitors. In a low-margin business, this disadvantage could mean the difference between profits and losses. While the land and building are not ideally suited to manufacturing, they have dramatically appreciated in value because of the influx of services sector businesses to the area, and are now valued at several million dollars. Had other factors not mitigated against staying in the area, the resale value of the site would not in itself have been sufficient inducement for leaving. But the combination of skill shortages, poor facilities, and high tax, insurance, waste disposal and utilities costs stacked the odds in favor of relocating.

Under normal operating conditions, companies prefer to stay in their current location: the disruption and cost for any move represents a major investment and risk for most companies. Employees will frequently be reluctant to relocate, in any case, the company will have to bear the moving costs and relocation allowances for key employees. The company will have to hire and train new employees, establish new service suppliers, and risk disrupting important supplier and customer relationships. While not as daunting as the prospect of moving an R&D facility, those risks are very real. Companies that have experienced a move, or have observed the impacts, appreciate that the benefits from relocation need to be substantial to compensate for the cost and risk of a move. Inertia is a tie to the region that in itself provides a strong incentive to stay.

There are crucial decision points when the rules of "normal operating conditions" do not apply, however. At those times, companies will be forced to confront the leave-or-stay issue, and inertia will exert a lesser force than during times of "business as usual."

The decision points include events such as:

- Change in ownership or management control: the changeover from family to professional management, as in the tool company example; or acquisition by a company from outside the region or by a foreign company; or the passing of management from one generation to the next -- these are all critical points at which decisions are made regarding the company's future strategy and location.

- Need to expand facilities: when the company is making a strategic decision to invest, the desirability of the current location becomes another factor in the overall decision. This is particularly true where existing facilities are inefficient due to high supervisory, materials movement or direct production costs.

- Addition of a new product line: for companies diversifying their product lines or beginning production of a new product family, an investment in process equipment will often be required. The choice may be to automate part of the production, changing the type of skills required. This changeover will reduce the value of the firm's current skilled employee base, since retraining will be required in any case. Recognizing this vulnerability, a number of states are offering consulting and training assistance, focused on adaptation to new, automated equipment, to companies that are considering a move.

- Requirement to meet the standards of new regulations: although companies interviewed often understood the benefits from new regulations such as those relating to groundwater testing, visual display terminals or waste treatment, the investments required to comply with the new regulations creates a particularly vulnerable decision point.

From our interviews and segmentation analysis, we estimate that some 21% of the employment in independent producer firms is currently vulnerable to leaving the region when they encounter decision points of this kind, as they are likely to do over the next few years. These companies, employing 49,000 people, are currently held to the region only

by a type of residual inertia. Similarly, many of the new growth companies in the segment will be forced to make expansion decisions in forthcoming years if their growth continues. They will become vulnerable when encountering these decision points unless there are strong factors tying them to the region.

Exhibit 4-4 shows our categorization of companies in this segment by degree of vulnerability. Most of the employment is in the stable category, predominantly in a large number of small, specialized producers with a regional market focus and skilled employees. They have carved out specific niches which allow them to prosper while their industries experience overall decline, and have adapted to the business conditions of this area.

However, although 64% of the segment's jobs are currently considered stable, many of these companies have few real ties to the region. They are stable only because they have attained a relatively secure position in their industry and have no obvious decision points to face in the near future.

RESIDUAL INERTIA: THE EFFECT OF SUNK INVESTMENT

There are several factors which create an inertia which holds companies to the region. The first of these factors to be discussed here is sunk investment, particularly recent capital investment in non-liquid assets. Sunk investment can be described as a form of inertia in that the company's ties to the region result from a past decision. The most striking examples are in automotive assembly. General Motors invested $300 million to rebuild and retool their Linden, New Jersey plant in 1985-87, and are retooling their Tarrytown, New York facility to produce mini-vans. In the future, that combined investment of $550+ million will continue to be a powerful tie to the region, keeping 7,000 employees in high-wage jobs.

Older sunk investment, however, represents a weaker tie. When assets are near the end of their economic life and require replacement, a decision point has been reached and companies are likely to relocate. Surveys conducted in traditional regional industries such as metal-working and machinery show that the usage of modern machine tools is lower than that of the nation as a whole. This suggests that a number of companies have been postponing investment decisions, and will be faced with decision points in the future.

A number of the remaining companies in the region's chemical industry also fall into the category of residual producers held to the region only by the inertia of sunk investment. As explained in Chapter 3, regional chemical production is comprised of two distinct businesses, commodities and specialty products. The breakdown of employment in the region's remaining companies (see Exhibit 4-5) shows that few commodity producers are left. Those which do remain have developed higher value-added products over the years and now have attributes of both commodity and specialty producers. They are referred to as "pseudo-commodity producers," with total employment of around 6,500. Their investment is aging, and often when reinvestment is needed, it is made outside the region.

However, some of these companies are reinvesting in the region. Several of the companies interviewed, both pseudo-commodity and specialty, are in highly competitive niche markets with low margins and mature production technology. The establishment of a greenfield site represents a large, risky investment that may take many years to pay back, since investment is required not only for the physical assets that must be moved or replaced, but also for a new environmental compliance infrastructure. Sunk investment in these cases consists of much more than physical production equipment alone, and these companies have made the decision to upgrade their current location rather than relocate. Once these reinvestments have been made, the companies have a renewed commitment to the region and a strong incentive to invest in training to upgrade worker skills.

RESIDUAL INERTIA: THE EFFECT OF LARGE REGIONAL MARKETS

A sizeable group of companies in the metropolitan region serves a regional market that encompasses the entire Northeast. Many of these companies began by supplying the metropolitan region alone, and over time have expanded their market coverage. Most of them are regional plants for nationwide producers. They fall into several main industry groupings: specialty chemicals, food, some plastic products, and transport equipment.

For these producers, the bonds of residual inertia are generally stronger. Companies that serve a Northeast market from a base within the region are often constrained in their choice of alternative locations to areas in or close to the Northeast, most of which have factor costs and operating

conditions similar to those of the metropolitan region. In the case of specialty chemical products, the tie to the Northeast region has two components: high freight costs, which encourage manufacture close to the market; and the need for close interaction with customers for tailoring products to customer specifications.

Not surprisingly, given the perishable nature of many food products and their bulk compared to value, the largest concentration of Northeast regional producers is in the food industry. The large, dense population of the New York-New Jersey region has both attracted regional production facilities for national food processing businesses, and provided a base for local companies to grow to a scale which allows them to serve a Northeast or national market. Several national breweries and soft drink manufacturers have established regional facilities here to serve both the local market and the Northeast market. By contrast, Entemann's bakery is an example of a locally focused company grown into a viable Northeast region business, which has then expanded nationally.

Entemann's had its genesis as a door-to-door bakery sales business within New York City, but in the mid-1950s moved to Bay Shore and began to grow regionally by selling through retail grocery stores. The company now serves a region stretching from Maine to Maryland from this one huge bakery on Long Island. The importance of distributor economics is demonstrated by its employee mix, with about twice as many in the sales and delivery organization as in the manufacturing plant.

The company replicated its regional operation in Miami in the late 1960s, in Chicago in the 1970s and, after being purchased by General Foods 10 years ago, has established a regional bakery in Los Angeles. As with other food processing businesses, growth has come from establishing a number of regional locations, each highly decentralized except for possibly purchasing and overall marketing direction, rather than by pursuing a national distribution strategy.

Many plastic products display the same characteristics, not because of the demands of freshness but because the products have a low value per bulk ratio. Plastic piping businesses, for example, although they may be owned by national companies, typically are produced in a large number of regional facilities spread around the country. Without regional production facilities, transportation costs would be too large a percentage of total cost. Construction product

businesses such as concrete piping and reinforcing steel bars are similar. All are well represented in the metropolitan New York-New Jersey area.

Therefore, in summary, the factors that tie Northeast regional producers to the region are freight cost advantages, and the requirements for proximity to customers for customizing products. The sunk investment these producers have in regional facilities and infrastructure also represents a tie, especially since no cost savings would accrue from moving to another location within the Northeast market area.

RESIDUAL INERTIA: THE EFFECT OF AN INSTALLED PRODUCTION AND TECHNICAL SKILL BASE

Many companies that were originally drawn to the region by its unique pool of work force skills are no longer dependent on those skills: either they have automated parts of their production process and eliminated the need for those skills, or, more frequently, the work force has aged and the companies have not been able to replace their key employees. In addition, many of these companies have increased their subcontracting and component purchases and the remaining production skills are now predominantly found among their subsuppliers. Few of the independent producers now in the region are solely dependent on the skills of their blue-collar work force; a larger group remains because of both production skills and the technical skills of their white-collar workers.

Major industries which are tied to the region to some degree by the skills of their employees include the defense and non-defense electronics industries and the instruments industry. The defense electronics industry is a good example of an industry in transition, with key technical employees playing a vital role. These employees are at the same time holding the remaining defense producers in the region, and driving the transition to newer growth industries such as non-defense electronics, instruments and medical electronics.

The defense electronics industry evolved from an avionics clustering that formed in the region during World War II. Aircraft production, particularly defense-related aircraft, has become characterized by a high electronics content. As an Air Force general has said, "In the past the Air Force used to buy airplanes and add electronics. Today the Air Force buys computers and puts wings on them."

A schematic representation of the region's industry formation is included as Exhibit 4-6. It shows the close intertwining of companies in the region in terms of ownership and evolution, as key employers trained the technical work force and provided a pool of key entrepreneurs to foster new businesses. The role that research labs and universities played in developing the regional defense electronics capability is also striking. Their influence is still strongly felt; an estimated 130 CEOs of Long Island companies are alumni of Polytechnic, for example.

This close interconnection has been strengthened over the past few years by the merger and acquisition activity that rationalized and shrank the industry. All the regional employment added in the 1980-85 buildup was lost in the 1986-88 period. Over 20,000 jobs were lost among the major prime and secondary contractors, as shown on Exhibit 4-7, and the decline has not yet ended.

The current defense contracting environment continues to place considerable competitive pressure on defense companies, and has led to several major changes in industry structure:

- Companies are subject to second sourcing for a number of programs, increasing cost pressures on manufacturers. Much of the second-sourced work has left the region, to lower-wage areas.

- Prime defense contractors are being required to assume more risk by investing in multi-year, fixed-price programs. The additional risk and capital required has encouraged a trend toward production consortia and a wave of mergers and acquisitions.

- Finally, the Department of Defense has begun defining integrated systems as a single prime contract, rather than issuing separate contracts for several systems within a project. This trend has encouraged the growth of systems integrators who can form the various subsystems into an integrated whole. The companies that have made that transition are now held to the region by their professional nucleus of engineers.

The loss of these jobs has also resulted in a change in work force composition and regional value-added. As discussed in Chapter 3, most of the job loss was among blue-

collar workers, many of whom had to leave jobs with wages and benefits of over $15 per hour for jobs in the subsupplier sector paying on the order of $10 per hour.

At the same time, the overall number of skilled workers in the region has decreased as employees relocate out of the region or take early retirement. Studies of the defense sector by the Long Island Regional Planning Board show that approximately 25% of employees at major defense contractors are over 55 years of age. As these skilled employees retire, they are not being replaced. Other employees have transferred to sectors of the economy with labor shortages, mainly into service occupations. The net effect has been to decrease the number of skilled workers available for high-paying blue-collar jobs in manufacturing.

The loss of skilled workers has created a problem for those companies that have maintained substantial production in the region by adding value to their product lines. These are mainly manufacturers of communications-based products for airborne use, reflecting the region's roots in avionics. Similarly to firms in the professional nucleus segment, they are increasingly tied to the region by their engineering employees as well as by key machinist and assembly worker skills. Employment in this group used to comprise a large portion of the 100,000-plus employment in the defense-related industry; it now totals 13,000. As shown on Exhibit 4-8, the other large categories of employers remaining in the defense industry are systems integrators, part of the professional nucleus segment, and components/subsystems manufacturers, who belong to the subsupplier segment.

The strategies of all these companies have been oriented towards adding value to their products, to avoid direct cost-based competition. Several have attempted to convert some of their production to non-defense markets, but with limited success. Most of the regional firms in this category are owned by larger defense contractors, and do not have a charter from their parent to develop and manufacture products for other markets. If such a product is developed by the parent, it will often be produced elsewhere by another division of the company. Many of these regional defense businesses are dying a slow death of attrition, with their corporate parents using them as "cash cows" to fund investments in other businesses. Rather than reinvest as needed in these regional businesses, the parent is often divesting or moving production to another location.

Several successful growing exporters do exist within the declining defense sector. EDO in College Point, New York is the sole supplier of mine sweepers to NATO countries, exporting 30% of its products. ISC Cardion is a producer of radar and air traffic control systems, with 45% of its revenues coming from exports throughout the world. Republic Electronics is a small producer of automatic test equipment, also exporting 45% of its production. However, a number of companies producing advanced military equipment, such as electronic countermeasures, are prohibited from export.

In an era when "peace has broken out", the outlook is for defense budgets to stabilize or decline. The restructuring of the defense companies can be expected to continue, as more companies shift production activities elsewhere. Most companies will maintain a presence in the region, held by their skilled engineers, but, as in Grumman's case, new businesses will increasingly be located in other parts of the country. In a cycle of decline, the relocation of businesses is affected by skill shortages since the base of skilled employees has eroded even more rapidly than overall employment. One of the region's traditional strengths, the availability of skilled manufacturing labor, is weakening as employees relocate or retire without regeneration in the form of trained work force entrants or skill upgrading. New and growing companies are now increasingly constrained in their regional growth by a lack of skilled employees.

There are similar skill shortages in other industries which have companies tied to the region because of employee skills. Blue-collar skills are being eroded as a younger generation is not being trained as machinists, tool and die makers, machinery assemblers, tailors or process operators. Companies that were committed to staying in the region because of the unique skills of their work force are finding not only that these skills now exist in other states, but also that they are in short supply in the metropolitan region. The skilled employees that companies are staying for are increasingly white-collar engineers and technicians. Therefore, this group of independent final producers is coming to resemble more closely the professional nucleus segment.

THE GROWTH CATEGORY: SPIN-OFFS AND ENTREPRENEURIAL COMPANIES

A number of new growth companies have emerged from the declining defense sector, selling mainly into other sectors of the economy but using related technology. Although attempts to

convert from defense to civilian-based products have not succeeded for the larger defense contractors themselves, their skilled engineers and technicians have in some cases successfully managed the conversion through small spin-off companies.

These new companies have located in the region for some of the same reasons that keep the other independent producers here, in particular the strong pools of engineering- and science-related personnel, but have an additional tie in that the founders are usually active in the business and loyal to the region.

Companies in this group employ a total of 32,000. Over 75% are in the electronics sector and have their roots in the region's defense and consumer electronics industry. Exhibit 4-9 shows some of the linkages among non-defense electronics companies. Most of the spin-off activity has occurred over the past 20 years, as is evidenced by the many small manufacturers growing "high-tech" businesses in Nassau, Suffolk, Morris, Bergen and Rockland counties.

One company that has progressed through a number of different product lines over 35 years illustrates the rapid change that characterizes this sector. In the 1950s, a New Jersey machine shop with seven employees was performing contract subassembly work for major Long Island aerospace contractors. The business became specialized in basic instrumentation devices, and by the 1960s had developed a centrifuge capable of separating impurities from various gases.

Cutbacks in defense contracts prompted the firm to shift its entire focus to commercial instrumentation devices by the early 1970s, a time when the medical diagnostic part of the health care industry was experiencing rapid growth. Since then the company's technology has evolved from instrumentation for filtering out isotopes in sulphide gas, to blood analysis instrumentation for hospitals and medical and pharmaceutical R&D labs.

While the company grew from a seven-employee defense sub-contractor to a final producer for the medical equipment industry with more than 300 employees, its key work force component -- highly skilled engineers -- remained a constant. Moreover, the firm continues today to recruit its cadre of engineers from the likes of Singer, Bendix, Curtiss-Wright and other leading New Jersey avionics companies.

Ironically, when the firm recently diversified into the biotechnology field by developing blood virus products for AIDS and other antibody testing, it found that the rich professional nucleus which for years had amply supplied it with engineers and organic chemists was wanting in the area of microbiologists and other life sciences professionals. It found the necessary biotechnology talent pool in Maryland, clustered around the National Cancer Institute (NCI) in Bethesda. The availability of that talent pool coupled with the advantages of being near a major potential customer prompted the company to spin off a separate fully-integrated R&D and manufacturing facility near Bethesda.

The company was recently acquired by a foreign-owned pharmaceutical giant which was already strong in the U.S. market for pharmaceutical therapeutics, ophthalmics and biotechnology equipment, but lacked a strong presence in health care diagnostics. The acquisition in itself will not accelerate the employment shift to Maryland. However, if the next generation of medical instrumentation products is influenced more by biotechnology than by clinical chemistry, as the company predicts, more employment opportunities will shift out of the New Jersey region.

Already the company has experienced a 20% decline in employment at its New Jersey facility in the past couple of years as the chemical blood analyzer technology matures, allowing more subcontracting for printed circuit boards, cables and harnesses, computers and printers. Conversely, the firm's employment is growing at Bethesda as reusable microbiology agents assume a more influential role in enzyme detection and blood tissue analysis.

At the very least, the migration to Maryland represents the first break in the company's links to the region. What began as an encouraging transformation from regional sub-assembler in the defense industry to an international final producer of medical equipment may still end with a slow bleeding of employment out of the region for lack of appropriate professional skills.

However, most of the companies in the growth sectors of the regional economy have found a close fit with the skills base in the region. In our interviews, we encountered many successful firms with strong international positions and excellent growth prospects who are committed to staying in the region. Some examples of successful exporters are included as Exhibit 4-10. Many of these firms have achieved world market

leadership in their businesses. Their challenge now is to extend their success to additional product lines, and to make the progression from a successful single product company to a more diversified international competitor.

Most of these new businesses are small by international standards, with employment of less than 1,000. As shown in the comparative cost structures in Exhibit 4-11, they compete on the basis of technological competence in either product development or custom design, and require a large marketing and applications engineering staff to tailor products to the requirements of particular market segments or customers. For each of the three companies illustrated in the exhibit, R&D and applications engineering/marketing accounts for 40-50% of the value-added structure.

Another characteristic of these new companies that should be stressed is that they actually manufacturer in the region. The high-volume, repetitive manufacturing appropriate for offshore or other low-wage production does not generally characterize these companies' products. The exceptions are labor-intensive processes in components manufacture, such as packaging for integrated circuits, but the increased use of flexible automation is bringing even those processes back to the region. Exhibit 4-12 outlines the major process steps, by location, for non-defense electronics products and components.

Companies that have formed as spin-offs or entrepreneurial start-ups are highly diversified across industries and industry segments. There is no critical mass in any particular technology: the region is not one of the major laser centers like Northern California, Orlando, Florida, and the Route 128 areas; nor is it a center for computer hardware; nor a center for scientific instrumentation. Instead, there is a broad cross-section of technology-oriented businesses which taken together, represents a significant amount of employment: Exhibit 4-13 shows that there are more engineers in this area than in the commonly cited high-tech center of San Francisco Bay/Silicon Valley. Nevertheless, the metropolitan region is not thought of as a technology center. One reason for this may be the absence of large integrated producers to anchor the sector -- AT&T and IBM are both employers of many engineers, but do virtually no manufacturing locally. Nor have clusters of new companies formed around AT&T and IBM. Their focus on R&D and headquarters activities in the region and their cohesive corporate culture may be factors accounting for the relatively low incidence of manufacturing spin-offs compared with spin-offs around companies such as Hewlett-Packard or Digital Equipment in other areas of the country.

In the volatile sectors in which these new growth businesses compete, there are many failures alongside the visible successes. The companies that succeed with their first product in the market often face fast-following competition, and must continue innovating to stay ahead. Until the company builds a defensible position in a number of product lines, they are vulnerable to a decline that could be as rapid as their growth.

Most of the companies interviewed were facing fierce international competition for their products. Unlike the traditional industries which traditionally enjoyed the linkages from other strong regional businesses, growth industries now in the metropolitan region suffer disadvantages from a lack of clustering. The concentrations of activity are not only in other areas of the country, but also increasingly abroad. Particularly for the manufacturers of semiconductor equipment, the growth in market share for Far East semiconductor manufacturers makes it difficult for equipment suppliers to compete from a U.S. base. As these regional companies have internationalized, some have been forced to establish production locations abroad. This transition to multinational production will increasingly make them resemble the companies in the professional nucleus segment, with regional activities concentrated in headquarters and R&D activities to support global production. However, most of the growth businesses are not facing such a strong imperative to internationalize. There will remain a base of integrated producers, particularly of technology-intensive products for a specific market application, as entrepreneurs continue to draw on the region's strengths and grow their businesses locally.

SUMMARY:

Independent final producers represent the heart of the metropolitan region's goods-producing economy. The companies in this segment are highly diverse in terms of industries, products and size. The majority of them can be described as residual from the industry concentrations that once made the region a worldwide manufacturing center. Factors keeping these residual companies in the region are:

- Sunk investment
- Proximity to large regional consumer markets
- A base of production and technical skills.

Of these factors, only the technical skills base also plays a role in generating new regional companies -- the spin-offs and entrepreneurial companies which have emerged as outgrowths of the region's special strengths, and which provide an important growth element in the manufacturing economy.

Since most of the employment in residual companies is in firms without enduring ties to the region, overall employment in the segment can be expected to decline. Some 50,000 jobs are currently vulnerable, in companies with impending decision points.

As with the subsupplier segment, retaining and renewing the skills base for blue-collar workers has come to represent an important factor in both maintaining jobs and providing a base for growth. Ensuring a continued supply of scientists, engineers and technicians from regional institutions is also a priority.

Actions taken to arrest the decline in employment and to build from the region's existing base must target two specific goals: strengthening the ties for existing companies, and boosting the transition of employment into the growth sectors.

CHAPTER 5
THE MARKETING INFRASTRUCTURE SEGMENT

New York was a center of commerce before it was a center for either manufacturing or finance. Over time it has evolved into a center for marketing, where fashion, advertising and media decision-makers help determine what Americans will spend their money on. The clothes Americans wear, the food they eat, the furniture they put in their houses, the cars they drive, the perfume they use, the medicines they take -- these and a thousand other purchase decisions are directly or indirectly influenced by the region's marketing infrastructure.

In many cases this marketing infrastructure supports and in turn is supported by a portion of the region's manufacturing base. We have identified at least 128,000 jobs, about 15% of the region's total traded base, in firms which derive much of their competitive strength from their proximity to the marketing infrastructure centered in the New York-New Jersey metropolitan region.

The largest share of this segment's employment is found in apparel or other textile-related industries. Cosmetics and personal care products also account for a substantial share, and some representation is found in other fashion-related industries such as jewelry and eyeglasses.

The primary link to the region for this segment is the heavy concentration of sales activity here. Beyond the selling activity itself, however, there exists an entire interconnected network which contributes to the region's competitiveness in this segment, a network which includes modeling agencies, advertising firms, the fashion press, photographers, free-lance designers for packaging, graphics, apparel, and textiles, and the sales and marketing organizations for many different products. The depth and span of this network, or "marketing infrastructure", is unique to the region.

The region's production employment in this segment has declined in recent years in favor of lower-wage areas within the United States or overseas. As a result, almost half the workers in this segment are now employed in non-production jobs -- headquarters, design-related, or logistical support positions -- rather than on assembly lines or machines. (Exhibit 5-1).

Non-production employment in this segment is secured to the region by its strong ties to the marketing infrastructure. We estimate that almost 60% of the segment's

jobs are in firms which will have stable or increased employment. Production activities in apparel businesses and in some parts of the cosmetics industry are still highly labor intensive however, and therefore subject to continuing threats from lower wage-areas, both domestic and international. Some 63,000 jobs are included in the vulnerable category.

Apparel and textile-related industries have always been a major force in the New York regional economy, and they still employ more workers than any other industrial sector -- about 154,000 workers in the traded parts of the business, compared to 126,000 in printing and publishing, the second largest category. The apparel industry will therefore serve as the primary model for our discussion of the ties between a marketing infrastructure and manufacturing employment -- particularly in production jobs -- which give this segment its vitality in the New York-New Jersey metropolitan region.

CLASSIFYING BUSINESSES IN THE APPAREL INDUSTRY

The apparel industry in the United States and elsewhere throughout the world can be broadly divided between design-to-marketing logistics activities and production activities. Performing the logistics activities are firms of varying sizes (often referred to as jobbers or manufacturers) who make all the arrangements for garments to enter the market, from choosing and creating designs to storing and shipping the final garment, but who do little actual production work themselves. Instead, they make use of a crowded field of contractors, both in this country and overseas, who own equipment and employ workers to sew the garments from fabric purchased by the logistics firms. Exhibit 5-2 graphically demonstrates the complicated flow of work in a typical apparel manufacturing arrangement.

We've classified as "production companies" both integrated manufacturers who produce garments as well as perform the necessary logistics activities, and the contractors, primarily involved in sewing garments but also providing cutting and various other services. Production companies can be further divided along two dimensions. The first cut is between manufacturers of high- or low-end garments which are differentiated mainly by the skill levels of their workers, product quality requirements, and margins received by the wholesaler. The second dimension is divided between "stable fashion" business where long lead times and long runs are normal, and "unstable fashion" business where

frequent fashion shifts, shorter lead times and shorter runs are the rule (Exhibit 5-3).

In practice, a great variety of players exists in the apparel industry: some manufacturers make wide use of contractors in addition to utilizing their own production facilities; some very large manufacturers have no facilities of their own; and some relatively small logistics-oriented firms achieve impressively large sales with few employees or facilities. Exhibit 5-4 shows examples of several combinations of logistics and production functions within individual firms.

In the metropolitan region, the industry is characterized by the very high percentage of employment in design-to-marketing logistics businesses as opposed to production businesses; by the relatively few employees in the high-end stable part of the business; and by the complete absence of production activity in the low-end, stable portion of the business (Exhibit 5-5). This pattern of employment reflects both the competitive strengths and weaknesses of the region as a location for apparel production, and the recent history of its apparel industry.

Employment Declines in the Region

Between 1950 and 1988, the region lost about 65% of its apparel employment, more than 320,000 jobs. In recent years, foreign competition has been blamed for the region's poor performance, but for the first three decades of this 40-year period the primary competition came from Southern states. During this period the region changed from being the undisputed center for apparel manufacturing in the country with 41% of total United States employment, to having only about 15% of total employment (Exhibit 5-6).

A dramatic increase in apparel imports beginning in the mid-1970s (Exhibit 5-7) has had an effect upon the country's overall apparel employment, but throughout the 1980s the region has continued to lose jobs at a more rapid rate than the country as a whole (Exhibit 5-8).

The major reason for this decline has been the reduction in the types of apparel industry businesses where the New York-New Jersey metropolitan region can maintain competitive advantage. The stable, low-end portion of the industry, which lends itself to limited automation while remaining relatively labor intensive, virtually disappeared

from the region, shifting at first to the South, where wages were lower, introduction of labor-saving equipment was easier, and land was available to build large new plants with modern equipment. Later, parts of this business shifted again to overseas locations.

Residual Employment in the Region

After almost 40 years of instability, the region is left with two major apparel categories where firms have managed to create a competitive advantage based on the region's marketing infrastructure: the design-to-marketing logistics sector; and the sector producing both high- and low-end garments which are exposed to frequent fashion shifts (Exhibit 5-9).

Firms in the logistics sector typically make use of a combination of production facilities, either within the region, elsewhere in the country, or at overseas locations. The central sales location for all of them, however, is in New York City. The fact that the region supports some 56,000 jobs in these activities is a direct reflection of the fact that New York remains the marketing and design center for apparel, even if it is no longer the production capital.

The production jobs which do remain are concentrated in firms which have forged close ties to the design and marketing infrastructure of the region. The 90,800 employees in this segment work for two basic types of firms: quick-turn-around companies able to respond to frequent fashion shifts and high-demand re-orders of popular items, and companies which emphasize production of expensive women's apparel requiring face-to-face contact between production supervisors and the marketers and designers who feed them work.

A modest employment level has also been retained in the high-end portion of the stable fashion business, primarily in the production of high-priced men's suits and coats by integrated manufacturers, a business where higher margins help offset the costs of the New York area. The main factors keeping this activity in the region are the availability of an aging, highly skilled workforce and the inertia and personal choice of managers who usually are descendants of the firms' founders. Firms in this part of the industry have a well-established reputation and customer base, and are less dependent on ties to the region's marketing infrastructure. We have included them in the "independent final producers" segment of the region's economy, which is discussed in Chapter 4.

