URBAN INDUSTRIAL DEVELOPMENT, JOB CREATION AND PUBLIC POLICY

by

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ABSTRACT

Urban Industrial Development, Job Creation and Public Policy

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Submitted to the Department of Urban Studies and Planning in partial fulfillment of the requirements for the degree of Master of City Planning

Four chapters compose the thesis. The first chapter examines the locational orientations of various industries; the requirements in terms of land for various activities and, the economic effects of industrial activity in a community. Chapter Two introduces three criteria that are designed to make certain that workers in new industries benefit in terms of payroll and environment. The third chapter will display and explain a matrix of industries that have employed a specific group of people. The matrix will then proceed industry by industry to show "yes" or "no" responses for the performance of each of the criteria introduced in the second chapter. The concluding chapter, Chapter Four, serves to review the requirements for urban industrial development, summarize the methodology and its findings and point out those areas that lack data and, therefore, inhibited more complete analyses.

Thesis Supervisor: Arthur P. Solomon
Title: Associate Professor of Urban Studies and Planning

FOREWORD

This thesis is an outcome of a segment of research being done by the author in his attempt to understand the complexities of employment generation in urban areas.

I would like to express appreciation to my thesis advisor, Professor Arthur P. Solomon for his assistance in the work on the methodology. My faculty advisor Professor Langely C. Keyes is also in line for a word of thanks for his departmental assistance on the writing format. Expressions of thanks are also due Mr. Donald Stone of the Boston Office of Commerce and Manpower and Mr. George Slye of the Spaulding and Slye Development Co. for their assistance in data compilation. Mr. Chuck Turner of Circle Incorporated was crucial in the idea dilineation phase and many kudos go out to him and the members of the Southwest Corridor Land Development Coalition. Finally, but not leastly, I must thank my copy editor Ms. Eileen Shapiro and my typist Ms. Marion Neville.

While the above mentioned people were crucial to the execution of this work, I remain accountable for its errors, omissions and restrictions imposed by genius and time.

Gordon John LaSane
Cambridge, Massachusetts
May 10, 1974

CHAPTER ONE

THE PROBLEM

This thesis will demonstrate the viability of re-establishing industrial districts in the inner city. For approximately the last fifteen years, urban planners and economists have become increasingly aware that re-establishing planned industrial districts in inner cities is part of the solution for easing some of the socio-economic ills in these low-income areas.

Planners concerned with alleviating the poverty and economic stagnation of inner city residents consider the attraction of industry and jobs a means of making these areas economically stable again. People concerned with failures of programs designed to transport inner city residents to suburban employment consider it a means of consolidating inner city neighborhoods and making these neighborhoods better able to function as viable social units.

In addition, measures intended to re-establish inner city industrial districts may also be part of the answer to problems of local government: New industry will in fact produce new tax revenue. A study done by the Boston Economic Development and Industrial Commission found that a 17 acre industrial site would return taxes of between $150,000 and $1,200,000 per year. Also, even without considering the spin-off employment possibilities and the concomittant payroll generation, there would be 2,200 new jobs created with a $16 million annual payroll.[1]

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1 "Urban Industrial Development In Boston," Donald N. Stone, B.E.D.I.C., p.2

This thesis is a presentation of a methodology that enables the identification of industries that can be located in a specific central city location, given those industries' abilities to a) attract and retain in employment members of the community in which the industry would be located; b) have a minimum wage level (in terms of both their median wage and the distribution of the wage); c) be job intensive enough to employ significant number of available neighborhood people.[2]

THESIS PARAMETERS

The intent of this thesis is to formulate a method that an urban planner can utilize in determining which industries can or should be induced to locate in a specific urban setting.

The hypothesis that will be tested is that a significant number of new employment possibilities can be generated if certain manufacturing activities can be attracted to the central city.

The outcome of increased manufacturing activity in the central city includes:

1) the creation of new jobs;
2) increased profits to firms moving to these locations;
3) reductions in expenditures or increases in revenues for local government as a result of the expanded tax base.

Although the manufacturing sector is not presently the fastest growing sector of the national economy, one should bear in mind that when expressed in terms of employment, value added, and share of the national income or wages

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2 Other requirements should be seasonably stable employment and training to upgrade labor force skills.

paid, the figures for manufacturing understate the importance of industry locally, regionally and nationally.

Between 1950 and 1969, manufacturing generated approximately 30% of the national income. Figures from the U.S. Department of Commerce show a decline in income of this sector, yet manufacturing remains by far the greatest single source of national income among the Industrial Divisions in the American Economy.[3]

It is also instructive to note that the manufacturing sector has the largest wage rolls and number of people employed. For these above reasons it is important to consider this sector as a means of creating jobs and providing adequate employment.

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3 See Exhibit I.