THE REGION AS A DESIGN-TO-MARKETING LOGISTICS CENTER

The strength of the New York region as a marketing and logistics center is demonstrated by companies such as Liz Claiborne, which has climbed to more than a billion dollars in sales and more than 4,000 employees worldwide from its base in the region. It has done this without ever manufacturing a garment itself, relying totally on contractors for production, and without ever hiring a field sales representative. Customers come to the company, calling at its large showroom in New York City.

Even companies with neither production nor headquarters and logistics facilities in the New York-New Jersey metropolitan region maintain showrooms here, and view New York as the major locus for their sales activity. Virtually all U.S. textile companies, most of whom long ago moved south, also consider New York as their sales headquarters. Burlington Industries, for example, has its corporate headquarters and most of its manufacturing activities in North Carolina. Its chief executive officer, however, keeps his office in New York along with 400 marketing and sales people.

New York has been the marketing center for apparel for as long as there has been a national market. In recent years, significant secondary market centers have grown up in Atlanta, Dallas and Los Angeles. New Yorkers watched the growth of these markets with concern in the early days, but have relaxed as the pattern became clear. Buyers may now go to two sales centers: Los Angeles and New York, or Dallas and New York, but virtually every retailer of any size still comes to New York.

As retailing power increasingly becomes concentrated in a few giant department store chains, the region's role as a marketing center is likely to become even more predominant. All the major chains maintain buying staffs in the city and have established distribution centers in New Jersey.

This concentration of apparel sales activities has fostered an agglomeration of related activities. New York has as many apparel designers as any region in the world. It is also the design center for textiles and for accessories such as jewelry, handbags, belts, and millinery. Its Fashion Institute of Technology has 4,000 full-time students and 10,000 evening students, making it the largest such institution in the world. It has the largest concentration of models in the United States. It is the editorial headquarters for most of the country's fashion magazines and as a result, the center for

fashion photography studios. It is the department store capital of the country, and a leading international fashion trend setter.

THE REGION AS AN APPAREL PRODUCTION LOCATION

The clustering together of these activities ensures that the apparel marketing infrastructure of the region will remain strong for years to come. It is natural that logistics firms would co-locate with this infrastructure, attempting to derive competitive advantage in choosing designs for manufacture and in selling the final product.

It is not so clear that a strong marketing infrastructure will support strong manufacturing activity, and as we have seen, the importance of the region as a production center has plummeted.

The production sector of the regional apparel industry has undergone a massive transfer of production to the South and a flood of foreign imports from low-wage areas. The labor intensity and low-technology base required for most of the industry ensures that foreign countries and low-wage areas of the United States will always have a significant cost advantage over regional contractors.

Furthermore, while the region's skilled labor force has been able to maintain a quality advantage for some product lines, virtually every major competing region has been able to improve quality rapidly soon after entering the apparel market. Hong Kong contractors, for example, have taken their management and technical skills to country after country throughout Asia in order to escape bilateral import quotas and overcome changes in currency exchange rates. Some have even ventured to Central and South America. The result has been a dispersal of overseas apparel production flow to many different countries, usually originating from Japanese and Hong Kong sourcing arrangements (Exhibit 5-10). The export of management skills along with production contracts ensures that quality levels improve enough for new regions to become globally competitive quickly.

Therefore, the only part of the industry in which substantial regional production employment remains is the unstable fashion business, at both the high and low ends. This employment too -- like that of logistics firms -- depends on the competitive strengths of the region's marketing infra-

structure. Production firms which have survived in the region have generally done so by exploiting their ability to develop close ties to both logistics firms and to the marketing infrastructure itself. This ability has given them an advantage in those product lines which require short order runs and quick turnaround times, or close face-to-face interaction with designers and marketers -- requirements which are less cost effective to meet using distant production facilities.

The Competitive Advantage of Quick Turnaround Capability

Many regional contractors specialize in overseas reorders to replenish lines which were originally produced in large runs. These reorders often require quick response to prevent a customer from being out of stock in a particular item, and are usually too small to allow for economic overseas production. Quick response is also required for fashion shifts and opportunities; the longer planning cycles required in sourcing do not always allow for this flexibility. Another advantage is sometimes the logistics firm's unwillingness to lay out the advance financing necessary to source from overseas.

One of the keys to success in retailing apparel is to sell less merchandise at sale prices than your competitors. This puts an emphasis on not over-ordering, but also on getting reorders quickly when an item begins selling well. Since the separate selling seasons are only 2-3 months long, waiting more than 4-5 weeks for reorders may not be feasible.

In the fashion-stable product categories -- where lead times can be long and order sizes often large, logistics firms can take advantage of production in low-wage locations. The difference in hourly earnings for production workers between the New York-New Jersey metropolitan region and the major Far East apparel exporters is over $5.00 an hour (Exhibit 5-11). Given the importance of labor in a contractor's cost structure, as shown in Exhibit 5-12, shifting production to low wage areas can translate into a substantial cost advantage. Men's rack suits and shirts, trousers, and some lower-end women's wear have become standardized or fashion-stable products, amenable to long production runs and lead times. All these products are produced outside the high-wage metropolitan region. Given large enough scale in the logistics firms, even products in the more unstable fashion segment can be procured from the South and overseas. Liz Claiborne and other large apparel companies, for example, have sufficient scale to order large Far East

production runs. More than 20% of Liz Claiborne's work force, about 800 workers, is located overseas, making it possible to organize international production such that lead times are reduced greatly.

Quick Turnaround: An Example of Quick Response from Chinatown

Within the New York area, Chinatown, has become the center of quick turnaround sportswear production. About 20,000 people are employed here by a cluster of small contractors. The emergence of Chinatown as an apparel production center is the result of several factors: the availability of a pool of immigrant labor; the availability, originally, of relatively low-cost manufacturing space; the Chinese entrepreneurial ethic combined with the ease of entry into apparel production; the cohesion of the Chinese community, which facilitates labor mobility and recruitment; and lower labor costs (often as a result of longer hours rather than lower labor rates).

Contractor A, located in Chinatown exemplifies the "quick turnaround contractor." The company produces ladies' jackets and skirts for jobbers who do private label work for Saks and Bergdorf Goodman, and employs from 30-45 people, depending on seasonal variation. Though contractor A's products sell in high-end retail stores, his jobber customers are still very price sensitive. The contractor considers his edge over foreign producers to be quick turnaround. He is producing for a fashion-sensitive segment of the apparel industry, as opposed to products like men's shirts which are more fashion stable and can be made overseas. He can deliver 2-3 weeks after the order, as compared to 2-3 months for overseas production. Typical lot sizes are 600-800 garments, sometimes as small as 200 garments for a test run. The logistics of fabric purchase also tend to favor local (high-end) contractors such as contractor A: shipping and production planning can become too complicated when high-quality fabric is purchased in Italy and is shipped first to the Far East and later back to the United States.

The economics of contractor A's business also illustrates some of the challenges facing Chinatown's quick response contractors. His rent is now $8.00 per square foot. Increasingly, demand for commercial real estate in Manhattan has put upward pressure on rental prices for manufacturing space in Chinatown. Due to the high rents, many contractors have been forced to move out of Manhattan to other boroughs. The problem is compounded by the fact that contractors are

given short-term leases so that landlords can seize opportunities in the real estate market. Contractors are reluctant to invest in new equipment given this uncertainty.

Firms are also concerned about recruitment and retention of experienced labor. Because this company competes in a relatively high-end segment, it cannot train sewing machine operators on the job and still ensure the necessary quality levels, but it has difficulty finding the experienced operators it needs. And once it has found good workers, there is always the threat of losing them during a slow period. Some contractors will price under cost on jobs to keep their employees working and prevent them from shifting to another contractor.

Finally, this contractor like many others expressed concern about the expense of new equipment. The firm's pressing operations cannot keep up with its sewing operation, but removing this bottleneck would require an investment of $100,000 in new pressing equipment.

Quick Turnaround: Examples from the Knitwear Industry

Another significant cluster of contractors is the group of knitting mills in the Ridgewood area of Queens. The overall market for this part of the industry has been severely reduced by import competition. The remaining knitting mills have therefore been vying for business in a smaller local market, where reorders and small fill-in orders are virtually all that remain. Some expressed pessimism about the viability of their businesses. One mill owner stated, "We only get the leftovers. . . run lengths have gotten shorter. We used to get orders for a full year of sweaters." This company was able to operate only eight months out of last year. The owner also complained that the expected turnaround times were faster than he could accommodate.

The surviving mills are those which have been able to develop ways to exploit the need for quick turnaround. One mill owner has successfully used computer-aided design and pattern making to speed up response time. In addition, this mill competes in higher-priced product lines where its high quality work is considered important. Another mill was able to expand its business by selling direct to retail stores, bypassing the jobbers. This strategy allowed it to escape dependence on a few jobbers and to deal instead with a several hundred store chain. Success of the strategy depended on the

mill's ability to provide quick turnaround: it can change styles 7-8 times a year and deliver one month after the order is received, versus a typical turnaround of four months for overseas production.

The Competitive Advantage of Face-to-Face Contact

The second category of products where regional contractors can maintain competitive advantage includes those which require frequent face-to-face contact with the logistics firm's designers or production supervisors. Generally, this interaction is important only in the production of more expensive, high-end goods. These garments also require more highly skilled sewing machine operators than other products, and the reservoir of skilled workers remaining in the region from the years when it was the production center of the country provides an additional advantage.

To illustrate this type of interaction a comparison of the production flow for formal dresses with different price points is useful. For the lower-priced dresses which comprise the bulk of the market, the normal design process begins when the designer either sketches a concept or drapes fabric directly on a mannequin. A sample maker then produces a dress which might be given final adjustments after another fitting to the mannequin. The sample dress is then sent to the pattern maker, who prepares a detailed pattern for use in cutting fabric and as a sewing guide.

In the higher end of formal wear, however, an actual model who represents the "average" customer is used for fitting, rather than a mannequin. At one high-end firm which was interviewed, fitting sessions take place at least weekly and are attended by four key people -- the designer, the pattern maker, the production supervisor, and the owner of the firm. The pattern maker and the production supervisor both take note for future reference of peculiarities in the design, or of changes the designer wants to make after seeing the dress on a model.

After the pattern is made and the fabric is cut, the sewing contractor produces one sample dress for the production supervisor, who calls daily on the firm's five sewing contractors. The supervisor brings this sample dress back to the showroom, where it is again modelled by the fitting model in front of the designer and owner. The production supervisor notes their comments and returns the sample to the contractor.

Only at this point is the contractor authorized to proceed with production of the 100-200 dresses which make up an average run for this company.

The turnaround time for this process, from the first attempt by the designer to sketch the concept until delivery of the first garment, can be less than five weeks. It would be difficult to match this speed even from a Southern location, and almost impossible to achieve from an overseas location without incurring high logistical costs.

Similar patterns of quick response time joined with frequent interaction with the contracting firm's logistics staff are increasingly being seen in high quality knitwear. For example, a knitting contractor in Ridgewood might be asked to produce a sample of a particularly tricky design on short notice. The designer might come to the shop to watch the item take shape, or the contractor could have it delivered to a midtown design studio in a matter of hours after it comes off the knitting machine.

Regional manufacturers who provide quick turnaround capability together with close interaction with designers and production supervisors from logistical firms will retain significant advantages in certain portions of the apparel business over competitors who are located far from the marketing infrastructure of the region.

MARKETING INFRASTRUCTURE AND THE COSMETICS INDUSTRY

The cosmetics industry offers another example of firms which remain in the New York region because of its marketing infrastructure. Of the 15 top cosmetic manufacturers in the world, 12 consider New York as their marketing center. All have significant sales and marketing presence in the region, and cosmetics sector employment totals 38,500.

The Link to the Region's Marketing Activities

Cosmetics, like apparel, is a fashion business. Unlike apparel, however, the major competitive cost drivers for cosmetics are in advertising, packaging, and other marketing-related activities, which total almost 70% of total costs, rather than in manufacturing costs (Exhibit 5-13). Since the package of most cosmetics is primarily used to sell the product, and only secondarily to contain it, most cosmetics

companies make packaging costs the responsibility of the marketing division.

With marketing costs being such a huge portion of the total, it is not surprising that cosmetics firms have located both headquarters and production facilities near the marketing infrastructure of their industry. Revlon, Estee Lauder, Cosmair and Avon share among them two-thirds of all cosmetics sales through department stores, the most important channel for quality cosmetics. All four companies have headquarters and fully-integrated manufacturing facilities in the region, and also use subsuppliers throughout the region. A fifth large regional manufacturer, Shulton (subsidiary of American Cyanamid), is the brand leader among men's toiletries, which represents 25% of personal care product sales and is growing rapidly.

Cosmetics firms, like apparel firms, have close contacts with the region's design and advertising sectors. In-house and free-lance package designers are considered key to a product's success. Constant interaction with advertising agencies, most of which are headquartered in New York, is valued by top executives up to and including the CEO, since advertising campaigns are the lifeblood of a company's sales.

Compared to other consumer products, such as pharmaceuticals or food, individual cosmetic products have a relatively short product cycle; five years is typically the maximum. This aspect of the business -- like the rapid fashion shifts of the apparel industry -- helps tie the industry to the region's marketing infrastructure.

Regional Production Activities in Cosmetics

As with certain sectors of the apparel industry, a presence in the region based primarily on marketing needs has also spawned significant production activity in the cosmetics industry. Both headquarters (including marketing) and production-related employment in the cosmetics industry has grown for the largest companies during the 1980s, partly because of acquisitions. Indeed, cosmetics is one of the few industries to show a pattern of employment growth without a reduction in the number of production jobs (Exhibit 5-14).

Increasingly, cosmetics firms have been reluctant to make major investments to support growing sales, but have chosen instead to use contract subsuppliers for product filling

or packaging, or both. The New York-New Jersey metropolitan region offers a variety of small- and medium-sized firms which can handle these assignments, many of them having historical ties to the region's strong pharmaceutical sector.

The changing behavior of their customers has served as a further incentive for cosmetics firms to continue producing in the region. In recent years, major retailers in this intensely competitive industry have steadily lowered inventories to improve turnover, requiring shorter lead times and more "just in time" manufacturing capability from their suppliers.

As a result, proximity to the region is no longer a requirement for the marketing department alone. In fact, several cosmetic firms have attempted to relocate their manufacturing operations to the South only to close the facility several years later and return to the region by sub-contracting most manufacturing to full-service suppliers.

OPTICAL COMPANIES: ANOTHER EXAMPLE OF A FASHION BUSINESS

Liberty Optical of Newark, one of the leading suppliers of fashion eyeglass frames to retail optical superstores, attributes its ability to execute leading-edge marketing strategies to the wealth of fashion-oriented suppliers in the region. A Liberty Optical executive commented, "If one supplier cannot make a very difficult delivery schedule, someone else can. That's why the leading national retailers typically look to New York for their prime supplier network."

The dependence of fashion-oriented companies on the region's marketing infrastructure is being further enhanced by the trend of some companies to add "signature" products from related industries to their offerings. National eyeglass manufacturers, for example, have begun to market high-end, "complete look" product lines that integrate make-up and eyewear. Their region-based suppliers range from cosmetics companies to modeling studios to display houses, and even extend to sports and entertainment celebrities who act as spokesmen.

SUMMARY

The unique sweep and strength of the region's creative marketing infrastructure has held a number of manufacturing businesses in the area despite competitive pressures from lower-cost locations. Headquarters and design-related jobs in these businesses are relatively secure. Production-related activities -- now employing some 84,000 people -- are vulnerable, however. Most of these activities are performed by small contractors who are dependent upon a steady supply of moderately skilled workers, reasonably priced loft-type space, and an ability to provide quick response and/or close face-to-face contact with customers. Severe price competition exists between these regional subcontractors and other sourcing locations, and the limited scale of most firms remaining in the region makes it difficult for them to exploit new technologies. However, the combined impact of developing instability in several Far East sourcing locations, together with the increasing importance of frequent fashion shifts and inventory control, will make the next few years a time of opportunity for the region's remaining producers.

CHAPTER 6
THE SERVING THE SERVICES SEGMENT

The services sector supports a relatively small but important segment of the manufacturing economy in the New York-New Jersey metropolitan region. Manufacturers in the "serving the services sector" segment are tied to the region by the large market which exists in the region's services firms. The size of this market is enhanced by the fact that unlike other metropolitan areas, this region's service sector is a national center for several types of services. For example, the majority of advertising and legal services in New York are sold to clients outside the region, while in a smaller metropolitan area most of these services would be sold within the regional economy.

Firms for which this services sector is the primary market are included in the "serve the services" segment, the smallest segment of the region's manufacturing base with about 79,000 employees, or 9% of total traded employment. Virtually all these jobs are production-related, reversing the trend toward white-collar employment noted in nearly all other regional manufacturing segments. Despite the growth of the services sector during the 1980s (Exhibit 6-1), a number of factors cause us to estimate that over 40% of the jobs in this segment are in firms vulnerable to failure in the next few years. (Exhibit 6-2).

The services sector has been recognized as the major driver of the region's economy in the past decade. As shown in Exhibit 6-2, services employment grew at 3% annually from 1977 to 1986, versus an annual decline of 1.6% in the manufacturing sector. The traded services sector grew faster than the non-traded, at 3.5% versus 2.8% in non-traded.

Profile of the Firms in the Segment

Manufacturers in the serving the services segment fall into two groups: those who make a product that is specially tailored for a particular service, such as high quality frames for art galleries; and those who manufacture less differentiated products with high service level requirements -- for example, commercial printers who must provide 24-hour turn-around to their ad agency clients.

With the few exceptions described below, most of the manufacturers in the "serving the services sector" segment are small-scale, integrated producers, many of them privately held.

The manufacturing sectors to which they belong include:

- Construction materials
- Office furnishings
- Commercial printing and related printing trades
- Envelopes and other paper goods
- Arts/entertainment equipment and supplies.

The office furnishings and construction materials sectors are primarily non-traded, and are therefore not included in our discussion of the segment. The arts-related sector is mostly traded, but total employment of regional firms in this sector is estimated to be below 1,000. (Exhibit 6-3 shows the firms contacted in the Telesis phone survey.) Therefore, our discussion will be limited to the two categories which account for the bulk of traded employment in the segment, commercial printing and paper-related products, as summarized below:

Manufacturers Serving the Traded Services Sector

Commercial Printing and Related Trades	70,000
Paper-Related Products	8,000
Plastic Products (credit cards)	1,000
Total Employment	79,000

The Traded Services Sector

In 1986, the Financial, Insurance and Real Estate category (FIRE) accounted for the largest share -- 40% -- of traded services sector employment (Exhibit 6-4); advertising, legal and other business services represented another 20% of traded employment. These categories account for a significant portion of the demand for manufacturers in the serve the services sector.

Employment in the traded services sector is heavily weighted toward New York City, which accounted for 59% of the total in 1986. It is therefore not surprising that 45% of total commercial printing employment in the region is still

based in New York City. However, traded services employment in the New York and New Jersey suburbs grew at a much higher rate between 1977 and 1986 -- at 4.8% and 4.6%, respectively, versus 2.8% in New York City (Exhibit 6-5). While it is unclear where the final balance will be struck between New York City and the suburbs, it is likely that traded services will remain concentrated in a fairly close radius around the city because of close linkages among individual sectors.

We have expanded the definition of the services sector to include many of the headquarters offices and creative firms in the professional nucleus category. These operations resemble service firms in their high proportion of white-collar jobs and in their regional purchasing patterns, and therefore in their impact on the local manufacturing economy. Book and magazine publishers and Fortune 500 headquarters with marketing functions in the area fall into this expanded definition.

A number of local firms benefit from the central purchasing practices of financial and other firms headquartered in the region. A Long Island-based engraver, in many instances, produces business cards and stationery for all of a client company's senior executives, no matter where they are located in the United States.

The Weakness of the Financial Sector Link

The most interesting aspect to emerge from our study of the linkage between the segment and its customer base is the relative unimportance of financial services. While this is the largest employment category among the traded services, it accounts for only a small percentage of traded employment in the serving the services segment -- about 2,000 people who are linked directly to the rather specialized financial printing field. By far the bulk of the segment's employment is tied not to finance but rather to the region's marketing infrastructure, and serve a wide variety of service sector business.

For example, a Manhattan-based commercial printer may serve a number of financial firms, but typically will produce material such as direct mail pieces, product brochures, etc., for these firms' marketing activities. A Long Island-based engraver serving large financial firms produces more marketing-related material such as business cards, stationery and envelopes.

The Key Role of New York as the Nation's Creative Marketing Center

The survival of the manufacturers in the serving the services segment -- against somewhat difficult odds -- is directly linked to the importance of the region as a media buying center. New York is still the advertising capital of the nation:

Total U.S. Advertising billings -- 1988	$48.3 billion
- New York based billings -- 1988	21.1 billion
- New York as a percent of U.S.	43.6%
- Next largest city: Chicago	5.9 billion
- Chicago as a percent of U.S.	12.2%

Source: Advertising Age 3-29-89

The region's role as a media center is responsible for the fact that about 80% of the nation's general magazine publishers are headquartered here. Advertising revenues drive the economics of this business; it therefore makes sense for the sales and headquarters functions to be located in the nation's media center.

This concentration contributes to the manufacturing economy as well as to the services sector. For example, regional printing service firms, such as color separators, produce the final film version of the print advertisements designed by ad agencies. These separations are then used for the ads which fill the pages of the magazines, with actual printing done at various plants around the country.

In fact, consumer magazines account for a large portion of the print-related media billings category:

Total Print Billings	$14.0b	100%
- Point of sale, direct response	4.9	35
- Consumer magazines	4.4	31
- Newspapers	3.2	23
- All other	1.5	11

THE VIEW FROM THE DEMAND SIDE

A number of regional services sector firms were interviewed to determine the nature of their demand for local manufacturers, and how demand might change in the future.

Advertising and Marketing Firms

Advertising and marketing firms interviewed noted that they use regional printers because of their need for quick turnaround or for hands-on quality control at the printing site.

Noted one advertising art director, "Color is key. If the client asks us for another run of 100,000 copies of a brochure, we have to be sure that the colors are in register...If we have to get on a plane and go to Indiana, it costs time and money, and not just travel costs. If I get there and the printer's not ready, I just have to sit and wait -- stranded. However, in the region, I can leave my desk and in a relatively short period of time get to the printer, evaluate the run, and get back to my office." This interviewee noted that regional printers accounted for about 75% of the firm's total printing business.

Another interviewee, the head of a marketing services firm, said: "So much of what we do is a rush job, requiring quick turnaround. Even though it would be cheaper to go out of the region, you normally just don't have that kind of time to meet the client's time deadline. For this reason, about 98% of the printing I buy is within the region."

This mostly consistent vision of the strong link between advertising/marketing firms and regional commercial printers was clouded by a more skeptical view, expressed by the head of purchasing at a large publisher:

"To me, this 'short leadtime' issue boils down to a lack of planning discipline in the marketing department. Plus, I think historically a lot of commercial printing buying is relationship based. Although approximately 80% of our commercial printing needs are supplied currently by regional printers, I would expect over time to see some rationalization in favor of lower-cost out-of-town firms. There will be more pressure on the marketing department's costs and therefore a rationalization of printing practices. I don't know where it will end up -- maybe at about 50% regional."

If this executive's attitude is any predictor of the future, New York firms are destined for an even more competitive market situation than currently exists.

Financial Services Firms

Most banking, securities and insurance firms interviewed listed paper products -- envelopes, copier paper, etc. -- as their largest purchases. Individual firms differed greatly in both their current purchasing practices and their intentions for the future.

Some firms expressed a commitment to local vendor support:

> "Our use of local suppliers has grown significantly in the past five years; we are very satisfied with the service level of the local vendors and will continue to push orders their way, specifically for envelopes and other paper products." --Leading Money Center Bank
>
> "We make every effort to use local vendors -- it is in the best interests of the bank to help stimulate the local economy." --Leading regional bank
>
> "Our use of local vendors for paper products and business forms has increased because of the quicker turnaround." --Leading investment banking house

"We use local vendors for envelopes and engraving because we are able to directly monitor the quality control and because we get better turnaround times." --Big 8 Accounting Firm

Other firms are not as committed:

"We feel that national vendors are cheaper." --Leading investment bank

"Our use of local vendors has declined; larger national firms are better able to supply our national and international needs." --Leading insurance carrier

Arts Sector

In the arts sector, the quick turnaround requirements take a second seat to the need for top quality work. When local vendors can meet this need, the arts community will use them. However, proximity alone does not represent as great a value for this sector as it does for the marketing community:

"For small invitations for gallery openings, we may use a local printer or engraver. We would be very open to considering the use of local firms for larger jobs if a list of quality suppliers were presented to us." --Manhattan Museum

"In the art world, reproduction quality is at a premium. We may send to Japan for reproductions if we feel the quality is better. That being said, we will use local high quality framers and printers (some of those mentioned were outside the New York-New Jersey metropolitan region but within the Northeast). This really varies on a project to project basis." --Manhattan Gallery

MANUFACTURERS IN THE SERVING THE SERVICES SECTOR: THE LIKELY SURVIVORS

Although the services sector will remain a central force in the region's economy, this does not automatically ensure stability for the manufacturing jobs currently dependent on it.

The winners are likely to be both the very small-scale, owner-managed firms (fewer than 20 employees), and the larger-scale firms which survive either by supplying highly specialized products, or by integrating under one operation a variety of graphics arts, such as commercial printing, color separation, and design. The losers are likely to be those medium-sized firms, typically family-owned, with employment in the 35-70 range. While the smaller-scale firms may survive by providing high service levels and the larger-scale firms will survive by upgrading technology, many of the medium-sized firms lack the financial resources to invest in new technology or to sustain a relocation.

The Specialty Commercial Printers: A Relatively Stable Subsegment

Firms that produce highly specialized printing products for specific customer groups -- architectural firms, financial firms, and some publishers of financial reference guides -- are likely to remain a relatively stable source of manufacturing employment in the region. The region's concentration of customers in these specialized markets is large enough for these firms to reach and maintain an efficient operating scale. The financial printing specialty is probably most representative of these firms, most of which operate at levels of at least 100 employees--large for a commercial printer.

Financial printing is a small specialty field within commercial printing, dominated by a few firms that compete nationally and globally. Of the 52,000 commercial printers in this country, around 60 are financial printers. Of the 60, four firms (R.R. Donnelly, Bowne & Co., CP Young and Sorg) account for nearly 60% of total financial printing revenues, estimated at $700-$900 million in total. All have major facilities in the New York-New Jersey metropolitan region. The dominance of these large firms is explained by the large capacity and extensive communications infrastructure required to meet the needs of the legal and financial community working on "hot deals".

New York's predominance as a financial center has been challenged somewhat in recent years, but the region still accounts for an estimated 40% of the nation's financial printing business. It is likely that this small subspecialty of the serving the services segment will remain a fairly stable source of employment for the near future (five to ten years)

although individual firms that over-expanded in the boom of 1983-87 may need to consolidate. In fact, recently (August 88) both C.P. Young and Sorg announced that they were operating under Chapter 11.

It may seem counterintuitive to include a high-volume, space-intensive sector among the likely survivors in the region's manufacturing economy. However, financial printers are likely to remain in the region in spite of their heavy space and capital requirements because:

- demand for their services is highly time sensitive
- the demand is very difficult to predict
- the clients are said to be "extremely price insensitive."

For these reasons, customers are willing to pay the premium required to use printing facilities located within a short driving distance of the financial community. And as shown in Exhibit 6-6, financial printers have much higher profit margins nationwide than the average of commercial printers -- especially those in the New York metropolitan area.

In the longer term, however -- ten years or so from now -- the situation may not look as favorable. As one financial printer noted, "At some point, the need to print this material will disappear and then we won't be in the printing business at all; we will be in the information exchange business."

Another firm in the specialty printer category operates successfully on a large scale because of a proprietary manufacturing process geared to the needs of its specific customer base. However, in spite of this process advantage, the firm has begun to move manufacturing gradually to another part of the Northeast, outside the region, due to the relatively high labor, rent and other factor costs in this area. The major cost difference cited by this manufacturer resulted from work rules rather than hourly rates: press manned in New York City requires 6 men versus 4 men outside the region. In a business with returns of 3% before taxes, one percentage point on sales created by improved labor productivity is extremely significant.

Even so, because of tight service requirements from some regional customers, this firm anticipates that it will maintain some level of manufacturing in the region.

The Small but Growing Segments: Envelopes and Coated Papers

New York and Chicago have historically been the envelope production capitals of the country, and it appears that they will retain this status. In this region, envelope and coated paper categories have grown in employment at an annual rate of 3% from 1986 to 1988 while the manufacturing economy as a whole declined at a rate of 4.8%. The major factor tying these firms to the region appears to be the service levels required by their services sector clients.

MANUFACTURERS IN THE SERVING THE SERVICES SECTOR: THE VULNERABLE FIRMS

New technology developments are threatening employment in the serving the services segment -- particularly in commercial printing firms -- in two major ways:

- Certain new technologies may eliminate a function entirely, for example typesetting;

- New technology developments usually raise the capital investment and scale requirements, making it difficult for medium-sized firms to compete and survive.

Because of this, it appears unlikely that medium-sized family-owned firms will survive in great numbers. A number of the firms interviewed in this category, particularly those located in Manhattan, were pessimistic about the future.

> "The cost to keep up technologically for a firm our size is overwhelming. Ten years ago the requirement was for a four-color press. We bought one for $1.3 million -- a lot of money for a firm our size. Now, it's starting to be that designers look for the firm with the 6-color press -- this is where we have to compete. I am not optimistic about the future."
> --Owner of commercial printer, 45 employees.

Even more perplexing is the dilemma faced by medium-sized firms who have considered moving to more economic

locations within the region -- but are faced with the possibility of bankrupting themselves in the process.

> "We examined very carefully the possibility of moving to the Brooklyn Army Terminal from downtown Manhattan with assistance from the city. The location offered us savings of approximately 50% in rent over the next five to ten years. We would also be given moving expenses, and some financing support. However, there were some real problems: first, the moving expense support wouldn't get us half way down the block; and second and perhaps most important, we would have to retool the entire plant at a cost of about two million dollars--and there was no support envisioned for that. Finally, the move would have cost us at least two weeks in down time and frankly, the way business is, I could not afford the loss in revenues coupled with the huge capital investment--the savings would just not justify it." --Manhattan printer, approximately 50 employees. (This printer is now faced with the prospect of a rent increase of as much as 50% in the next five years, together with labor rate increases in his unionized shop.)

The possible survivors among the medium-sized firms -- particularly in Manhattan -- are those few firms that own their own real estate. As one commented, "Actually, technically I am now in the real estate business, not the printing business -- I make more every month from five floors of rent than I do from my commercial printing clients."

Consolidation offers an alternative to the real estate business for firms fighting to survive. A number of medium-sized firms with different specialties -- printing, color separation, typesetting -- have merged to provide a more full-service operation to a wider client base and to spread technological risks across several activities. There have been a number of examples of this in the past few years, and future consolidation among the medium-sized printers and trade firms can be expected.

ONGOING ISSUES FOR MANUFACTURERS IN THIS SEGMENT

Although, as noted above, some firms are better situated to survive than others, there are two major issues that emerged in our discussions which were shared across a wide variety of firms:

. Availability of skilled labor;

. Transportation and logistics.

Availability of Skilled Labor

Almost without exception, manufacturers in this segment said that one of their major problems was finding and keeping skilled labor. Skilled employees such as strippers -- who "strip out" the images from a photo-negative and need a steady hand, a good eye and substantial on-the-job experience -- are difficult to find for commercial printers.

Also, as more sophisticated machinery is put into place at typesetters, color separators and commercial printers, the need for employees with sound basic math and reading skills increases. One commercial printer showed us samples of employee applications, including results of a simple 8th grade level math test of ten questions. The average score was under 70%. In order to schedule and set up even fairly simple printing operations, basic math skills are a necessity.

Transportation and Logistics

Running a printing shop in Manhattan and trying to schedule daily deliveries of paper and supplies was described as a "nightmare". The problem is not limited to Manhattan-based firms, however; even companies on Long Island raised logistics as a key issue -- because most of their customers are in Manhattan. According to one interviewee, "I really can't afford to be more than a 1-1/2 hour drive from any of my customers -- so right now I am about as far out in the city as I can go. This limits my choice of real estate, since we've expanded and we need to move."

A number of interviewees cited poor transportation access for both employees and customers as one of the main reasons for the failure of the City's initiative to attract printers to the Brooklyn Army Terminal site.

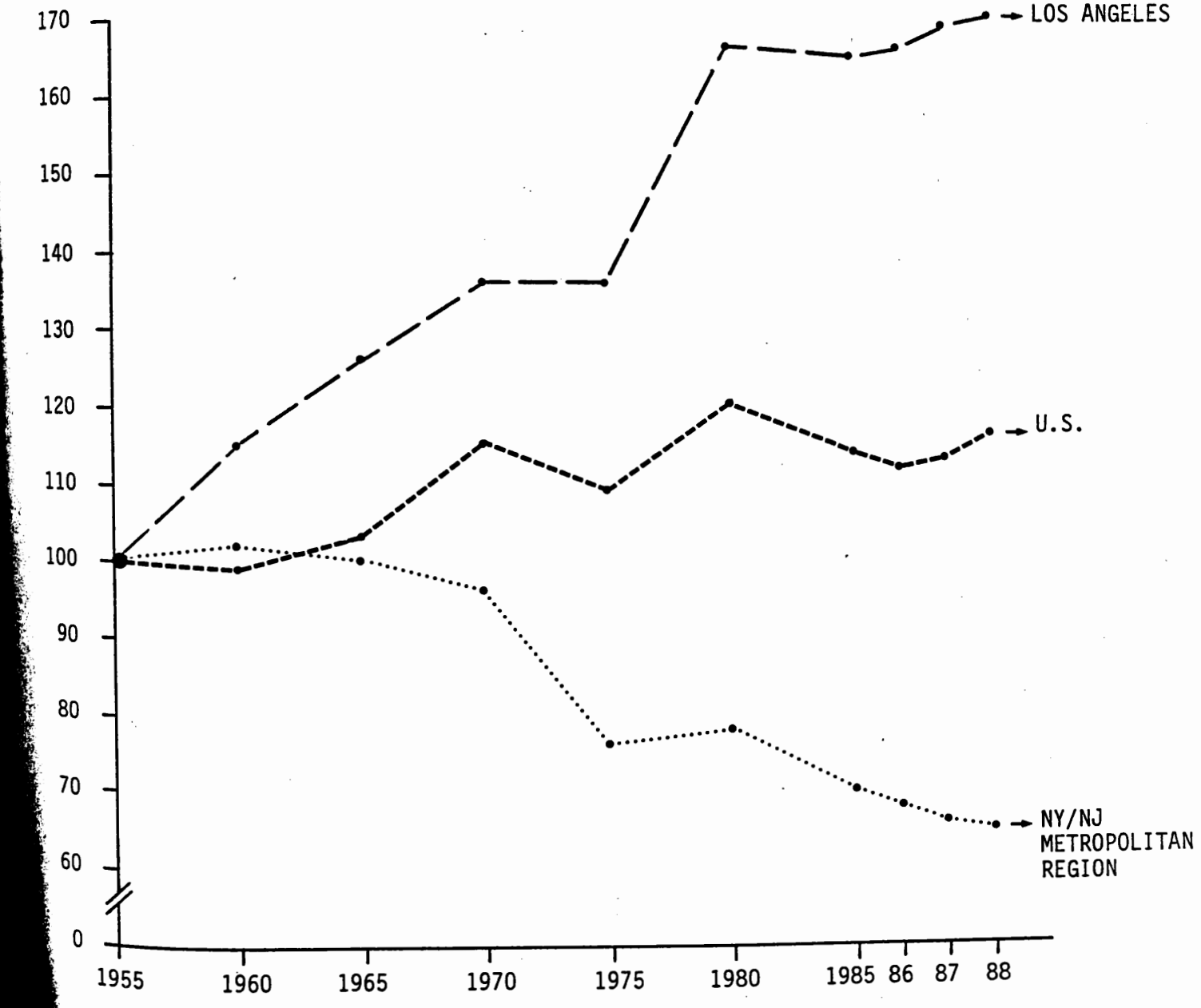
SUMMARY

The "serving the services sector" is a small but important segment of the region's manufacturing economy, with a high percentage of production-related jobs, a concentration in

the New York City area, and relatively high paying positions. The region's strength in these industries is derived from the huge market provided by its services firms, somewhat surprisingly led by the creative/marketing-related sectors rather than the financial sectors (Exhibit 6-7). The region suffers from high costs compared to other areas of the country, however, driven by rent, utilities, labor rates and work rules. The future looks most optimistic for small, owner-managed firms with the ability to respond quickly to specialized market requirements and for larger firms who can add technology and integrate functions. Major problems faced by printing firms, particularly, relate to maintaining and replacing a skilled workforce, raising enough capital to keep up with technology, and dealing with the costs of urban congestion.

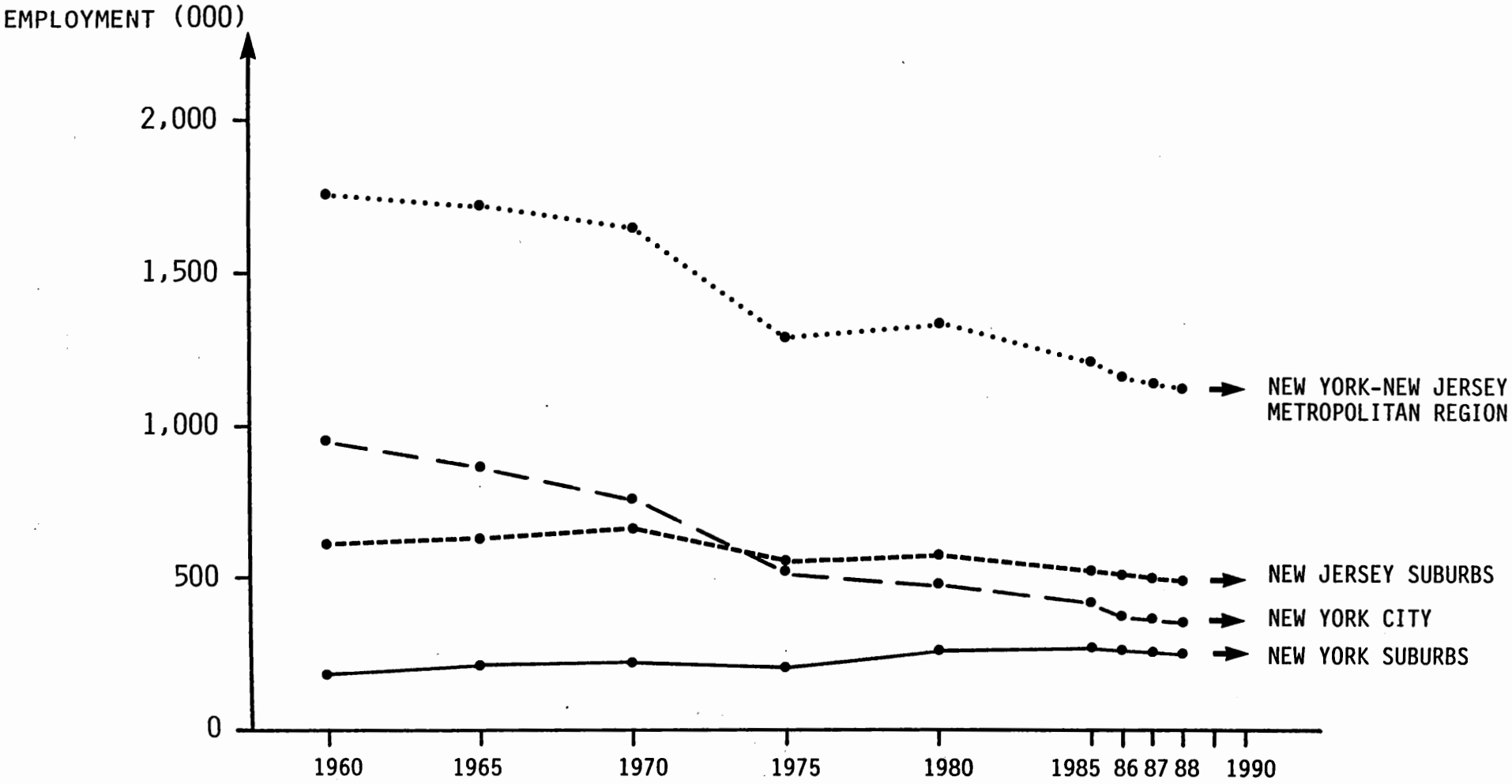
EXHIBITS

EXHIBIT 1-1
MANUFACTURING EMPLOYMENT
NEW YORK - NEW JERSEY METROPOLITAN REGION COMPARED
TO THE U.S. AND THE LOS ANGELES REGION
1955 = 100



SOURCES: EMPLOYMENT AND EARNINGS, BUREAU OF LABOR STATISTICS

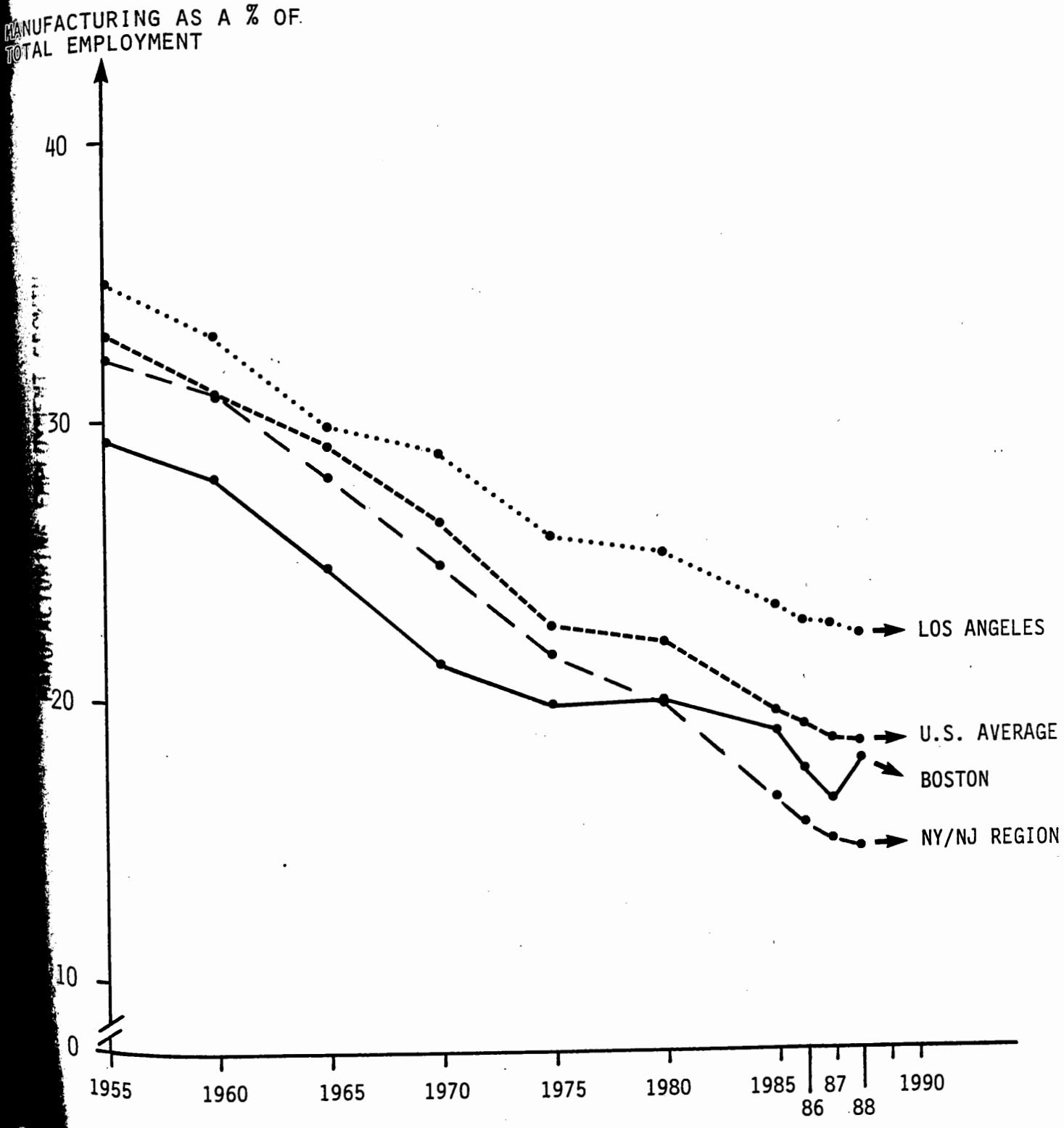
EXHIBIT 1-2
MANUFACTURING EMPLOYMENT IN THE
NEW YORK-NEW JERSEY METROPOLITAN REGION



SOURCES: EMPLOYMENT AND EARNINGS, BUREAU OF LABOR STATISTICS

EXHIBIT 1-3

MANUFACTURING AS A % OF TOTAL EMPLOYMENT:
NY-NJ METROPOLITAN REGION COMPARED TO THE U.S. AVERAGE,
AND TO THE LOS ANGELES AND BOSTON REGIONS



SOURCES: EMPLOYMENT AND EARNINGS, BUREAU OF LABOR STATISTICS

EXHIBIT 1-4

MANUFACTURING EMPLOYMENT GROWTH
NEW YORK - NEW JERSEY METROPOLITAN REGION COMPARED TO THE
U.S. AVERAGE, LOS ANGELES REGION AND BOSTON REGION
(COMPOUND ANNUAL GROWTH RATE PER ANNUM)

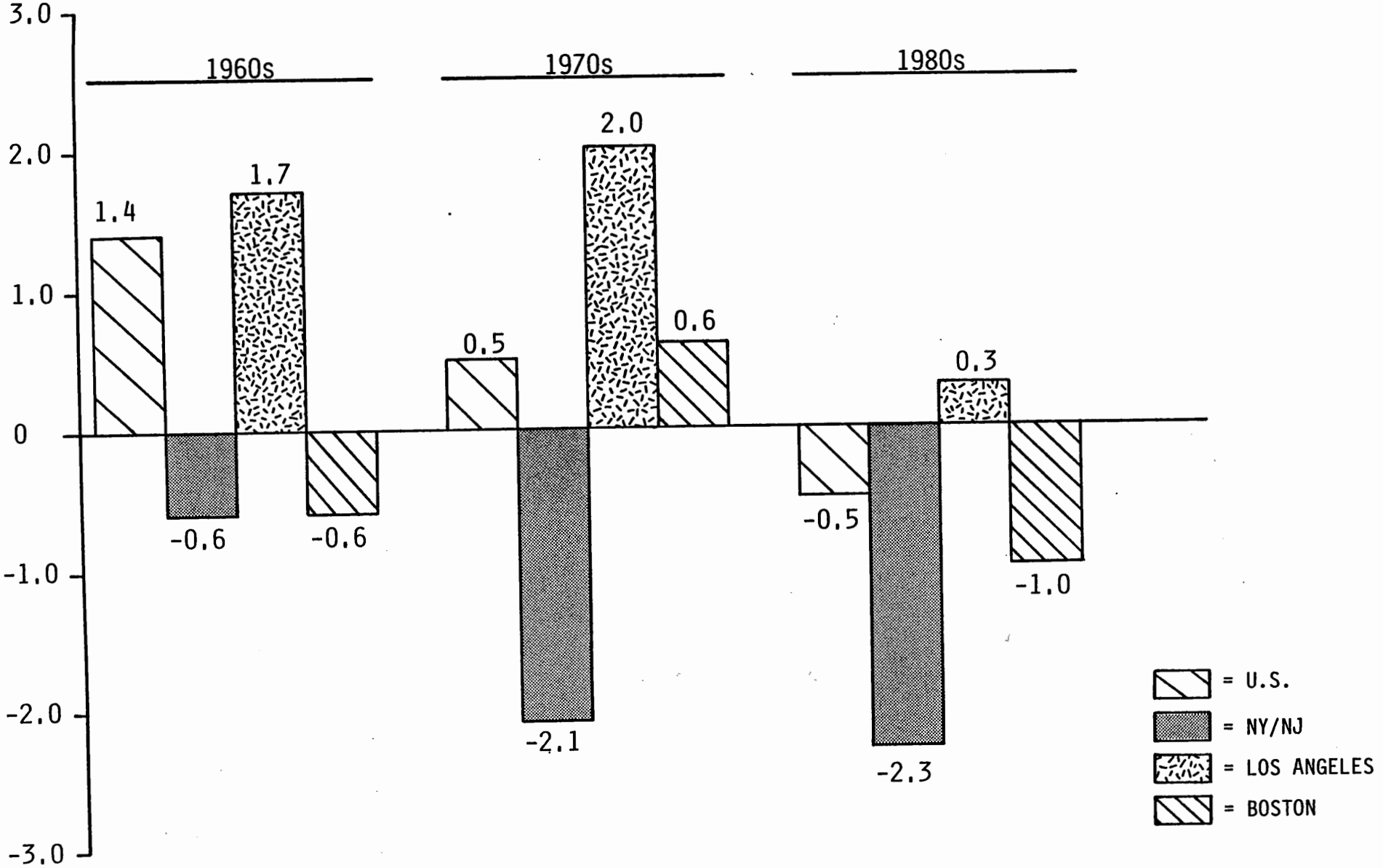


EXHIBIT 1-5
PHARMACEUTICAL INDUSTRY
COMPETITIVE COST DRIVERS
(AS % OF SALES)

	ETHICAL DRUG	GENERIC DRUG
MATERIALS (MFG.)	11	15
MANUFACTURING	9	14
MATERIALS (PKG.)	6	9
R&D	11	4
APPLICATION ENGINEERING		
MARKETING	15	9
SALES	17	30
HQ/PROFIT	31	19
TOTAL	100%	100%

EXHIBIT I-6

FIRMS INTERVIEWED BY THE STUDY TEAM

SECTOR	REGIONAL EMPLOYMENT (000)	# OF FIRMS INTERVIEWED	EMPLOYMENT OF FIRMS INTERVIEWED (000)	FIRMS INTERVIEWED AS % OF REGIONAL EMPLOYMENT
MFG.				
DEFENSE	102	44	56.3	55.2
ELECTRONICS	88	33	28.3	32.2
PHARM/CHEMICAL	134	57	83.7	62.5
APPAREL/TEXTILES	179	26	9.1	5.1
METAL FAB	62	18	5.7	9.2
MACHINERY	91	17	9.7	10.5
PRINTING/PUBL.	171	30	17.1	10.0
FOOD	66	20	19.1	28.9
MED. EQUIP.	25	5	5.5	22.0
PLASTIC PROD.	41	34	6.6	16.1
OTHER	152	27	6.0	3.9
TOTAL	1,111	311	247.1	22.2

EXHIBIT 1-7

NEW YORK-NEW JERSEY METROPOLITAN REGION
1988 MANUFACTURING EMPLOYMENT BY SIZE OF FIRM
(000)

	0-100		100-500		500+		TOTAL	
	TOTAL	TRADED	TOTAL	TRADED	TOTAL	TRADED	TOTAL	TRADED
DEFENSE	15	15	27	27	60	60	102	102
ELECTRONICS	29	29	28	28	31	31	88	88
PHARMACEUTICAL	0	0	3	3	50	50	53	53
CHEMICAL	12	12	16	16	14	14	42	42
COSMETIC	8	8	10	10	21	21	39	39
APPAREL	139	118	36	33	3	3	179	154
METAL FAB.	33	16	22	22	7	7	62	45
MACHINERY	55	45	14	14	22	22	91	81
PRINTING/PUB.	70	62	47	37	54	27	171	126
FOOD	11	4	17	10	38	27	66	41
MEDICAL EQUIP.	6	6	11	11	8	8	25	25
PAPER	15	10	20	18	5	1	40	29
PLASTIC PRODUCTS	18	18	21	21	2	2	41	41
UNCLASSIFIED	45	18	40	36	28	22	112	76
TOTAL	456	361	312	286	343	295	1,111	942

EXHIBIT 1-8

SEGMENTATION BY INDUSTRY
(000 EMPLOYEES)

	TRADED					
	PROFESSIONAL NUCLEUS	MARKETING INFRASTRUCTURE	SERVING THE SERVICE SECTOR	RESIDUAL SUBSUPPLIER	INDEPENDENT FINAL	TOTAL TRADED
APPAREL		111		28	15	154
CHEMICAL	10			3	29	42
PHARMACEUTICAL	50				3	53
COSMETIC		32		6	1	39
DEFENSE - AIRCRAFT	16			8	3	27
- ELECTRONICS SYSTEMS	26				10	36
- COMPONENTS/SUBSYSTEMS				39		39
ELECTRONICS	20			26	42	88
FOOD	20				21	41
METAL FABRICATION				28	17	45
MACHINERY	5			26	50[1]	81
PRINTING/PUBLISHING	56		70			126
PLASTICS			1	28	12	41
PAPER	3		8	18		29
MEDICAL EQUIPMENT	3	6			16	25
SUBTOTAL	209	149	79	210	219	866
						76[2]
TOTAL:						942

[1] INCLUDES AUTOMOTIVE ASSEMBLY

[2] INCLUDES 17,000 WHICH ARE IN PROFESSIONAL NUCLEUS SEGMENT, BUT ARE NOT CLASSIFIED BY INDUSTRY

EXHIBIT I-9

THE REGION'S TRADED MANUFACTURING EMPLOYMENT BY SEGMENT AND FUNCTION
(000 EMPLOYEES)

EMPLOYEE FUNCTION:	PROFESSIONAL NUCLEUS	MARKETING INFRASTRUCTURE	SERVING THE SERVICES SECTOR	RESIDUAL SUBSUPPLIER	INDEPENDENT FINAL	TOTAL
HEADQUARTERS	99	26		20	31	176
CREATIVE	33	35			1	69
ENGINEERING	42	2		12	20	76
SCIENTIFIC	21	2		1	5	29
SUBTOTAL	195	65	0	33	57	350
PRODUCTION-RELATED	31	84	79	177	162	533
TOTAL	226	149	79	210	219	883
UNCLASSIFIED						59*
TOTAL						942

*OF THE REGION'S TOTAL TRADED EMPLOYMENT, SOME 59,000 ARE EMPLOYED IN SMALLER INDUSTRIAL SECTORS WHICH WERE NOT ADEQUATELY REPRESENTED IN OUR SAMPLE OF INTERVIEWED FIRMS. WE HAVE USED A BASE OF 883,000 MANUFACTURING EMPLOYEES IN OUR ANALYSIS. FIRMS EMPLOYING ABOUT 30% OF THIS BASE WERE INTERVIEWED DURING THE STUDY.

EXHIBIT 1-10
BLUE COLLAR/WHITE COLLAR
EMPLOYMENT IN INTERVIEWED FIRMS

	% BLUE COLLAR	% WHITE COLLAR
MANUFACTURING SECTOR:		
DEFENSE	30.4	69.6
ELECTRONICS	21.1	78.9
CHEMICAL/PHARMACEUTICAL	29.0	71.0
APPAREL/TEXTILES	51.2	48.8
METAL FABRICATION	68.1	39.1
MACHINERY	77.8	22.2
PRINTING/PUBLISHING	36.1	63.9
FOOD	47.5	52.5
MEDICAL EQUIPMENT	16.2	83.8
PLASTICS	77.4	22.6
TOTAL	35.7	64.3

EXHIBIT 1-11
BLUE COLLAR/WHITE COLLAR
BREAKDOWN BY SEGMENT

	BLUE COLLAR (%)	WHITE COLLAR (%)
PROFESSIONAL NUCLEUS	14.2	85.8
RESIDUAL SUBSUPPLIERS	62.5	34.5
INDEPENDENT FINAL PRODUCT	57.7	42.4
MARKETING INFRASTRUCTURE	45.9	54.1
SERVING THE SERVICE SECTOR	87.0	13.0
TOTAL	35.7	64.3

EXHIBIT 1-12

THE REGION'S TRADED MANUFACTURING EMPLOYMENT BY DEGREE OF VULNERABILITY
(000 EMPLOYEES)

	OUTLOOK FOR FIRM			
EMPLOYEE FUNCTION:	GROWING	STABLE	VULNERABLE	TOTAL
HEADQUARTERS	12	142	22	176
CREATIVE	2	62	5	69
ENGINEERING	4	52	20	76
SCIENCE	3	26	0	29
SUBTOTAL	21	282	47	350
PRODUCTION-RELATED	36	273	224	533
SUBTOTAL	57	555	271	883

EXHIBIT 1-13
VULNERABILITY BY SEGMENT
(TRADED MANUFACTURING, 000 EMPLOYEES)

	PROFESSIONAL NUCLEUS	MARKETING INFRASTRUCTURE	SERVING THE SERVICES SECTOR	RESIDUAL SUBSUPPLIER	INDEPENDENT FINAL	TOTAL
GROWING	7	6	5	9	31	58
STABLE	190	101	39	78	146	554
VULNERABLE	29	42	35	123	42	269
SUBTOTAL	226	149	79	210	219	883

EXHIBIT 1-14

COMPETITIVE DRIVERS OF THE REGION'S MANUFACTURING SEGMENTS

(TRADED MANUFACTURING, 000 EMPLOYEES)

COMPETITIVE DRIVERS:	PROFESSIONAL NUCLEUS	MARKETING INFRASTRUCTURE	SERVING THE SERVICES SECTOR	RESIDUAL SUBSUPPLIER	INDEPENDENT FINAL	TOTAL
SCIENTIFIC/ENGINEERING	139				27	166
CREATIVE DESIGN	56	143	68			267
TIES TO FINANCE/LEGAL	31		11			42
REGIONAL BUSINESS SUBSUPPLIERS TO REGIONAL FACILITIES				84	29	29
INERTIA OF OWNERS				78	112	84
WORKFORCE SKILLS		6		44	19	190
ENTREPRENEURIAL SPIN-OFFS				4	32	69
						36
SUBTOTAL	226	149	79	210	219	883

EXHIBIT 2-1

LOS ANGELES, TENNESSEE AND NEW YORK-NEW JERSEY
AS HEADQUARTERS LOCATIONS

	NY REGION EMPLOYMENT	%	LA REGION[1] EMPLOYMENT	%	TENNESSEE[2] EMPLOYMENT	%
TOTAL MANUFACTURING EMPLOYMENT	1,111,000	100.0	1,273,500	100.0	500,000	100.0
HEADQUARTERS & R&D TOTAL	209,000	18.8	36,082	3.0	6,074	1.2
FOREIGN HQ & RD	62,700	5.6	11,288	1.0	2,261	0.5
U.S HQ & RD	146,300	13.2	24,794	2.0	3,813	0.7

[1]SOURCE: LA CHAMBER OF COMMERCE; INCLUDES LA COUNTY, RIVERSIDE, ORANGE, SAN BERNADINO AND VENTURA (1988)

[2]SOURCE: TENNESSEE ECONOMIC DEVELOPMENT AUTHORITY

EXHIBIT 2-2

LOS ANGELES AS A HEADQUARTERS: FOREIGN FIRMS

FOREIGN HEADQUARTERS PRESENCE IN LA IS PREDOMINANTLY JAPANESE (70%) WITH MOST EMPLOYMENT IN FIRMS IN THE AUTOMOTIVE AND ELECTRONICS SECTORS (70%).

	HQ EMPLOYMENT BY INDUSTRY				
COUNTRY	AUTO	ELECTRONICS	OTHER	TOTAL	%
JAPAN	4,744	2,574	550	7,868	70
KOREA	450	-	-	450	4
SINGAPORE		60		60	1
EUROPE	-	-	2,910[1]	2,910	25
TOTAL	5,194	2,634	3,460	11,288	100%

70% OF TOTAL

[1] MOSTLY FOOD-RELATED

SOURCES: LA CHAMBER OF COMMERCE; TELESIS RESEARCH AND ANALYSIS.

EXHIBIT 2-3

NEW YORK-NEW JERSEY FOREIGN-OWNED HEADQUARTERS CATEGORIZATION BY DATE OF ESTABLISHMENT

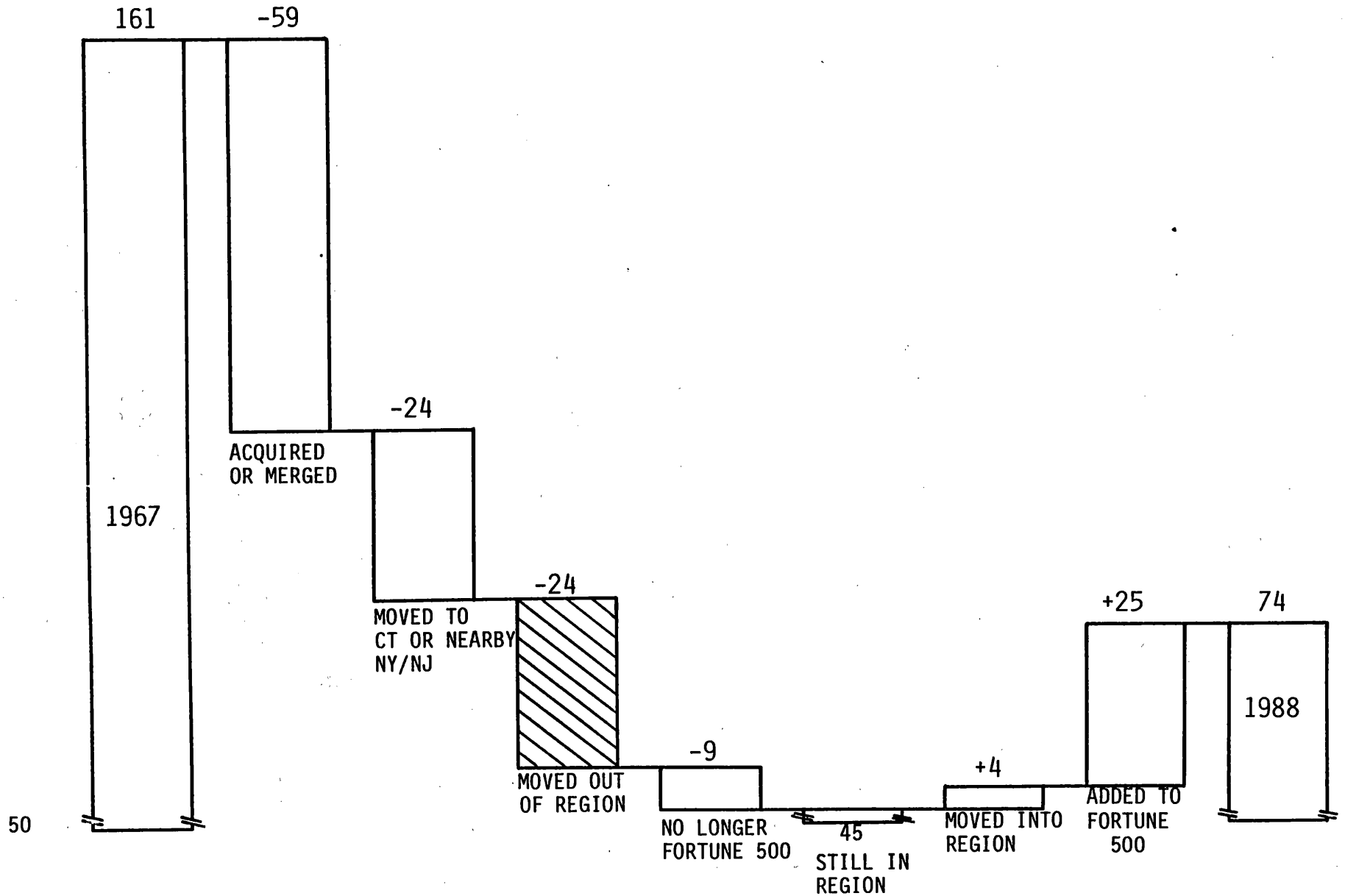
	ACQUISITION OF EXISTING COMPANIES	OLD ESTABLISHED FIRMS (PRE WWII)	NEW INVESTMENTS (WWII-1979)	NEW 1980'S	TOTAL
NUMBER OF FIRMS	26 (53%)	12 (25%)	10 (20%)	1 (2%)	49 (100%)
EMPLOYMENT	15,181 (31%)	22,816 (46%)	10,661 (22%)	800 (1%)	49,458 (100%)

SAMPLE EMPLOYMENT AS PERCENT OF TOTAL FOREIGN HEADQUARTERS EMPLOYMENT = 80%

SOURCE: TELESIS ANALYSIS

EXHIBIT 2-4

CHANGES IN THE NUMBER OF FORTUNE 500 FIRMS WITH HEADQUARTERS IN THE NEW YORK - NEW JERSEY METROPOLITAN REGION
1967 - 1988



SOURCE: TELESIS ANALYSIS OF FORTUNE 500 PUBLISHED DATA

EXHIBIT 2-5

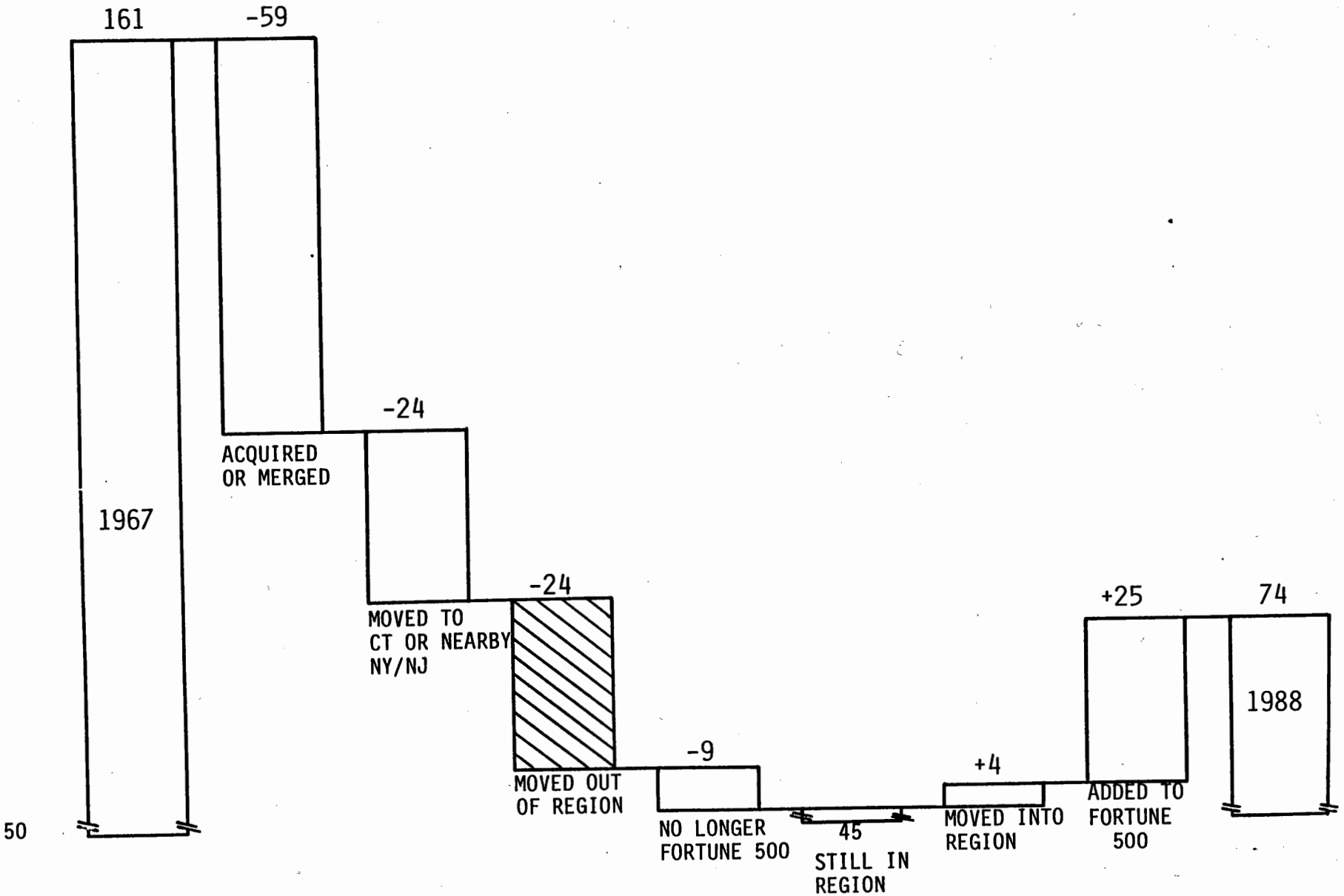
DECREASES IN NEW YORK CITY HEADQUARTERS EMPLOYMENT
1980 - 1989

	HEADQUARTERS EMPLOYMENT 1980		HEADQUARTERS EMPLOYMENT 1989
COMPANY A			
$5BB SALES	1,000	→ RESOURCES GROUP TO DALLAS (200)	500
39,400 EMPLOYEES		→ SPEC. PRODUCTS GROUP TO STAMFORD (50)	
		→ CORPORATE DOWNSIZING (250)	
COMPANY B			
> 70BB SALES		→ ADMIN. SYSTEMS TO NEW JERSEY (700)	300
100,000 EMPLOYEES	3,400	→ INT'L GROUP TO NEW JERSEY (650)	
		→ PRODUCTION DIVISION HQ TO CT. (100)	
		→ VARIOUS ACTIVITIES TO TEXAS (150)	
		→ CORPORATE DOWNSIZING (500)	
COMPANY C			
$2BB SALES	500	→ DISPERSAL TO LINE COMPANIES (300)	90
25,500 EMPLOYEES		→ CORPORATE DOWNSIZING (110)	
	3,900	(77%)	890

SOURCE: TELESIS INTERVIEWS

EXHIBIT 2-4

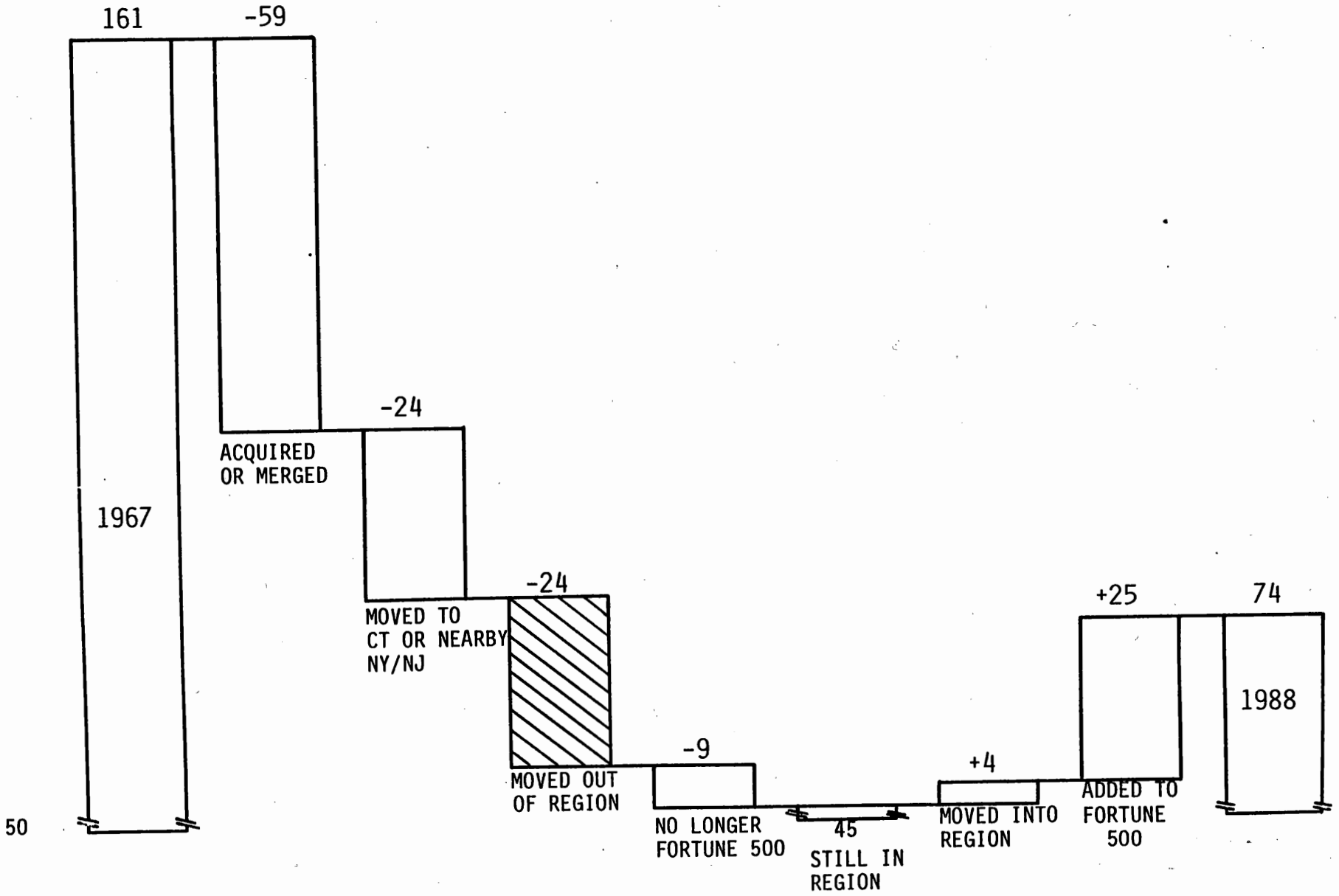
CHANGES IN THE NUMBER OF FORTUNE 500 FIRMS WITH HEADQUARTERS IN THE NEW YORK - NEW JERSEY METROPOLITAN REGION 1967 - 1988



SOURCE: TELESIS ANALYSIS OF FORTUNE 500 PUBLISHED DATA

EXHIBIT 2-4

CHANGES IN THE NUMBER OF FORTUNE 500 FIRMS WITH HEADQUARTERS IN THE NEW YORK - NEW JERSEY METROPOLITAN REGION 1967 - 1988



SOURCE: TELESIS ANALYSIS OF FORTUNE 500 PUBLISHED DATA

EXHIBIT 2-5

DECREASES IN NEW YORK CITY HEADQUARTERS EMPLOYMENT

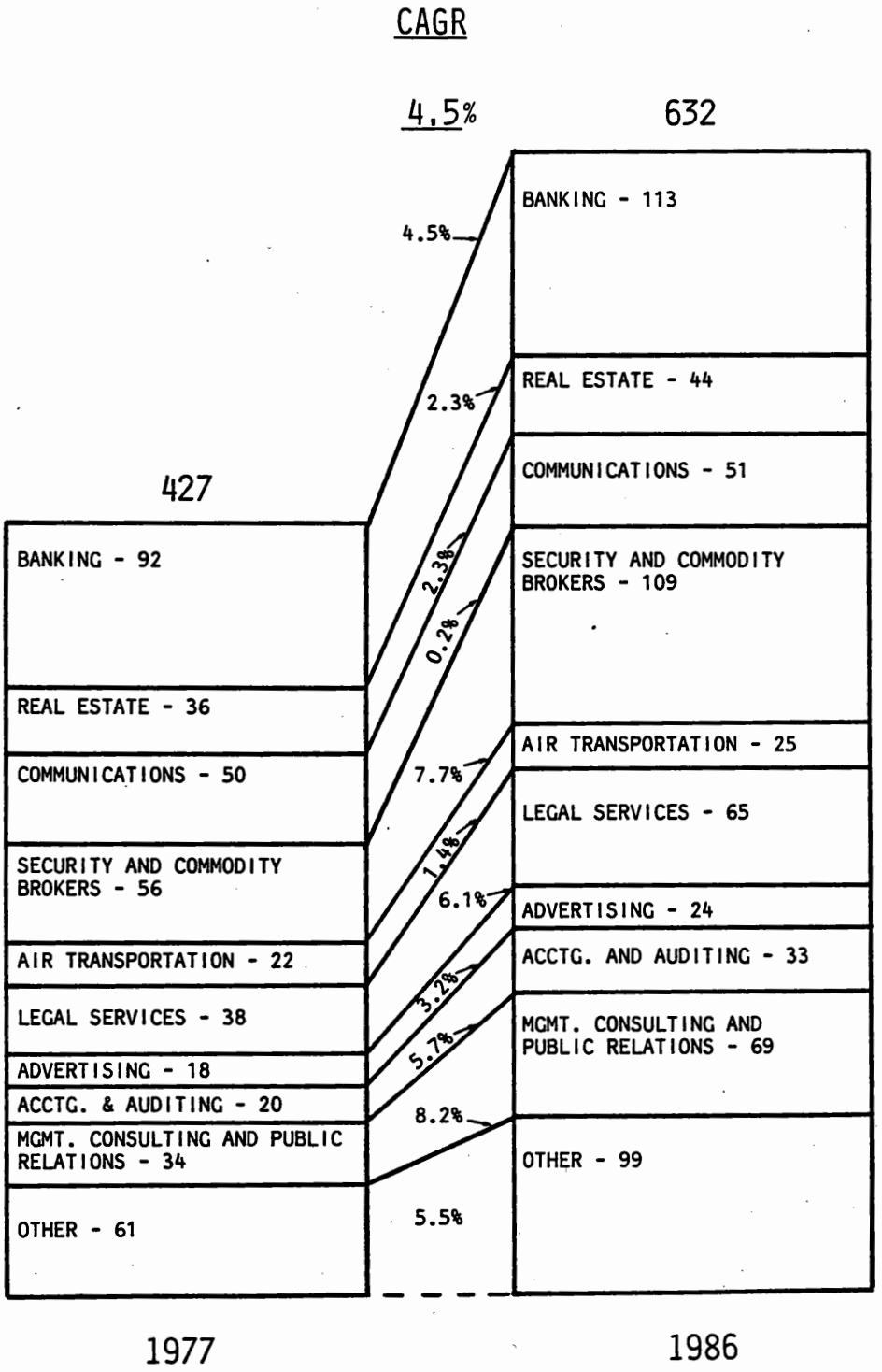
1980 - 1989

	HEADQUARTERS EMPLOYMENT 1980		HEADQUARTERS EMPLOYMENT 1989
COMPANY A $5BB SALES 39,400 EMPLOYEES	1,000	→ RESOURCES GROUP TO DALLAS (200) → SPEC. PRODUCTS GROUP TO STAMFORD (50) → CORPORATE DOWNSIZING (250)	500
COMPANY B > 70BB SALES 100,000 EMPLOYEES	3,400	→ ADMIN. SYSTEMS TO NEW JERSEY (700) → INT'L GROUP TO NEW JERSEY (650) → PRODUCTION DIVISION HQ TO CT. (100) → VARIOUS ACTIVITIES TO TEXAS (150) → CORPORATE DOWNSIZING (500)	300
COMPANY C $2BB SALES 25,500 EMPLOYEES	500	→ DISPERSAL TO LINE COMPANIES (300) → CORPORATE DOWNSIZING (110)	90
	3,900	(77%)	890

SOURCE: TELESIS INTERVIEWS

EXHIBIT 2-6

CORPORATE SERVICE FIRMS IN THE "CORPORATE HEADQUARTERS COMPLEX"
NEW YORK/NEW JERSEY REGION ESTIMATED EMPLOYMENT
(000 EMPLOYEES)



SOURCE: "THE CORPORATE HEADQUARTERS COMPLEX," COLUMBIA UNIVERSITY; TELESIS ANALYSIS.

EXHIBIT 2-7

KEY REGIONAL INDUSTRIES EMPLOYMENT TRENDS:
% JOB GROWTH
EARLY 1980'S - 1988

	DEFENSE AVIONICS ELECTRONICS	PHARMACEUTICALS	SPECIALTY CHEMICALS
PRODUCTION RELATED EMPLOYMENT	-25	-23	-22
R&D RELATED EMPLOYMENT	+19	+28	+27
HQ RELATED EMPLOYMENT	0	+10	
OVERALL REGION EMPLOYMENT GROWTH	0%	+ 1%	- 0.4%

SOURCE: TELESIS INTERVIEWS.

EXHIBIT 2-8
REGIONAL INDUSTRIAL EMPLOYMENT TRENDS:
COMPOSITION OF WORKFORCE
1988

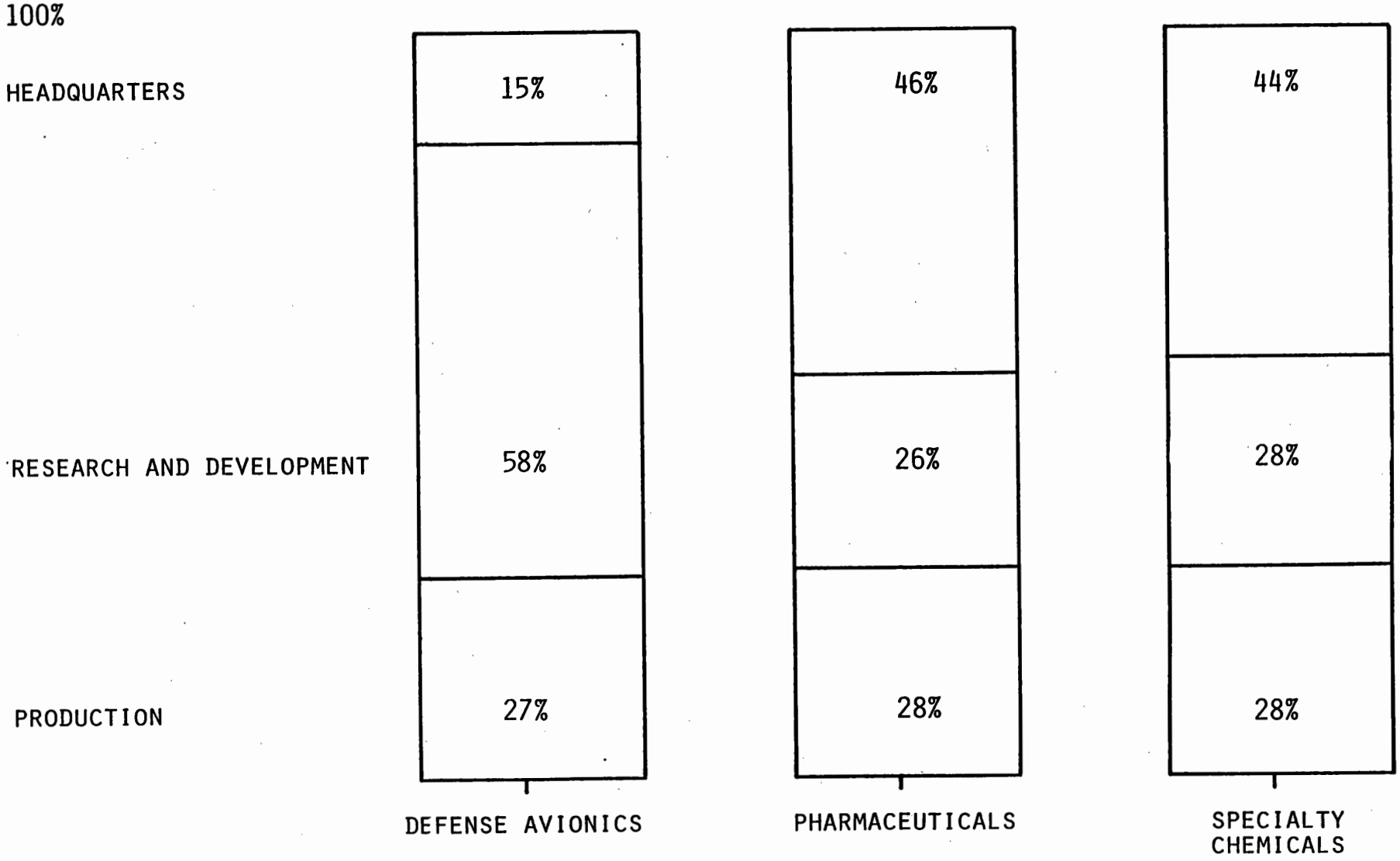
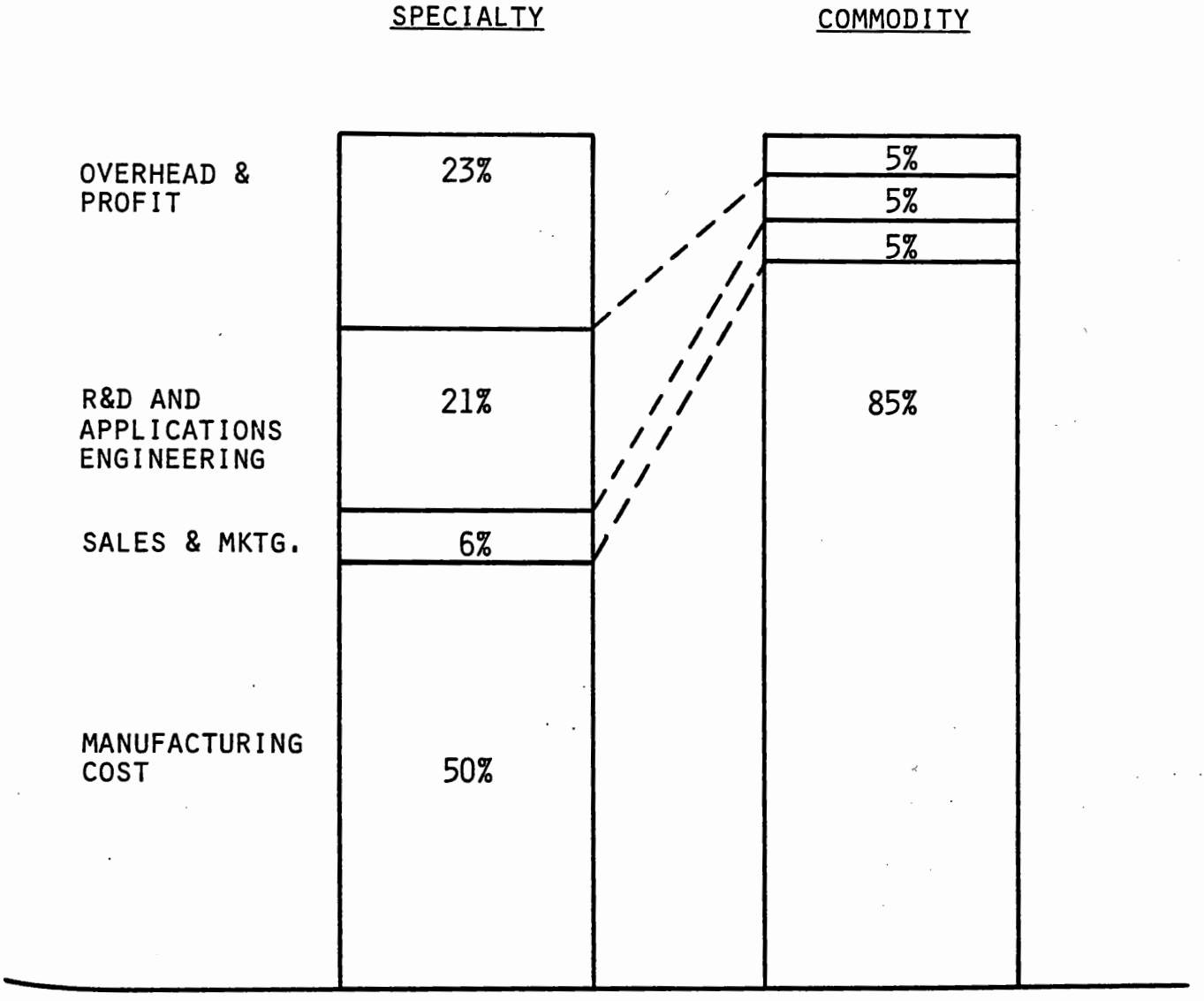


EXHIBIT 2-9
SAMPLE COST STRUCTURES
SPECIALTY VS. COMMODITY CHEMICALS
AS % OF SALES



NOTE: MANUFACTURING COST INCLUDES RAW MATERIALS AND DISTRIBUTION COSTS AS WELL AS PROCESSING COSTS SUCH AS LABOR AND ENERGY.

SOURCE: TELESIS INTERVIEWS

EXHIBIT 2-10
DEFENSE/ELECTRONICS
HISTORICAL LINKAGES

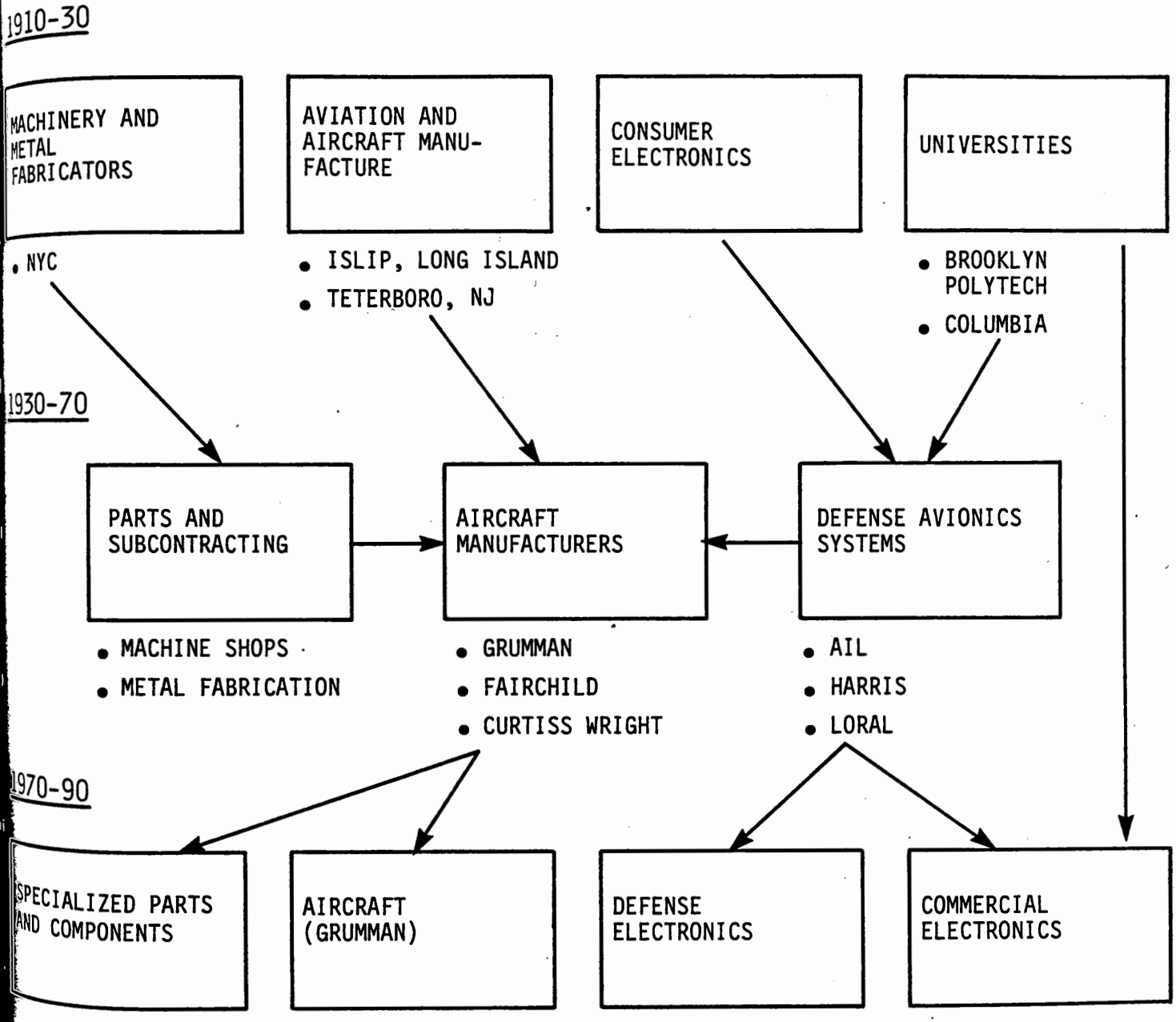


EXHIBIT 2-11
DEFENSE SECTOR
REPRESENTATIVE VALUE-ADDED STRUCTURES
FOR REGIONAL ACTIVITIES

	SYSTEMS INTEGRATOR (RADAR)	FINAL PRODUCER (COMPUTER PERIPHERALS)
FABRICATION	0%	5%
SUBASSEMBLY, ASSEMBLY AND TEST	18%	45%
R&D (COMPANY SPONSORED)	1%	7%
PRODUCT DESIGN/ ENGINEERING	53%	18%
MARKETING/ APPLICATIONS ENGINEERING	2%	4%
CONTRACTS/ACCOUNTING/ HQ	26%	21%
TOTAL VALUE ADDED	100%	100%
OTHER LOCATIONS:	VIRGINIA (FABRICATION)	FLORIDA (FABRICATION)

SOURCE: TELESIS INTERVIEWS.

EXHIBIT 2-12
PERIODICAL COST STRUCTURE

COST ELEMENT		PERCENT REVENUES	INCURRED WITHIN NY/NJ REGION
ADVERTISING EXPENSES:		9.31	YES
SELLING COSTS	5.93		
PROMOTION	3.38		
CIRCULATION EXPENSES[1]		27.20	NO
EDITORIAL		8.50	YES
PRODUCTION COSTS		25.11	NO
PAPER	12.29		
PRINTING	12.82		
DISTRIBUTION		6.99	NO
OF WHICH POSTAGE	5.54		
OTHER OPERATIONAL COSTS		3.41	NO
ADMIN & O/H		5.93	YES
TOTAL COSTS		86.45	
% IN NY/NJ REGION	28%		

[1] FULFILLMENT COSTS & PROMOTION COSTS; NOT PHYSICAL DISTRIBUTION.

SOURCE: MAGAZINE PUBLISHERS ASSOCIATION

EXHIBIT 3-1
REGIONAL SUBSUPPLIER EMPLOYMENT
BY INDUSTRY SERVED

	1988/89 EMPLOYMENT
INDUSTRY-SPECIFIC:	
DEFENSE-RELATED	47,000
APPAREL	28,000
ELECTRONICS	26,000
LIGHTING AND WIRING	14,000
CHEMICAL/PHARMACEUTICAL	9,000
MACHINERY/INDUSTRIAL	6,000
AUTOMOTIVE PARTS	6,000
SUB-TOTAL	136,000
GENERAL SUPPLIERS:	
METALWORKING SERVICES	10,000
GENERAL METAL PARTS	18,000
PLASTICS	28,000
PACKAGING	18,000
SUB-TOTAL	74,000
TOTAL SUBSUPPLIER EMPLOYMENT	210,000

SOURCE: TELESIS INTERVIEWS

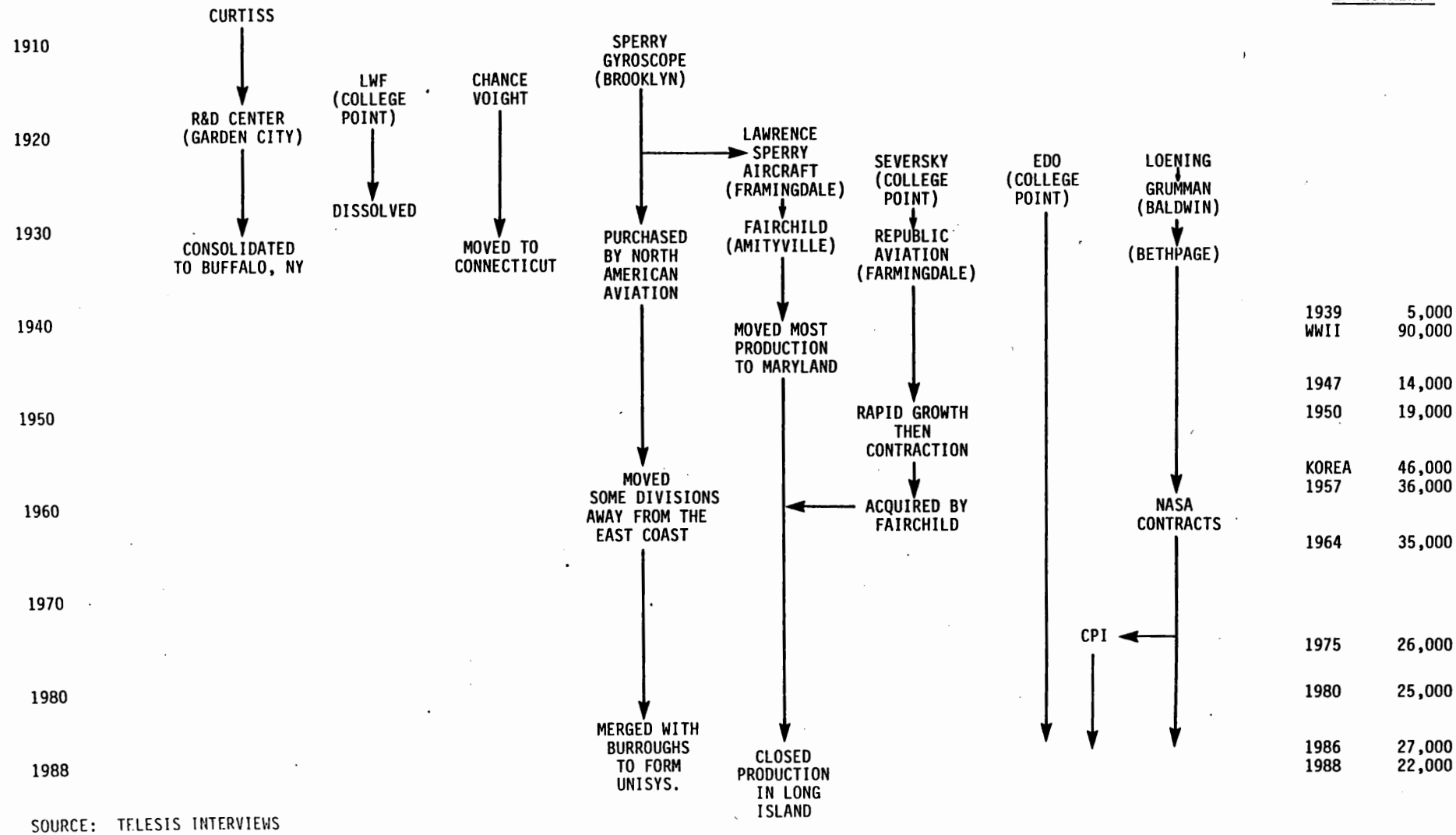
EXHIBIT 3-2
TIES TO THE REGION BY INDUSTRY SECTOR
(000 EMPLOYEES)

	TIE TO THE REGION				
INDUSTRY	EMPLOYEE SKILLS	RESIDUAL INERTIA	DEPENDENCE ON FINAL ASSEMBLY	SPIN-OFFS	TOTAL
DEFENSE-RELATED	14	13	17	3	47
ELECTRONICS	8	15	2	1	26
APPAREL	4		24		28
LIGHTING AND WIRING		14			14
CHEMICAL/PHARMACEUTICAL	3		6		9
MACHINERY/INDUSTRIAL	3		3		6
AUTOMOTIVE		6			6
METALWORKING SERVICES	1	6	3		10
GENERAL METAL PARTS	1	16	1		18
PLASTICS	10	8	10		28
PACKAGING			18		18
TOTAL SUBSUPPLIER EMPLOYMENT	44	78	84	4	210
% TOTAL	21%	37%	40%	2%	100%

77%

SOURCE: TELESIS INTERVIEWS

EXHIBIT 3-3
AIRCRAFT INDUSTRY EVOLUTION



LONG ISLAND EMPLOYMENT	
1939	5,000
WWII	90,000
1947	14,000
1950	19,000
KOREA	46,000
1957	36,000
1964	35,000
1975	26,000
1980	25,000
1986	27,000
1988	22,000

SOURCE: TELESIS INTERVIEWS

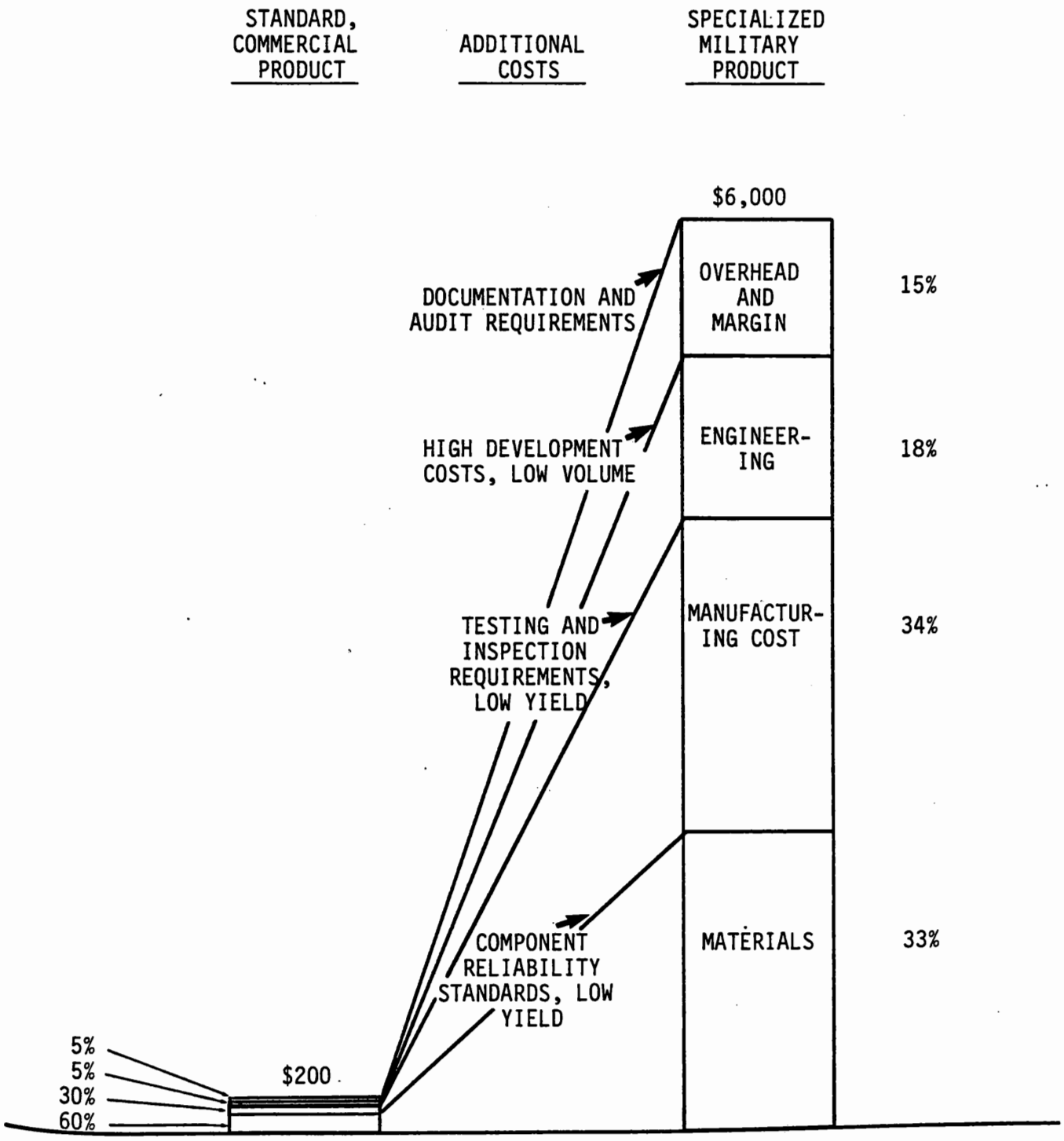
EXHIBIT 3-4
DEFENSE PRIME CONTRACT AWARDS BY STATE

	(% OF TOTAL DEFENSE CONTRACTS)			
	1951	1965	1980	1988
NEW YORK	18	10	9	6
NEW JERSEY	5	4	2	2
OTHER MID ATLANTIC	7	6	6	7
MID ATLANTIC SUBTOTAL	30	20	17	15
MASSACHUSETTS	3	5	6	5
CONNECTICUT	6	5	6	3
OTHER NEW ENGLAND	1	1	1	1
NEW ENGLAND SUBTOTAL	10	11	13	9
MID-WEST	31	13	11	9
TEXAS	2	6	8	7
VIRGINIA	1	2	5	5
FLORIDA	0	3	3	4
OTHER SOUTH	6	10	9	13
SOUTH SUBTOTAL	9	21	25	29
CALIFORNIA	13	22	21	19
MISSOURI	2	5	5	5
OTHER WEST	4	8	8	15
WEST SUBTOTAL	19	35	34	38
OTHER	1	0	0	0
TOTAL U.S.:	100%	100%	100%	100%

SOURCE: DEPARTMENT OF DEFENSE MILITARY PRIME CONTRACT AWARDS BY STATE.

EXHIBIT 3-5

COMPARISON OF STANDARD COMMERCIAL POWER SUPPLY WITH SPECIALIZED MILITARY PRODUCT



SOURCE: TELESIS INTERVIEWS

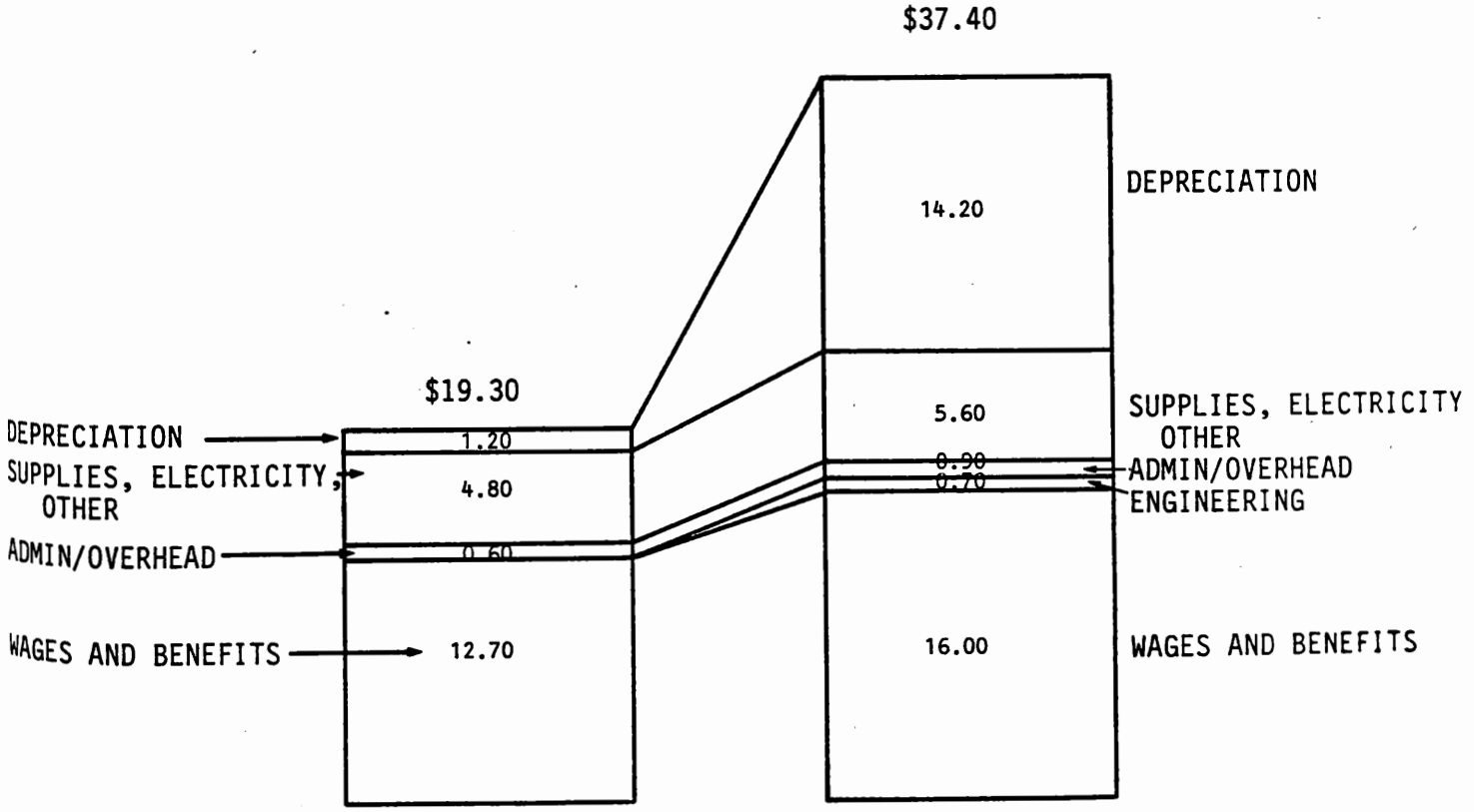
EXHIBIT 3-6
POWER SUPPLY MANUFACTURERS
COMPANIES INTERVIEWED

COMPANY NAME*	COUNTY	STATE	EMPLOYMENT
	SUFFOLK	NY	700
	SUFFOLK	NY	450
	ESSEX	NJ	200
	NASSAU	NY	150
	NASSAU	NY	150
	NASSAU	NY	150
	UNION	NJ	150
	SUFFOLK	NY	140
	SUFFOLK	NY	125
	WESTCHESTER	NY	100
	SOMERSET	NJ	45

SOURCE: TELESIS IN-PERSON AND TELEPHONE INTERVIEWS.

*COMPANY NAMES NOT PROVIDED AT THIS TIME

EXHIBIT 3-7
COMPARATIVE VALUE-ADDED STRUCTURE
GENERAL MACHINE SHOP VS. PRECISION MACHINE SHOP
($ PER HOUR OF OPERATOR TIME)

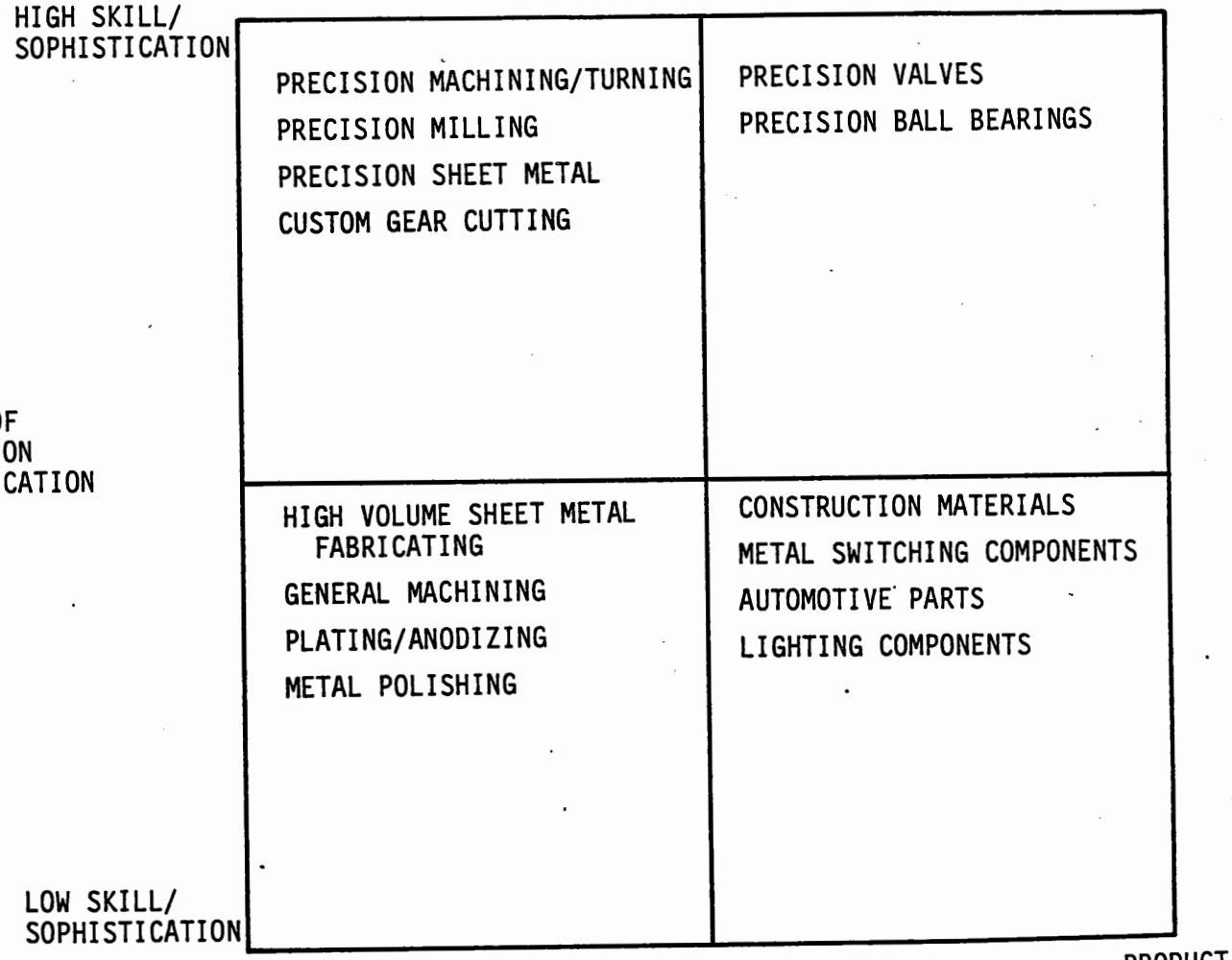


MACHINE TOOLS:	20 YEARS OLD; MANUAL	5 YEARS OLD; CNC
OTHER EQUIPMENT:	-	CAD SYSTEM

SOURCE: REPRESENTATIVE COST STRUCTURES FROM COMPANIES INTERVIEWED BY TELESIS.

EXHIBIT 3-8

MATRIX OF REGIONAL METALWORKING SUBSUPPLIERS TYPES OF PRODUCTS



SOURCE: TELESIS ANALYSIS

EXHIBIT 3-9
MATRIX OF REGIONAL METALWORKING SUBSUPPLIERS BY KEY CHARACTERISTICS

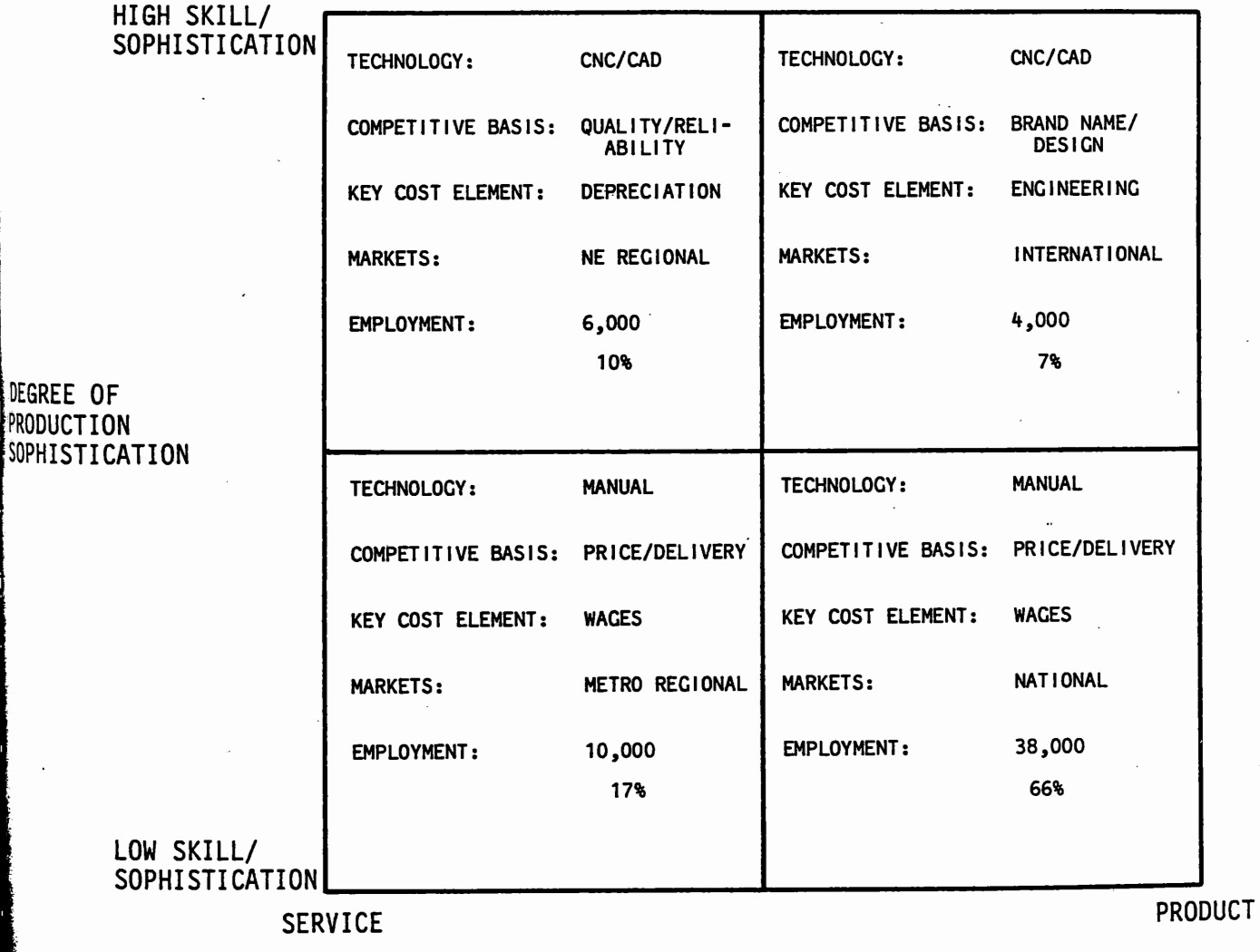


EXHIBIT 3-10

EXAMPLES OF SUCCESSFUL SUBSUPPLIER EXPORTERS

INDUSTRY SERVED	PRODUCTS	EMPLOYEES	% EXPORTS
AIRCRAFT	PRECISION MACHINING OF METAL PARTS	430	20%
DEFENSE ELECTRONICS	CRTS AND RF RECEIVERS	220	30%
	COMPUTER PERIPHERAL EQUIPMENT	600	15%
	MICROWAVE COMPONENTS	500	30%
ELECTRONICS	PRINTED CIRCUIT BOARDS	1,200	30%
	SPECIALTY SILICON RECTIFIERS	100	15%
LIGHTING & WIRING	SPECIALIZED CABLE CONNECTORS	550	15%
	SWITCHES AND LIGHTING COMPONENTS	2,000	10%
CHEMICAL/PHARMACEUTICAL	PETROLEUM REFINERY TEST EQUIPMENT	45	20%
	PACKAGING MACHINERY	115	50%
MACHINERY/INDUSTRIAL	PRECISION VALVES	200	30%
GENERAL INDUSTRIAL	PACKAGING MACHINERY	90	20%

SOURCE: TELESIS INTERVIEWS

EXHIBIT 4-1
INDEPENDENT PRODUCERS SEGMENT
TIE TO THE REGION

CATEGORY	TIE TO THE REGION	000 EMPLOYEES	% TOTAL
RESIDUAL:	BLUE COLLAR & TECHNICAL SKILLS	46	21%
	REGIONAL MARKET	29	13%
	SUNK INVESTMENT	112	51%
GROWTH:	ENTREPRENEURS/SPINOFFS	32	15%
TOTAL		219	100%

EXHIBIT 4-2
INDEPENDENT PRODUCERS SEGMENT
BREAKDOWN OF EMPLOYMENT BY INDUSTRY
1988

	TOTAL EMPLOYEES	% TOTAL
TRADITIONAL INDUSTRY CONCENTRATIONS:		
DEFENSE-RELATED PRODUCTION	13,000	
METAL PRODUCTS[1]	17,000	
MACHINERY[2]	41,000	
AUTOMOTIVE ASSEMBLY	9,000	
CHEMICALS	33,000	
FOOD	21,000	
PLASTICS	12,000	
APPAREL	15,000	
SUBTOTAL	161,000	74%
"NEW" REGIONAL INDUSTRIES:		
NON-DEFENSE ELECTRONICS	42,000	
MEDICAL EQUIPMENT	16,000	
SUBTOTAL	58,000	26%
TOTAL SEGMENT	219,000	100%

[1] OFFICE EQUIPMENT, TOOLS, HARDWARE, ETC.
[2] INDUSTRIAL EQUIPMENT, APPLIANCES, MOTORS, PUMPS, ETC.

SOURCE: TELESIS INTERVIEWS, SIC CODE DATA

EXHIBIT 4-3

INDEPENDENT PRODUCERS SEGMENT

TIE TO THE REGION, BY INDUSTRY

(000 EMPLOYEES)

INDUSTRY	TIE TO THE REGION				TOTAL
	RESIDUAL SKILLS	REGIONAL FACILITY	RESIDUAL INERTIA	ENTREPRENEURS/ SPINOFFS	
DEFENSE	12			1	13
NON-DEFENSE ELECTRONICS	13		12	17	42
MEDICAL EQUIPMENT	8			8	16
METAL PRODUCTS			17		17
MACHINERY	2	1	33	5	41
AUTOMOTIVE ASSEMBLY			9		9
CHEMICALS	3	4	22		29
PHARMACEUTICAL		1	2	1	4
FOOD		21			21
PLASTICS		2	10		12
APPAREL	8		7		15
TOTAL SEGMENT	46	29	112	32	219

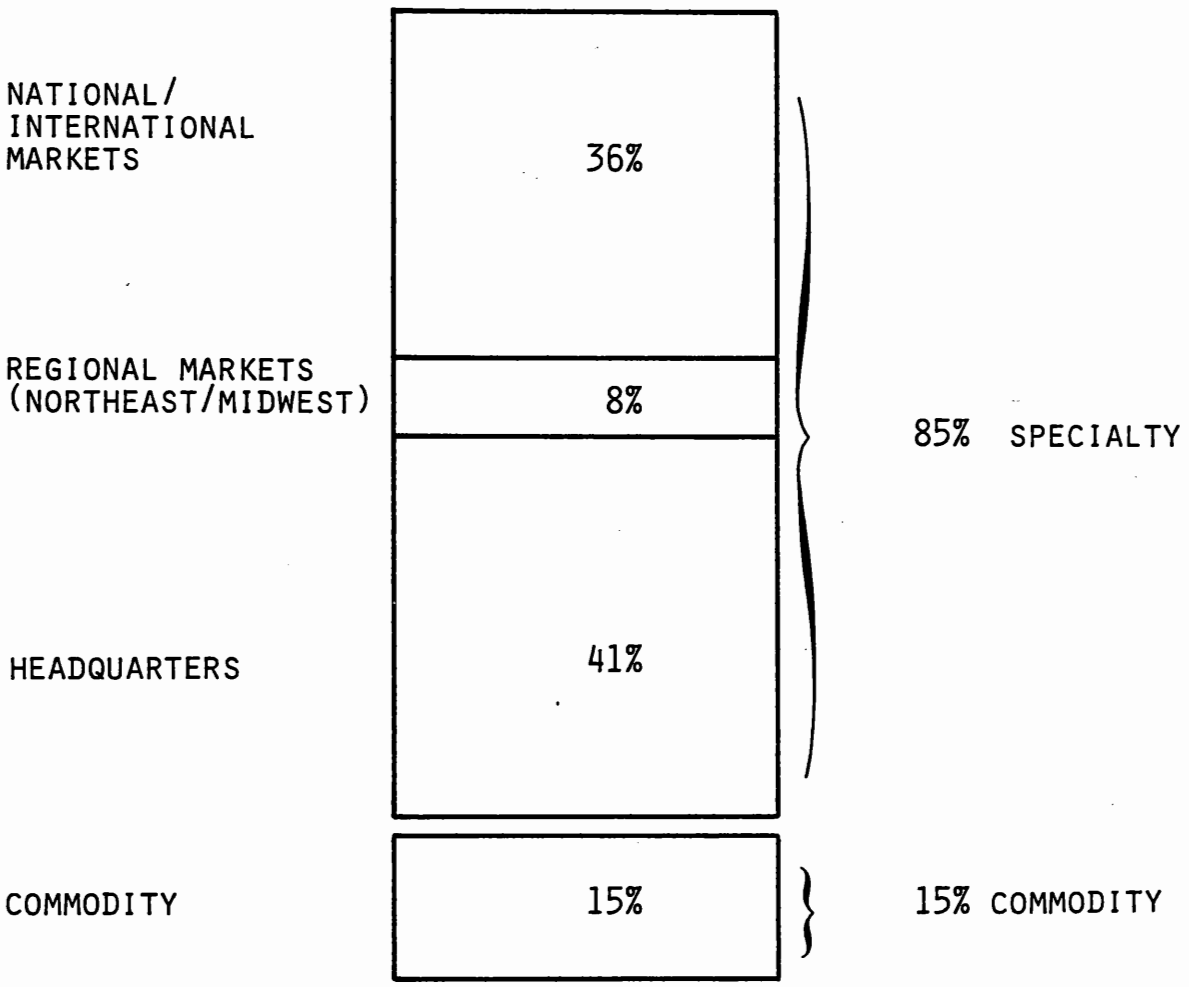
EXHIBIT 4-4
INDEPENDENT PRODUCER SEGMENT
CATEGORIZATION BY DEGREE OF VULNERABILITY

	EMPLOYMENT	% OF TOTAL
GROWTH	31,000	14%
STABLE	140,000	64%
VULNERABLE	45,000	21%
GONE [1]	3,000	1%
TOTAL	219,000	100%

SOURCE: TELESIS INTERVIEWS

[1] COMPANIES THAT HAVE DECIDED TO LEAVE THE REGION, BUT HAVE NOT YET RELOCATED.

EXHIBIT 4-5
CHEMICAL INDUSTRY EMPLOYMENT BY SEGMENT
NEW YORK-NEW JERSEY METROPOLITAN REGION
1988



SOURCE: TELESIS INTERVIEWS

EXHIBIT 4-6
DEFENSE AVIONICS EVOLUTION

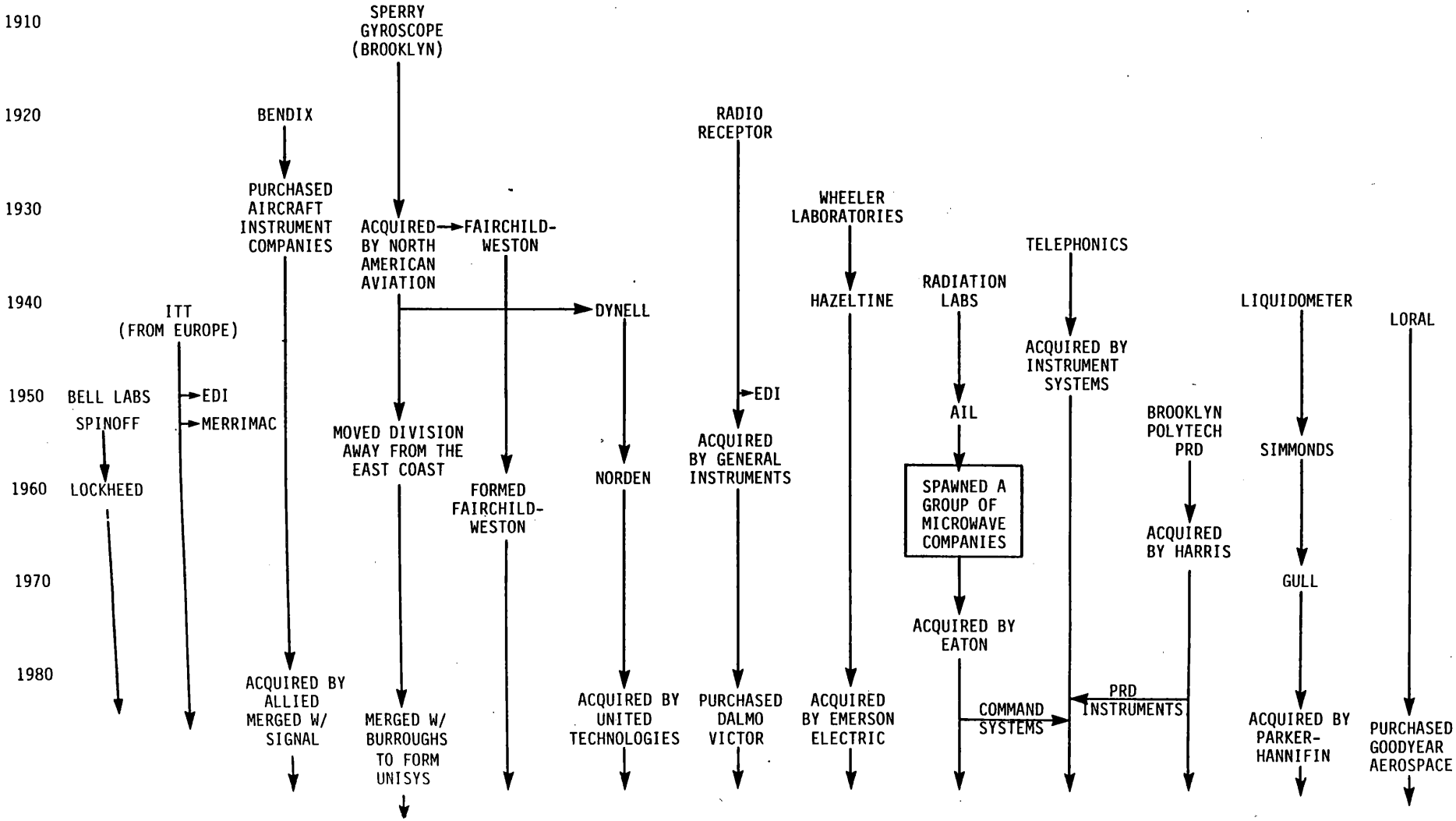


EXHIBIT 4-7
DEFENSE SECTOR
RECENT JOB LOSSES AT MAJOR REGIONAL CONTRACTORS

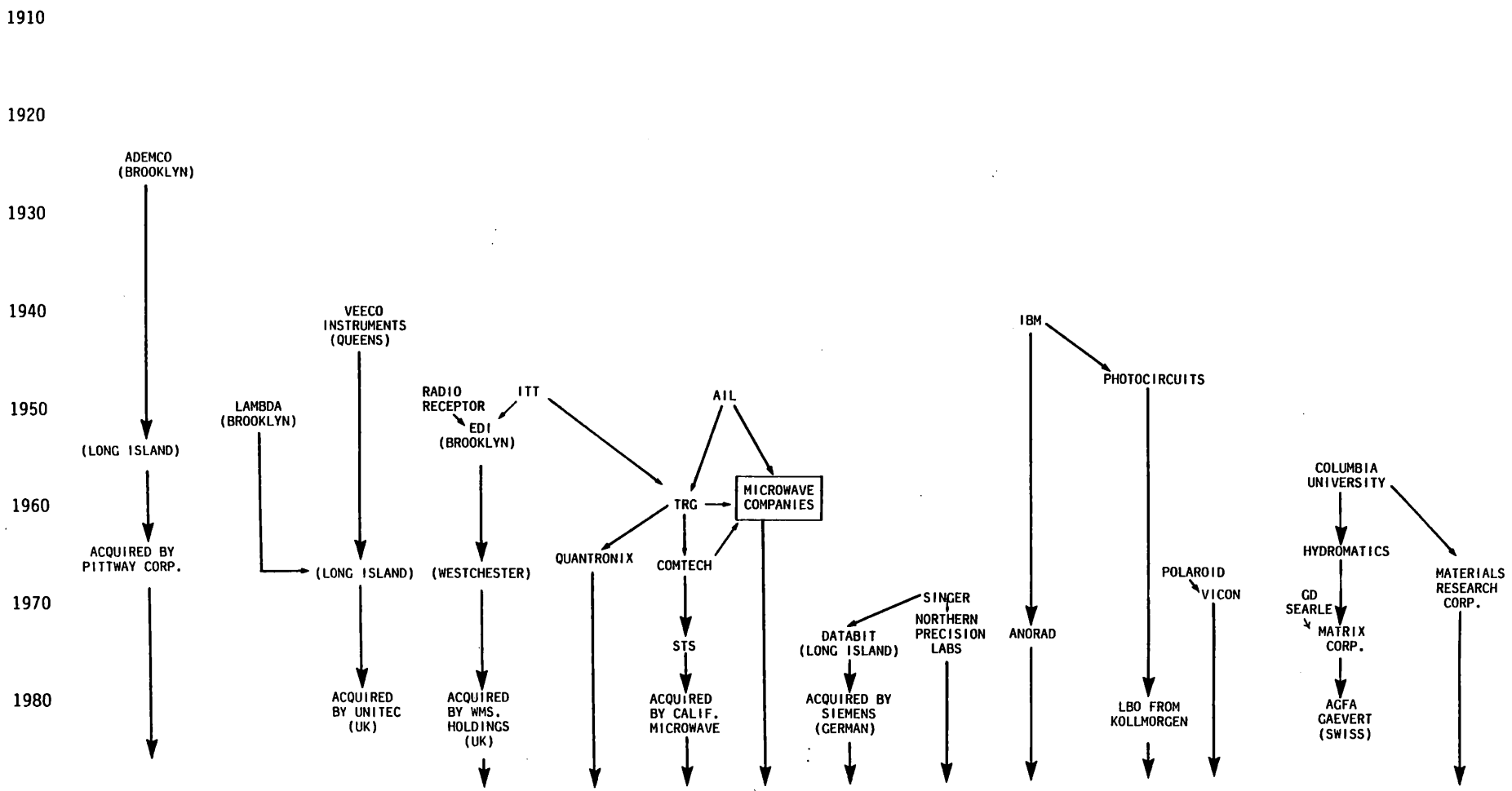
AIRCRAFT PLATFORMS:	
FAIRCHILD REPUBLIC (1987 CLOSURE)	3,500
GRUMMAN JANUARY 1987	1,500
MARCH 1988	2,300
JANUARY 1989	2,500
TOTAL	9,800
DEFENSE ELECTRONICS SYSTEMS:	
ALLIED SIGNAL 1986-1988	8,100
SEDCO 1988	600
AIL AUGUST 1987	500
JULY 1988	500
HARRIS 1987-88	450
HARTMAN 1988-89	220
HAZELTINE	200
LOCKHEED ELECTRONICS	200
ITT	150
UNISYS NOVEMBER 1988	120
TOTAL	11,040
GRAND TOTAL	20,840

SOURCE: TELESIS INTERVIEWS

EXHIBIT 4-8
CLASSIFICATION OF EMPLOYMENT IN THE DEFENSE-RELATED SECTOR

	1988 EMPLOYMENT (000 EMPLOYEES)			
	PROFESSIONAL NUCLEUS	RESIDUAL SUBSUPPLIER	INDEPENDENT PRODUCERS	TOTAL
AIRCRAFT	16	8	3	27
DEFENSE ELECTRONICS SYSTEMS INTEGRATORS	26		10	36
COMPONENTS AND SUBSYSTEM INTEGRATORS		39		39
TOTAL	42	47	13	102

EXHIBIT 4-9
NON-DEFENSE ELECTRONICS EVOLUTION



INDEPENDENT PRODUCERS

NON-DEFENSE ELECTRONICS

COMPANY *	PRODUCTS	EMPLOYMENT	GROWTH	% EXPORTS	ACTIVITIES IN REGION	COST DRIVERS	OWNERSHIP
INSTRUMENTS:							
	OSCILLOSCOPES	300	HIGH	47%	INTEGRATED	DESIGN	
	INSTRUMENT CONTROLLERS	70	DECLINE	5%	INTEGRATED	APPLICATIONS ENGR.	
COMMUNICATIONS:							
	MULTIPLEXERS/ MODEMS	145	LOW	50%	INTEGRATED	APPLICATIONS ENGR.	
	EARTH STATIONS	430	HIGH	39%	INTEGRATED	APPLICATIONS ENGR.	
	PACKET SWITCHING	300	SLOW	12%	INTEGRATED	PRODUCTION ENGR.	FOREIGN
	CCTV	280	HIGH	-	DESIGN/ ASSEMBLY	DESIGN	
	AIR TRAFFIC CONTROL	450	SLOW	45%	INTEGRATED	DESIGN	FOREIGN
	BURGLAR ALARMS	1,200	HIGH	5%	DESIGN/ ASSEMBLY	DESIGN	
IMAGING:							
	MICROCOMPUTER	400	LOW	25%	DESIGN/ ASSEMBLY	SOFTWARE DESIGN	
	MEDICAL IMAGING	700	HIGH	30%	INTEGRATED	DESIGN	FOREIGN
SEMICONDUCTOR EQUIPMENT:							
	LASER REPAIR	180	HIGH	27%	INTEGRATED	DESIGN	
	SPUTTERING EQU.	700	HIGH	44%	INTEGRATED	DESIGN	

SOURCE: TELESIS INTERVIEWS

*COMPANY NAMES NOT PROVIDED AT THIS TIME

EXHIBIT 4-12
NON-DEFENSE ELECTRONICS SECTOR
LOCATION OF ACTIVITIES

	PRODUCTS/SYSTEMS	COMPONENTS
FABRICATION	METRO REGION/ SUBCONTRACT	METRO REGION
ASSEMBLY	METRO REGION	METRO REGION/ OFFSHORE (LOW WAGE PRODUCTION)
R&D	METRO REGION/ OTHER U.S./ INTERNATIONAL	METRO REGION
HQ/ADMINISTRATION	METRO REGION	METRO REGION

EXHIBIT 4-13

ENGINEERS

NY/NJ METROPOLITAN REGION VS. SAN FRANCISCO BAY AREA

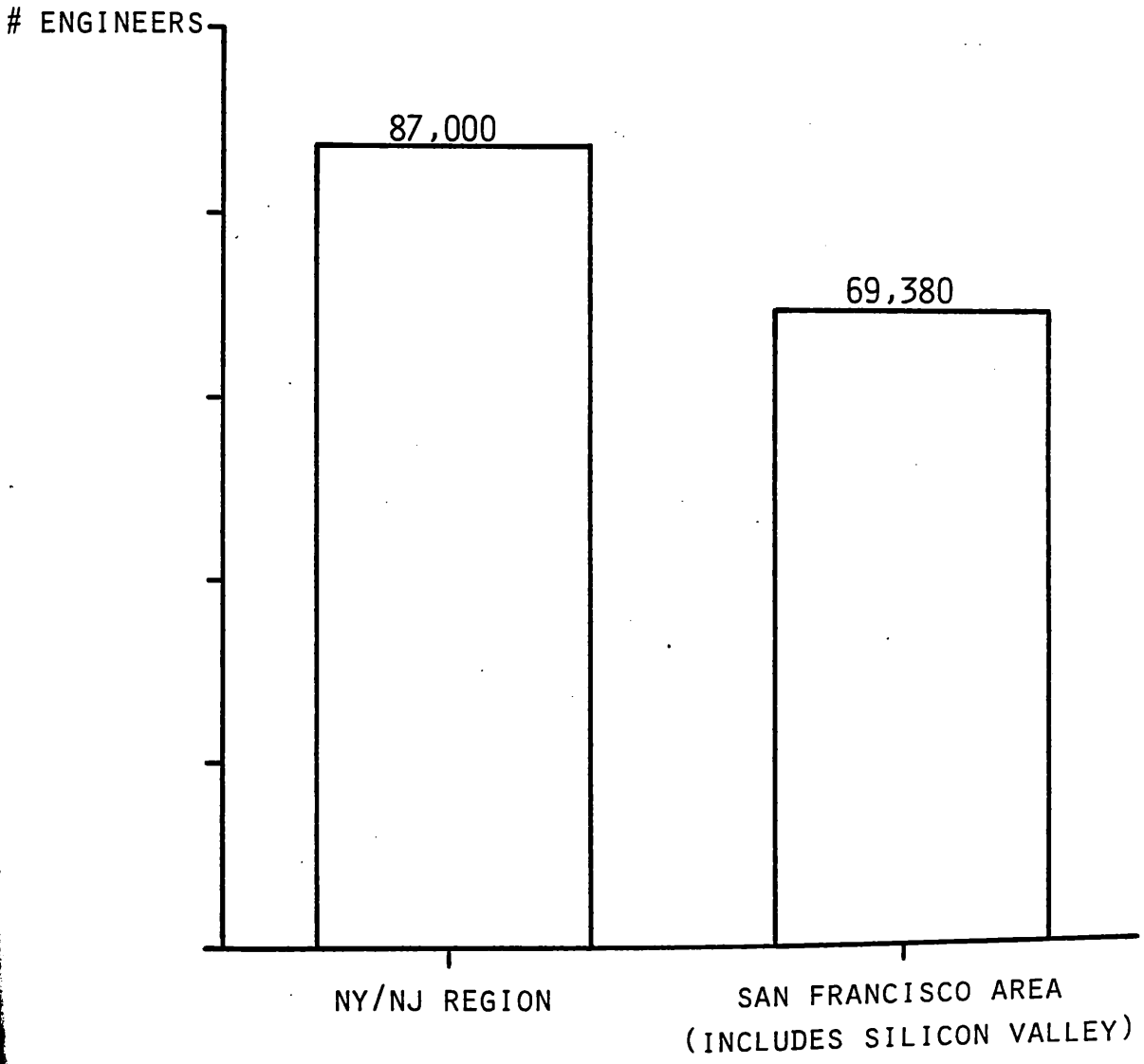


EXHIBIT 5-1

MARKETING INFRASTRUCTURE SEGMENT
BY TYPE OF EMPLOYMENT

	APPAREL[1]	COSMETICS	OPTICAL	TOTAL
HEADQUARTERS	16	9	1	26
CREATIVE	35			35
ENGINEERING		2		2
SCIENCE		2		2
PRODUCTION-RELATED	60	19	5	84
TOTAL	111	32	6	149

[1]ONLY INCLUDES APPAREL EMPLOYMENT WHICH IS CLASSIFIED IN THE MARKETING INFRASTRUCTURE SEGMENT.

SOURCE: TELESIS INTERVIEWS AND ANALYSIS

EXHIBIT 5-2
A TYPICAL PRODUCT FLOW IN THE
APPAREL INDUSTRY

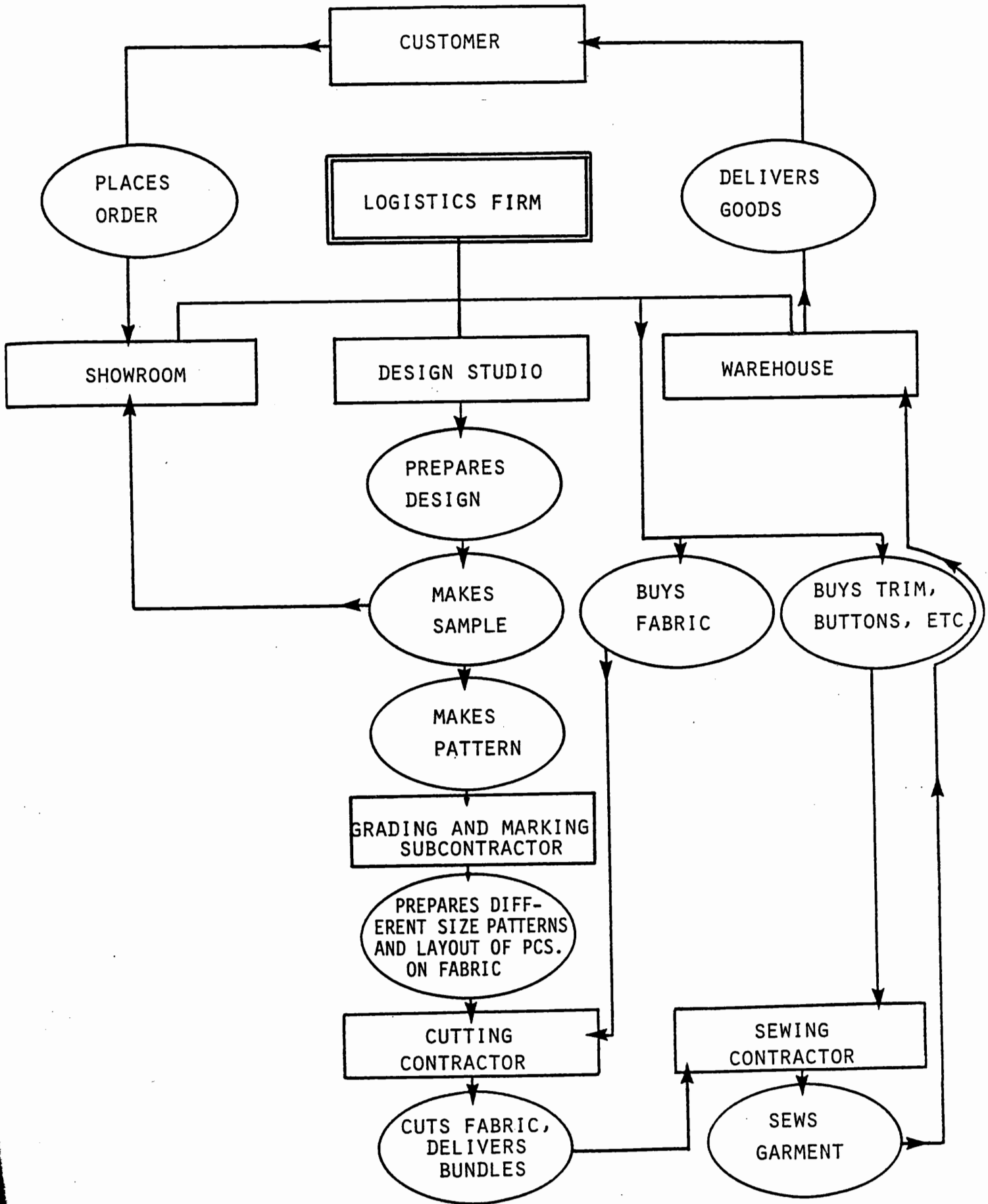


EXHIBIT 5-3
CLASSIFICATION OF BUSINESSES IN THE U.S. APPAREL INDUSTRY

DESIGN-TO-MARKETING LOGISTICS SECTOR

FIRMS WHICH DESIGN GARMENTS, BUY FABRIC, CONTRACT FOR PRODUCTION LABOR, AND WAREHOUSE, SELL AND SHIP FINISHED GARMENTS.

PRODUCTION SECTOR

HIGH END SKILLED WORKERS QUALITY IMPORTANT HIGH MARGINS	MEN'S HANDSTITCHED SUITS AND COATS TUXEDOS	DESIGNER DRESSES MEN'S TIES
LOW END LOWER SKILLS LOW MARGINS QUALITY UNEVEN	MEN'S RACK SUITS UNDERWEAR MEN'S SHIRTS AND TROUSERS HOSIERY	WOMEN'S & MISSES DRESSES LADIES SPORTSWEAR
	LONG LEAD TIMES STABLE FASHION LONG RUNS	SHORT LEAD TIMES FASHION SHIFTS SHORT RUNS

EXHIBIT 5-4

WOMEN'S CLOTHING MANUFACTURERS IN THE NEW YORK AREA

	LIZ CLAIBORNE	LESLIE FAY	DAVID WARREN	COMPANY A	COMPANY B
PRODUCT:	WOMEN'S SPORTSWEAR	WOMEN'S DRESSES AND SPORTSWEAR	WOMEN'S DRESSES	WOMEN'S DRESSES	WOMEN'S ACCESSORIES
SALES:	$1,053MM	$682MM	$50MM	$10MM	$20MM
# EMPLOYEES IN REGION:	3,200	3,000	200	40	500
OUTSIDE REGION:	800	1,000	0	0	0
% OWNED PRODUCTION:	0%	12%	0%	0%	100%
% PRODUCTION FROM U.S. CONTRACTORS:	15%	28%	80%	100%	0%
IN REGION:	10%	0%	70%	100%	
OUTSIDE REGION:	5%	28%	10%		
% PRODUCTION FROM OVERSEAS:	85%	60%	20%	0%	0%

SOURCE: TELESIS INTERVIEWS

EXHIBIT 5-5

EMPLOYMENT IN THE
APPAREL INDUSTRY IN THE
NEW YORK-NEW JERSEY METROPOLITAN REGION
BY TYPE OF BUSINESS

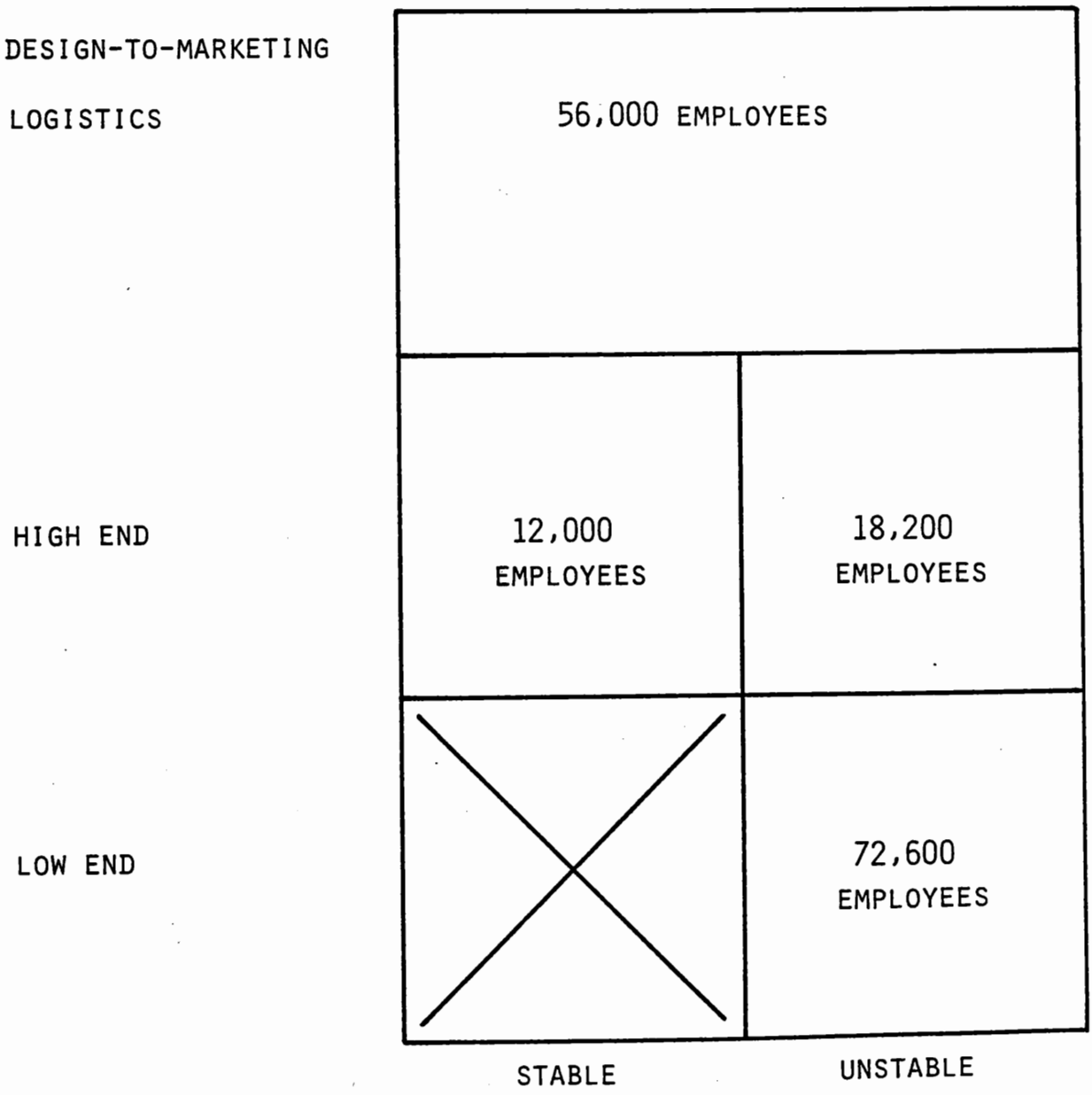
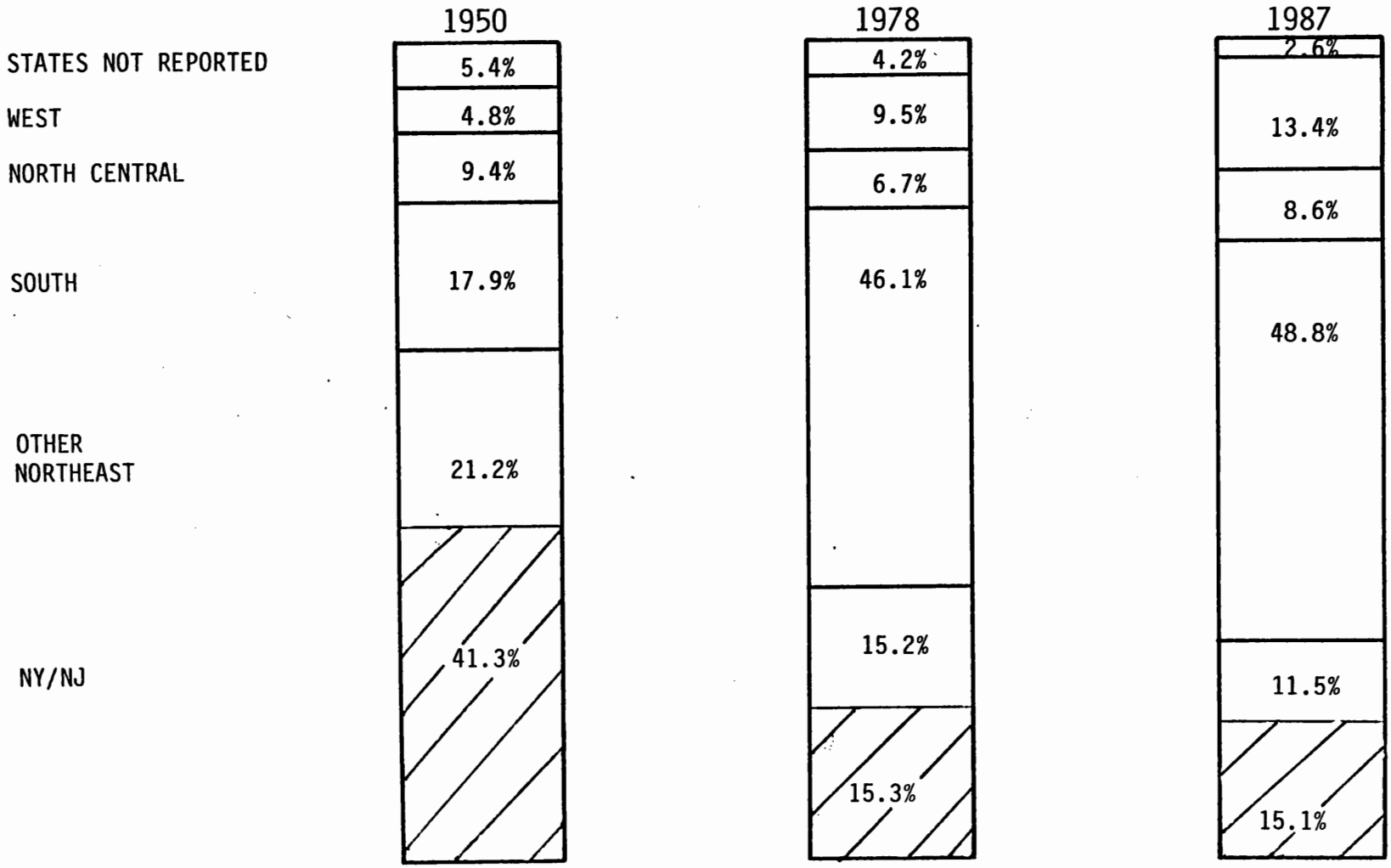


EXHIBIT 5-6

APPAREL INDUSTRY
GEOGRAPHIC DISTRIBUTION OF U.S. EMPLOYMENT

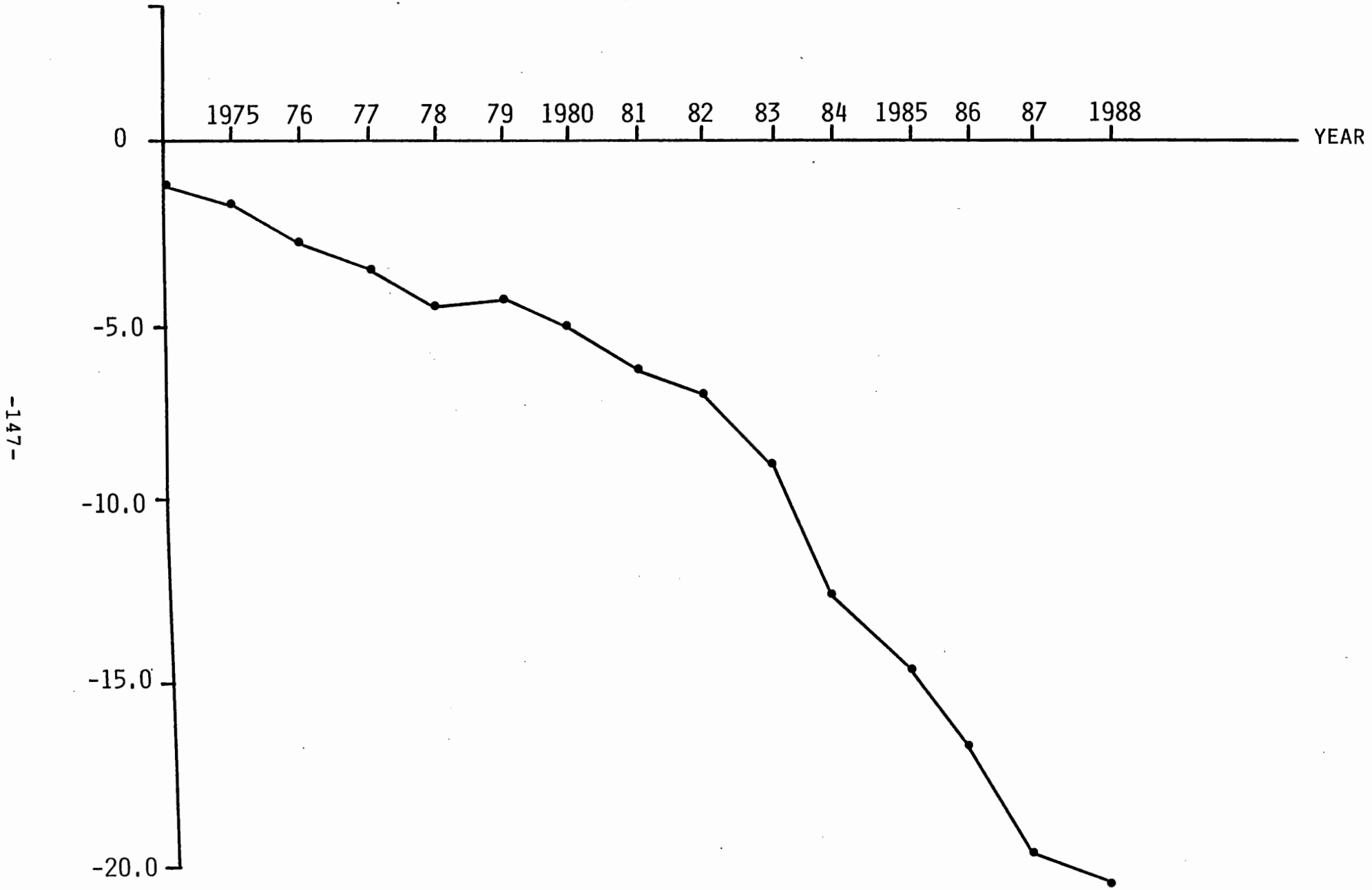


[1] SIC 23

SOURCE: FOCUS 1988, APPAREL MFG. ASSOC. AND THE U.S. APPAREL INDUSTRY, 1960-1985 WITH SPECIAL EMPHASIS ON WOMENS AND CHILDRENS APPAREL, ILGWU

EXHIBIT 5-7

U.S. APPAREL INDUSTRY
TRADE BALANCE
1974-1988



SOURCE: U.S. INDUSTRIAL OUTLOOK

EXHIBIT 5-8

APPAREL INDUSTRY EMPLOYMENT
NEW YORK-NEW JERSEY METROPOLITAN REGION VERSUS UNITED STATES
% CAGR 1977-1986

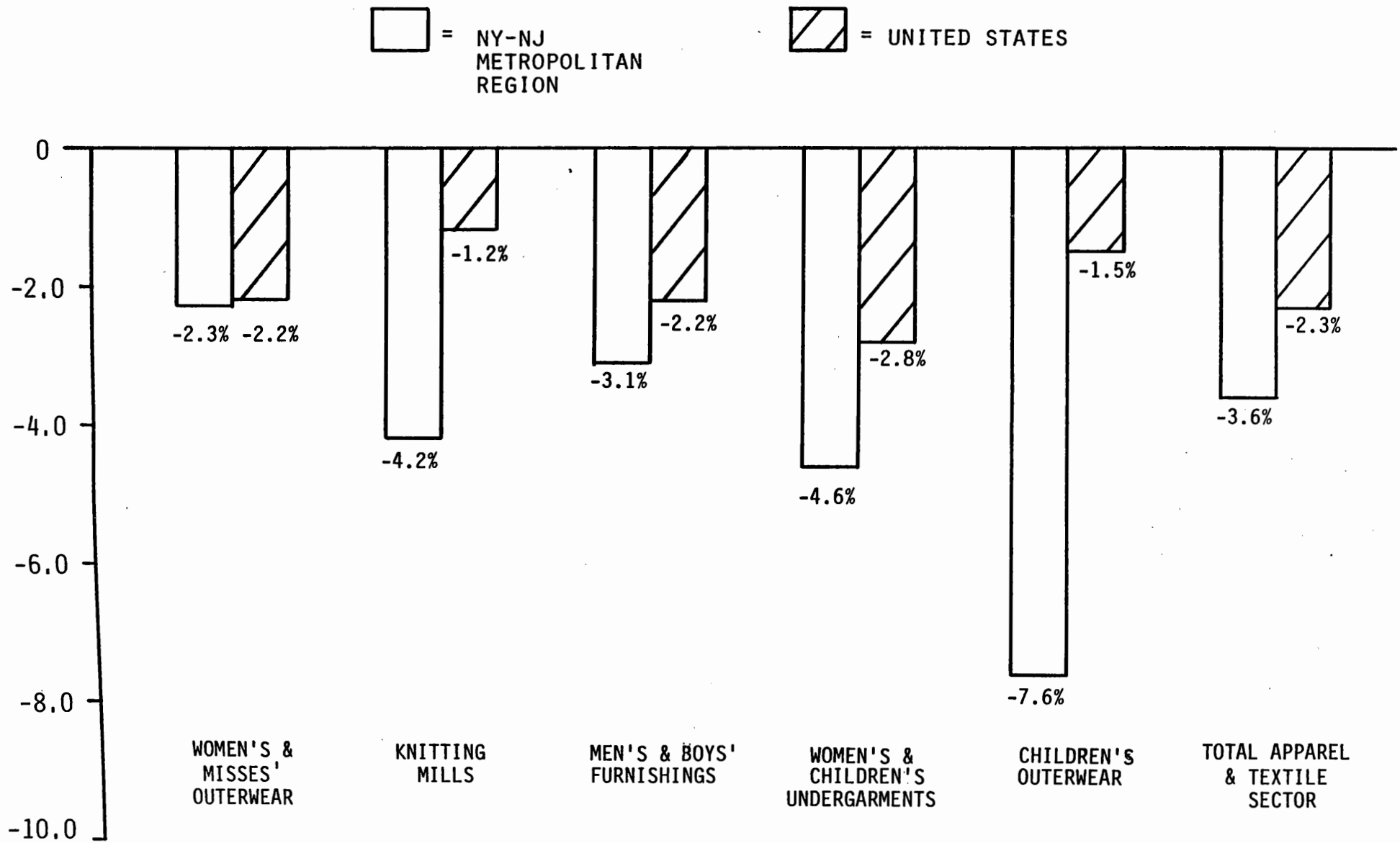


EXHIBIT 5-9
RESIDUAL APPAREL INDUSTRY
IN THE NEW YORK-NEW JERSEY METROPOLITAN REGION

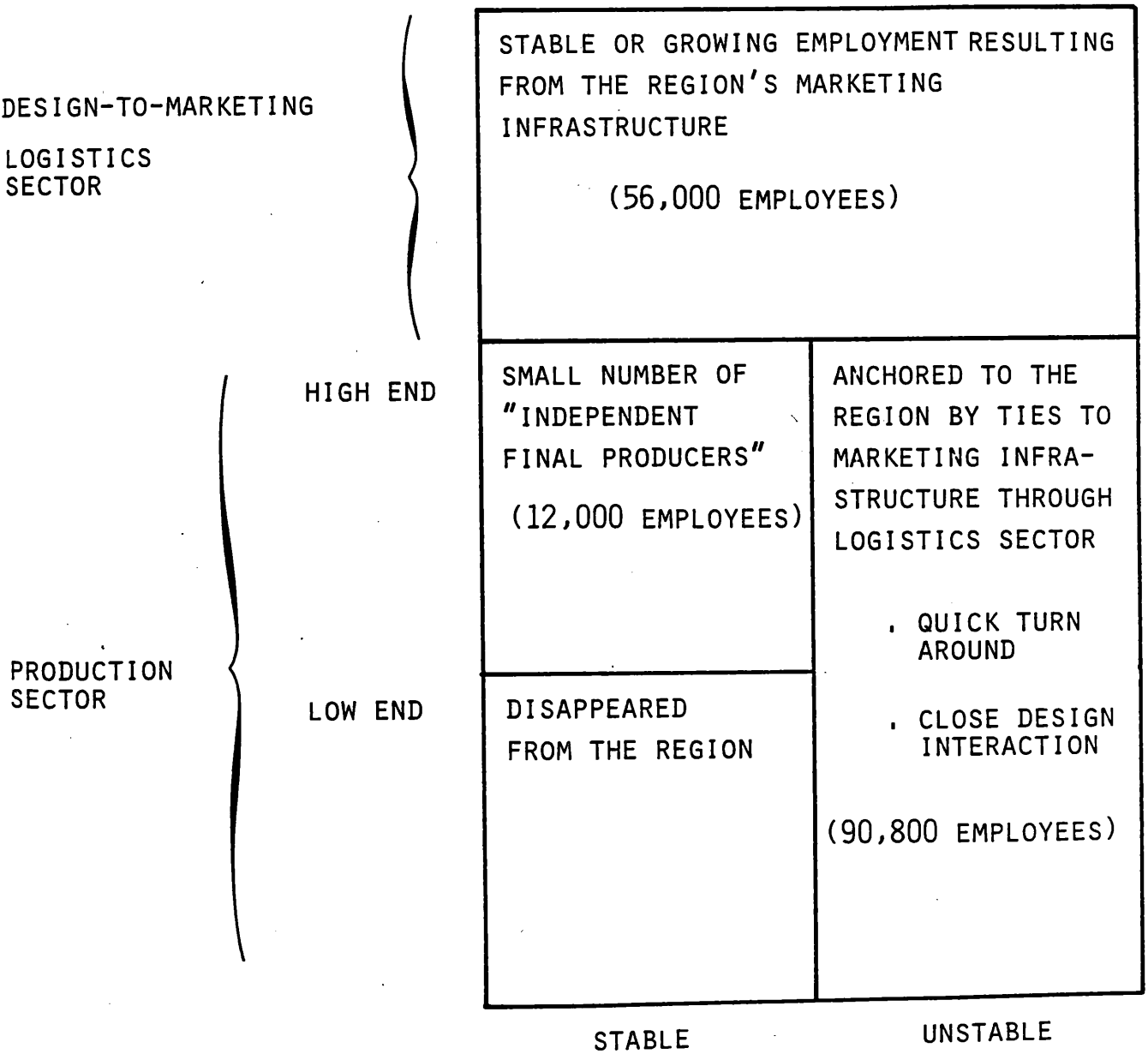
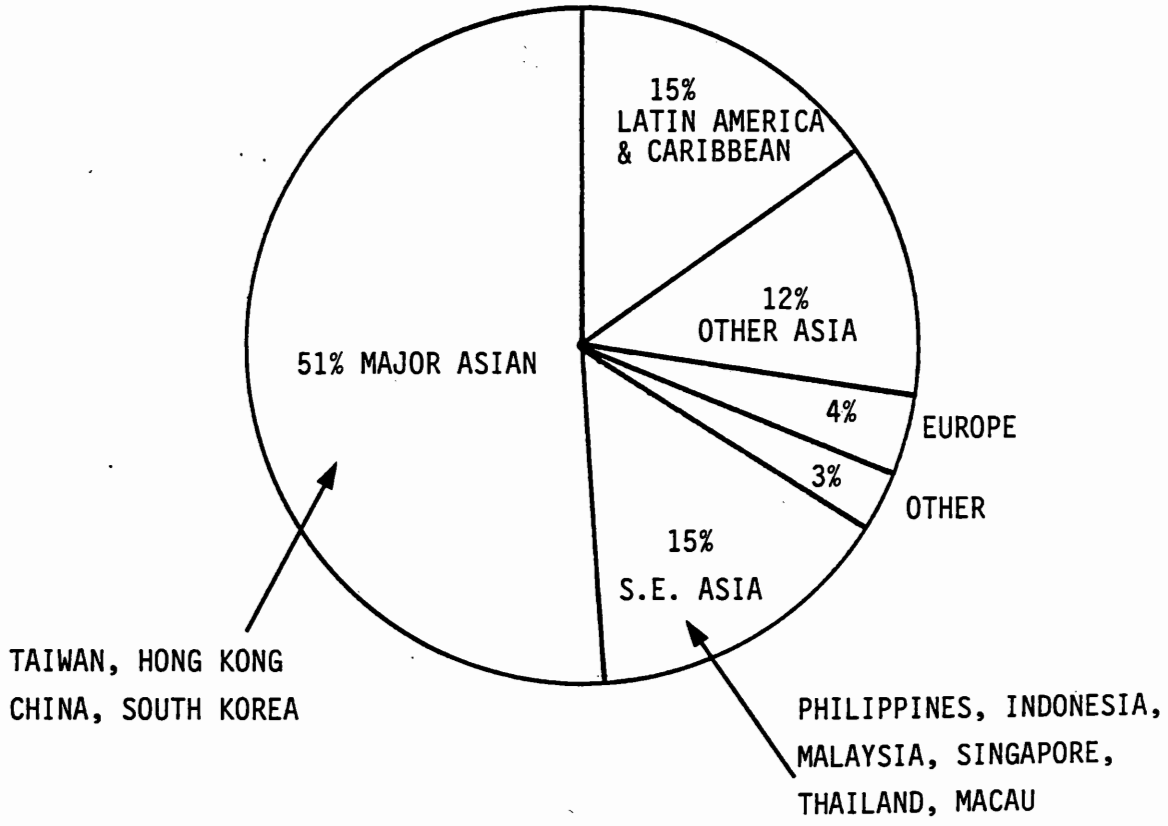


EXHIBIT 5-10

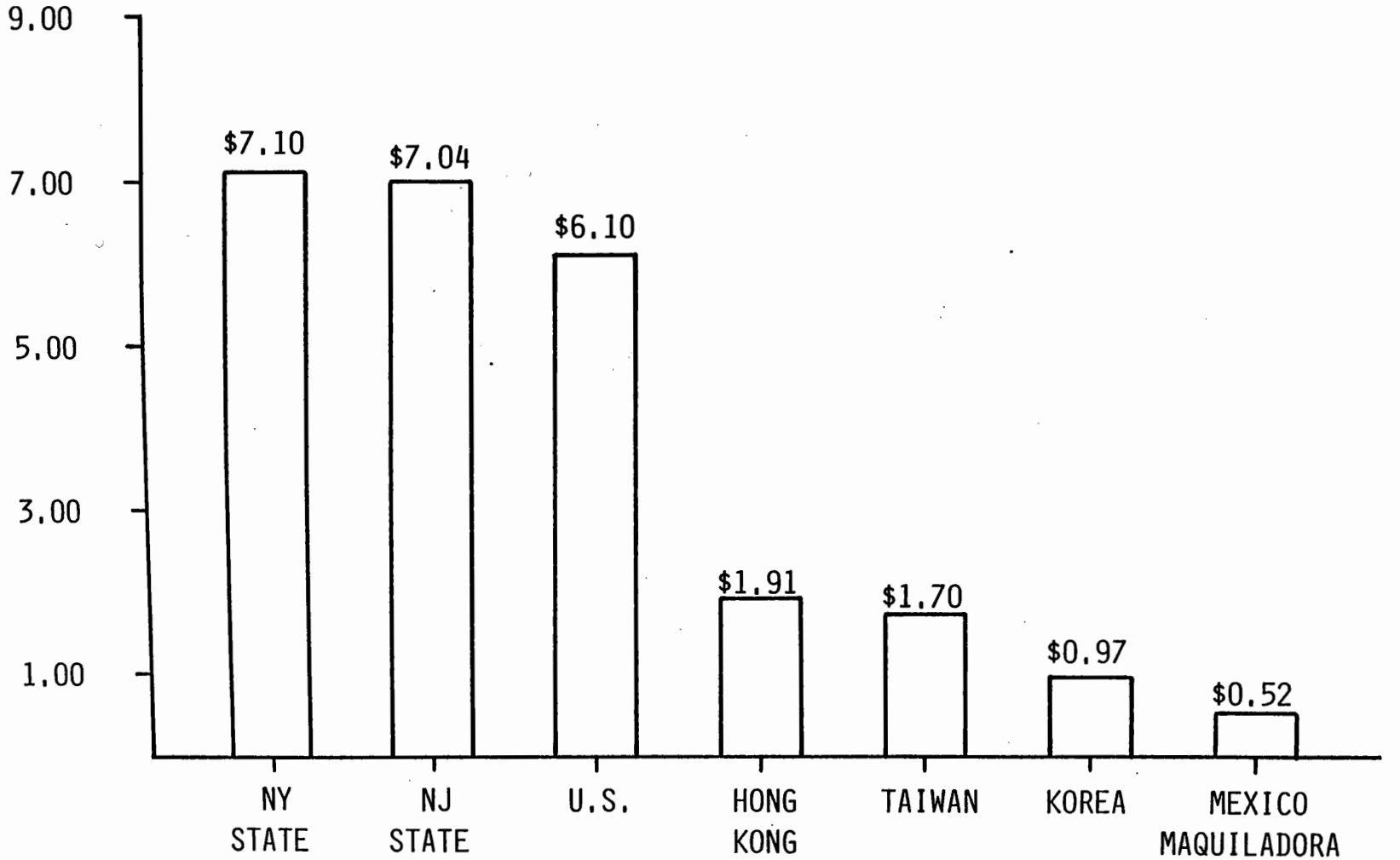
ORIGINAL U.S. IMPORTS OF COTTON, WOOL,
AND MAN-MADE FIBER APPAREL
1988

6,314MM SQUARE YARDS



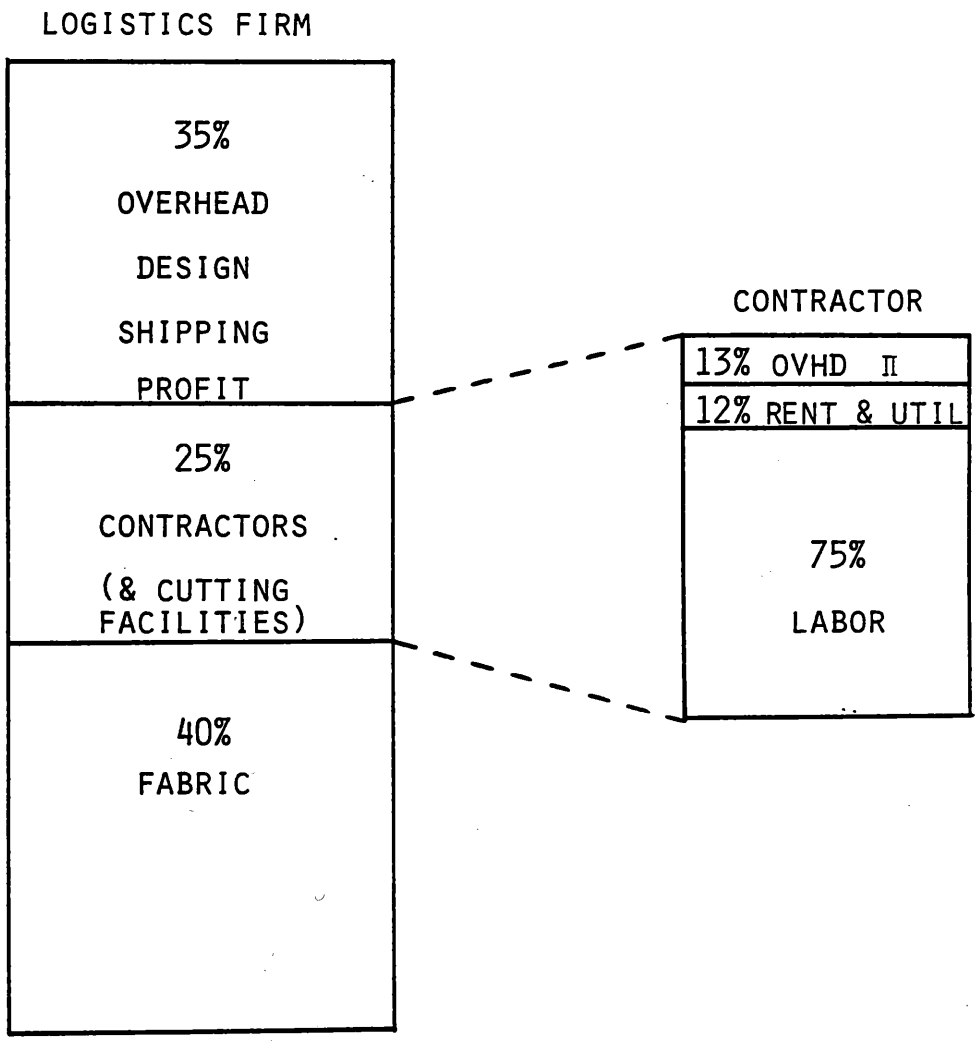
SOURCE: 1988 FOCUS, AMERICAN APPAREL MANUFACTURING ASSOCIATION

EXHIBIT 5-11
HOURLY EARNINGS IN SELECTED LOCATIONS
APPAREL INDUSTRY (SIC 23)
1987



SOURCE: BUREAU OF LABOR STATISTICS, OFFICE OF PRODUCTIVITY AND TECHNOLOGY.

EXHIBIT 5-12
COST STRUCTURE
LOGISTICS FIRM AND CONTRACTOR
(% OF SELL PRICE)



SOURCE: TELESIS INTERVIEWS

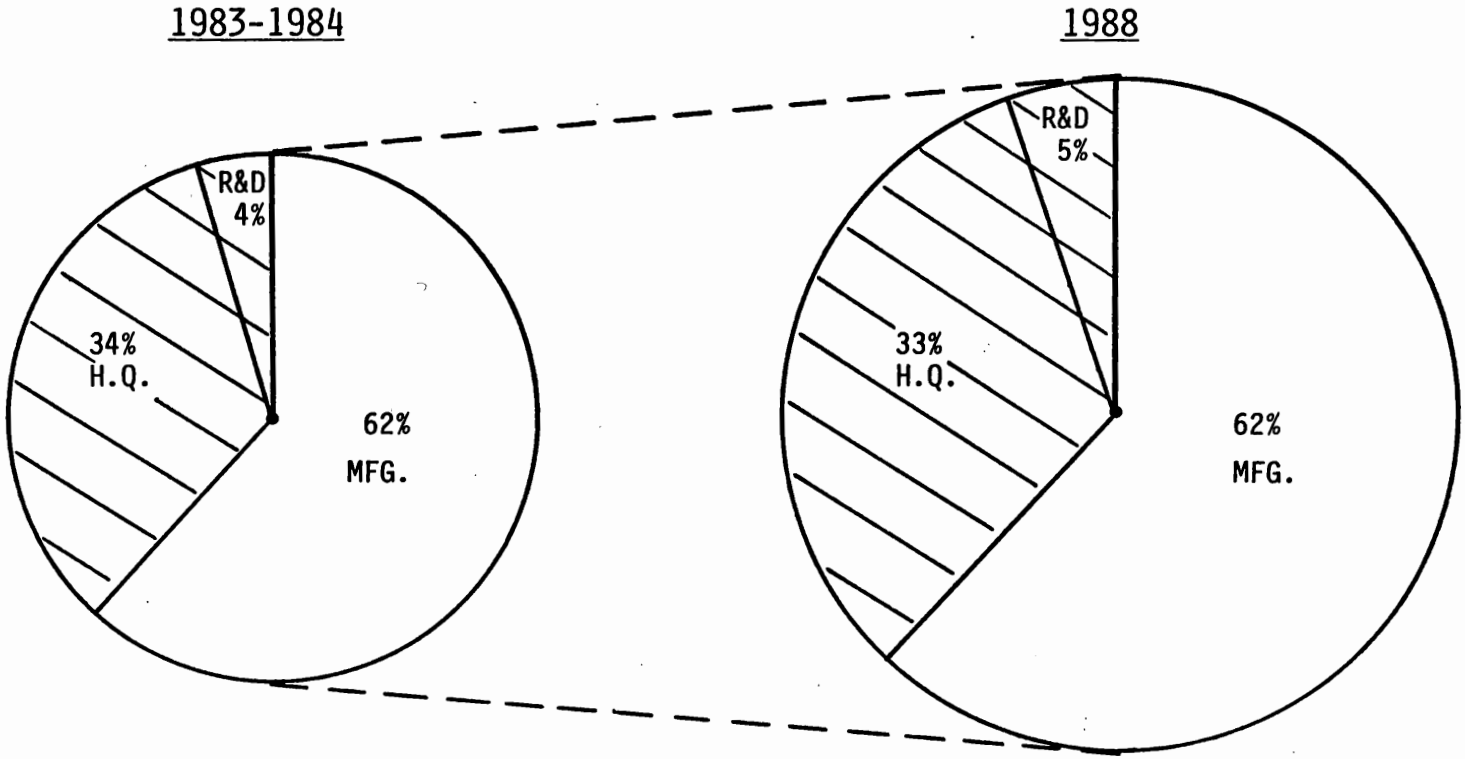
EXHIBIT 5-13

COST STRUCTURE OF A TYPICAL COSMETIC PRODUCT
(AS % OF SALES)

OVERHEAD AND PROFIT	15	
RAW MATERIALS	9	
MANUFACTURING COSTS	9	
RESEARCH & DEVELOPMENT	7	
MARKETING	25	TOTAL MARKETING 67%
PACKAGING	18	
SALES	17	
	100	

SOURCE: TELESIS INTERVIEWS

EXHIBIT 5-14
COSMETIC INDUSTRY
REGION EMPLOYMENT GREW WITHOUT
CHANGE IN EMPLOYMENT COMPOSITION

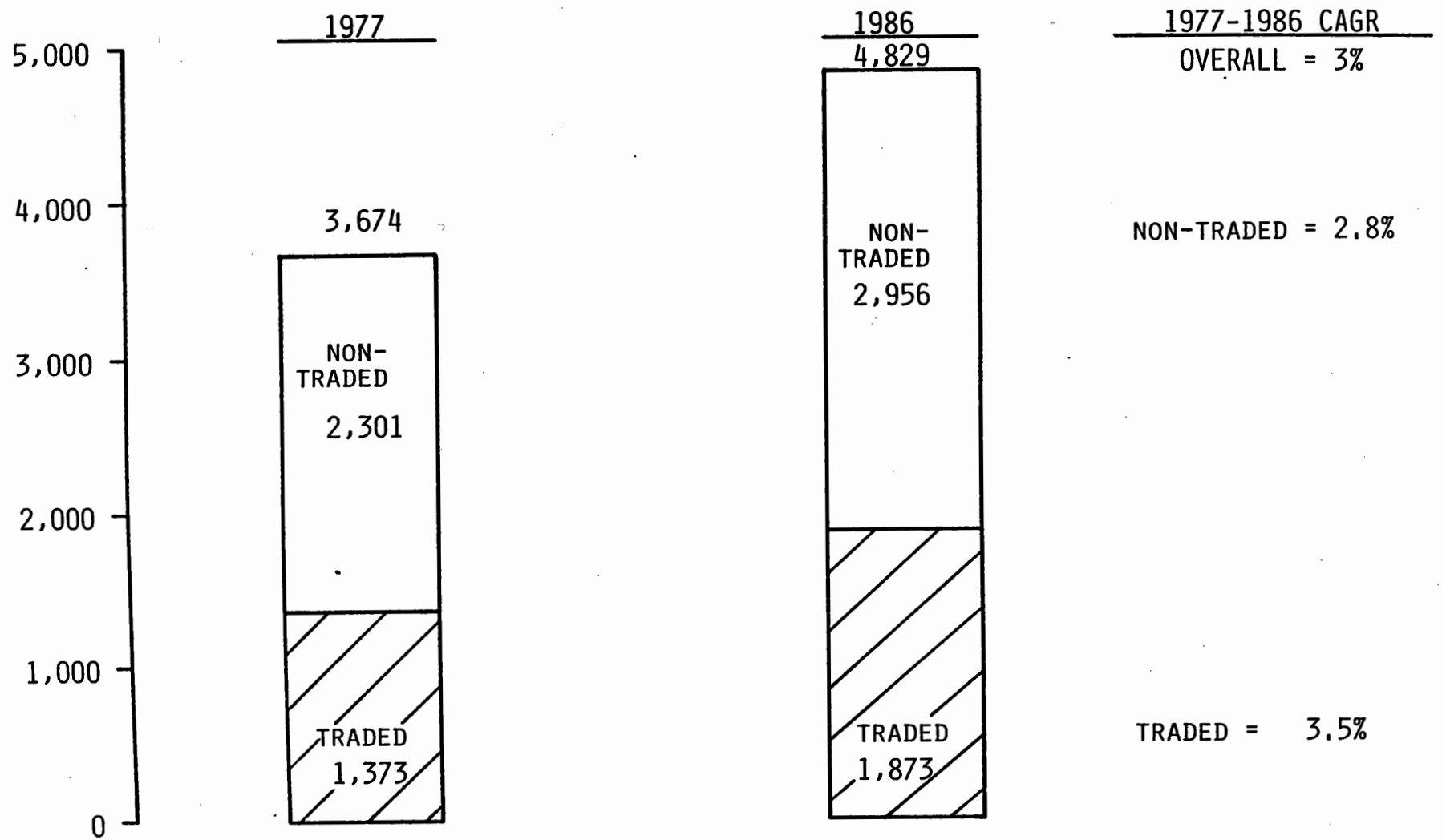


TOTAL EMPLOYMENT
FIRMS INTERVIEWED: 12,970

TOTAL EMPLOYMENT
FIRMS INTERVIEWED: 14,599

SOURCE: TELESIS INTERVIEWS

EXHIBIT 6-1
GROWTH IN THE
NEW YORK-NEW JERSEY METROPOLITAN REGION SERVICE SECTOR
1977 TO 1986



SOURCE: COUNTY BUSINESS PATTERNS, CENSUS DATA

EXHIBIT 6-2
SERVING THE SERVICES SECTOR
TYPE OF EMPLOYMENT BY VULNERABILITY
($000)

	GROWING	STABLE	VULNERABLE	GONE	TOTAL
HEADQUARTERS					
CREATIVE					
ENGINEERING					
SCIENCE					
PRODUCTION-RELATED	5	39	35	0	79
TOTAL	5	39	35	0	79

EXHIBIT 6-3
MANUFACTURERS SERVING THE ARTS

END USERS SERVED: ARCHITECTS AND DECORATORS

COMPANY NAME	COUNTY	PRODUCT	# EMPLOYEES
	NEW YORK	CUSTOM DRAPERIES	11
	PASSAIC	BEDSPREADS & DRAPES	40
	NEW YORK	SHADES & DRAPES	80
	NEW YORK	MARBLE TOPS	5
	WESTCHESTER	DECORATIVE METAL PLANTERS	9
	NEW YORK	FIREPLACE EQUIPMENT	12
	NEW YORK	CUSTOM BEDS	20
	NEW YORK	UPHOLSTERED FURNITURE	5
	SUFFOLK	CUSTOM FURNITURE	6
	SUFFOLK	CUSTOM FURNITURE	8
	QUEENS	CABINETRY	13
	NEW YORK	REED & RATTAN FURNITURE	20
	NASSAU	CABINETRY & WOODWORKING	30
	QUEENS	LIGHTING	75
	NEW YORK	LIGHTING	29
	WESTCHESTER	TEXTILE & WALLPAPERS	32
SUB-TOTAL: 16 FIRMS, EMPLOYEES =			395

END USERS SERVED: THEATERS

	NASSAU	COVERS FOR THEATRICAL LIGHTS	4
	SUFFOLK	THEATER EQUIPMENT	15
	NEW YORK	THEATRICAL SCENERY	25
	NEW YORK	DISPLAYS, PROPS FOR THEATERS & FILM/TV STUDIOS	20
	BERGEN	SUPPORTS FOR CAMERAS	5
SUB-TOTAL: 5 FIRMS, EMPLOYEES =			69

END USERS SERVED: ARTISTS AND MUSEUMS

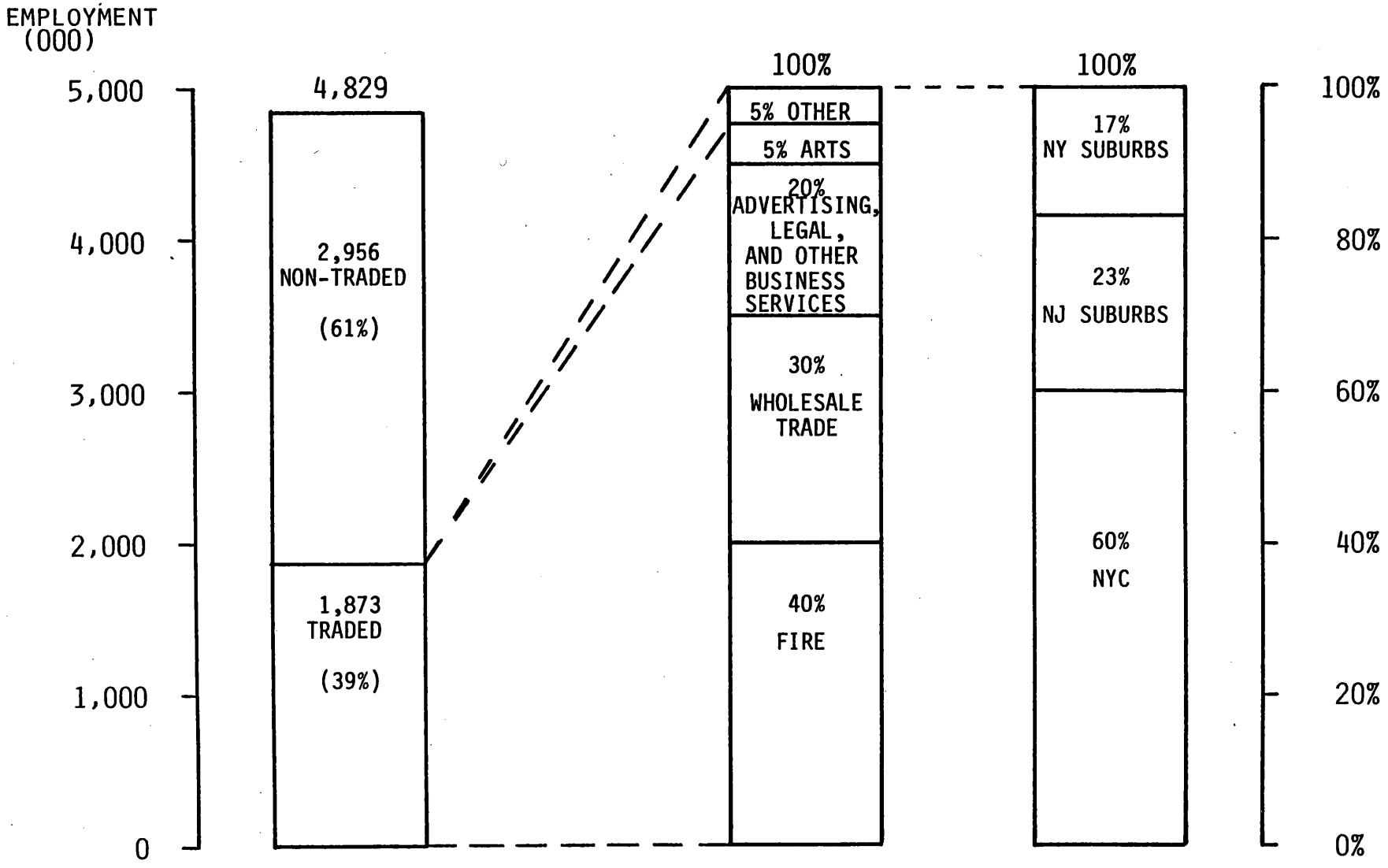
	NEW YORK	BANNERS	16
	QUEENS	HARDWARE FOR FRAMES	20
	NEW YORK	FRAMES	18
	QUEENS	BRONZE STATUARY	11
		BRONZE WORKS	50
	NEW YORK	PAPER MAILING TUBES FOR ARTISTS	10
SUB-TOTAL: 6 FIRMS; EMPLOYEES =			125

*COMPANY NAMES NOT PROVIDED AT THIS TIME

EXHIBIT 6-4

NEW YORK-NEW JERSEY METROPOLITAN REGION SERVICES EMPLOYMENT

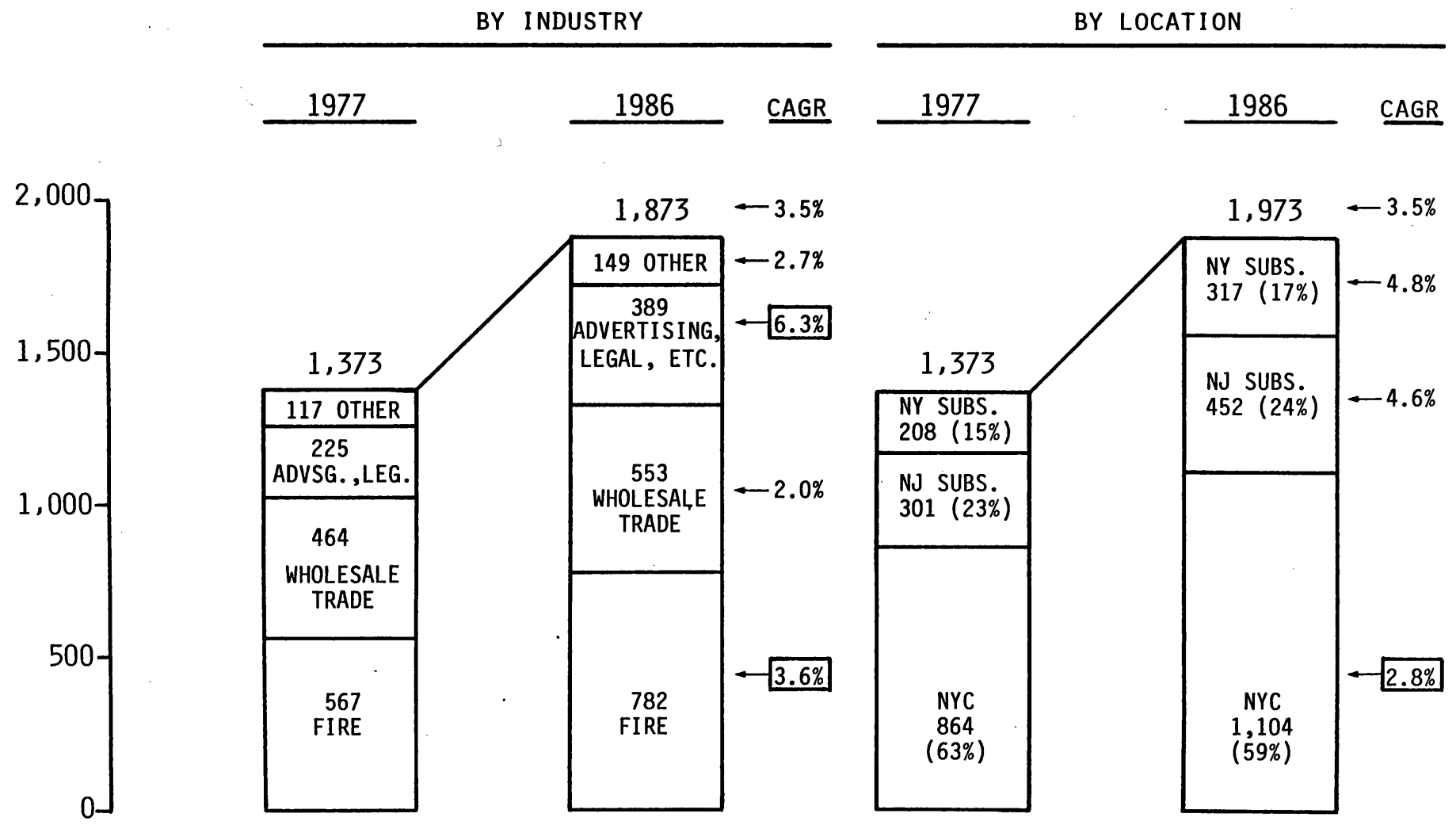
THE TRADED SERVICES SECTOR REPRESENTS ABOUT 40% OF TOTAL SERVICES EMPLOYMENT, CONCENTRATED IN NEW YORK CITY



SOURCE: 1986 COUNTY CENSUS DATA

EXHIBIT 6-5

CHANGES IN EMPLOYMENT IN THE TRADED SERVICES SECTOR OF THE NEW YORK-NEW JERSEY METROPOLITAN REGION 1977-1983



SOURCE: 1986 COUNTY CENSUS DATA

EXHIBIT 6-6

COMPARATIVE P&L STRUCTURES - PRINTING

	ALL NATIONWIDE COMMERCIAL PRINTERS	METROPOLITAN NY/NJ PRINTERS	FINANCIAL PRINTERS
SALES	100%	100%	100%
COST OF GOODS			
MATERIALS	37%	33%	26%
LABOR	26%	28%	24
OVERHEAD	13%	15%	15
TOTAL	76%	76%	65
GROSS MARGIN	24%	24%	35
ADMINISTRATIVE	10	13	12
SELLING	9	7	8
INCOME (LOSS) BEFORE INTEREST	5	4	15
INTEREST EXPENSE	2	2	1
OPERATING INCOME (LOSS)	3	2	14
OTHER INCOME (EXPENSE)	-	(1)	-
INCOME (LOSS) BEFORE TAXES	3	1	14

SOURCE: PRINTING INDUSTRY ASSOCIATION

EXHIBIT 6-7
TIES TO THE REGION, BY INDUSTRY, IN THE
SERVING THE SERVICES SECTOR SEGMENT
(000 EMPLOYEES)

	CREATIVE INFRASTRUCTURE	FINANCE/LEGAL INFRASTRUCTURE	TOTAL
PRINTING/PUBLISHING	68	2	70
PAPER		8	8
PLASTICS	___	1	1
TOTAL	68	11	79

SOURCE: TELESIS ANALYSIS