Table I

National Income Classified by Industrial Origin: 1950 to 1969 (Billions of Dollars)

Industrial Division	1950*	1960	(preliminary) 1969	change 1950-1960
All Industries	$241.1	$414.5	$771.2	+220
Agriculture				
Forest and Fisheries	17.6	16.9	23.8	+ 35
Mining and Construction	17.2	26.5	48.1	+180
Manufacturing	76.2	125.8	229.1	+201
Transportation	13.4	18.2	29.0	+116
Communication	3.3	8.2	15.5	+370
Electric, Gas and Sanitary	3.9	8.9	14.6	+274
Wholesale and Retail	40.9	64.4	112.6	+175
Finance, Insurance and Real Estate	22.0	45.9	85.2	+287
Services	21.8	44.4	94.4	+333
Government and Government Enterprises	23.6	52.9	114.8	+386

* 1950 figures delete Alaska and Hawaii

Source: U.S. Department of Commerce, Statistical Abstract of the United States; 1970 (Washington U.S. Government Printing Office, 1970), p.317

SUMMARY OF CONTENTS

This thesis is basically composed of four chapters; the following constitutes a synopsis of the material that will be discussed in each.

Chapter One, "The Requirements for and Effects of Urban Industrial Development," will explore a) how industries are classified by their locational orientations; b) the land requirements for various activities; c) the economic effects of industrial development for a community.

These three factors are essential for the examination of those industries that can be induced to locate in the inner city.

In Chapter Two, "The Evolution of Criteria for Industry Selection," three criteria that a planner should consider in planning for industrial development in the inner city are introduced. These criteria are designed to assure that neighborhood residents will benefit not only in terms of payroll but also in terms of environmental quality. These criteria are summarized as follows:

1. THE INDUSTRY MUST HAVE THE ABILITY TO ATTRACT AND RETAIN IN EMPLOYMENT PEOPLE FROM THE COMMUNITY IN WHICH IT IS TO BE LOCATED.
2. THE INDUSTRY MUST HAVE A WAGE LEVEL OF AT LEAST $5,000 PER YEAR AND EMPLOY BETWEEN 11-33 PEOPLE PER ACRE.
3. THE INDUSTRY SHOULD, WHEN NECESSARY, BE ABLE TO OPERATE IN MULTI-LEVEL BUILDINGS.

The third criterion is a complex one to address. This criterion was included because researchers have found that most developable industrial sites in the inner city are oddly shaped and irregular in size and in close proximity to residentiably zoned land. Therefore, building up, as opposed to out, is often a more viable option.

This criterion has also to do with the amount and cost of land in the central city that is available for industrial development. Andrew Hamer, in his Doctoral Thesis "The Comparative Costs of Location of Manufacturing Firms in Urban Areas: A Boston Case Study," found that:

> In the absence of sufficient published data, land comparisons between and within metropolitan areas must be more suggestive than rigorous. Varient land data is fragmentary. Sites which are being used for purposes of comparison are likely to differ from one another in such dimensions as load bearing quality, the size of individual lots, the accessibility to major roadways and the availability of water and sewer lines at the sites. When sites are not standardized then price differentials may be caused by factors other than distance from the core. 4

Other economists feel that central city land for industrial uses is and must remain expensive and scarce.[5]

Chapter Three, "Matrix for Location of Urban Industry," will display and discuss a matrix of industries that have employed black inner city residents in Boston. Specifically, it will show, drawn from data presented in Chapter Two the percentage of black participation in the manufacturing sector in the city and SMSA of Boston for the period 1966-1969. The matrix is composed of a column of industries and a row of the selected criteria. An individual in dustry will be given "yes" or "no" responses for its performance under each criterion.

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4 Hamer, Harvard University, Cambridge, Mass., March 1972, p.7. On the question of central city land costs see A. Manvel, Three Land Research studies, National Commission of Urban Problems, Research Report no. 12; (Washington U.S. Government Printing Office, 1968).

5 See Hoover and Vernon, Anatomy of a Metropolis.

The concluding Chapter, Chapter Four, will summarize the methodology and the findings, review the requirements for inner city industrial development, and point out those areas where data was lacking and therefore inhibited more complete analyses.

THE REQUIREMENTS FOR AND EFFECTS OF URBAN INDUSTRIAL DEVELOPMENT

A. How Industries Have Been Classified by Locational Orientation

Industries can be classified by their locational orientation, but these orientations should not be held as mutually exclusive. These classifications reflect the ingredients that decision makers view as contributing most to the profitability of the firms' operation.

The five basic categories of industry are:

1) labor oriented industry
2) transport oriented industry
3) market oriented industry (for consumers and producers)
4) supply oriented industry
5) footloose industry[6]

1. Labor Oriented Industry

Industries dependent upon adequate labor supply are not only concerned with the dollar costs of labor but also with the provision of special skills in the total supply of labor.

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6 Industrial Development and Manufacture Record (Conway Public., Atlanta). Also see Malinowski, Zenon,S., and Kinnard, Wm. N., The Metals Service Industry: A Case Study of a Satellit Industry; New York, McGraw-Hill, April 1960, p.12. Also see Greenhut, Melvin L., Plant Location In Theory and Practise: The Economics of Space, Chapel Hill, University of North Carolina Press, 1956, pp. 103-176.

Firms that employ skilled or highly qualified personnel have been noted to cluster in as close proximity as possible to centers of advanced technical competence. A good example is the clustering of research and development activities around the Massachusetts Institute of Technology - Harvard area. This has led to reinforcing the agglomerative effect as these two institutions develop the ability to serve the needs of the research and development sector. The facilities of these institutions have served to help attract and retain the "intellectual industries."

2. Transportation Oriented Industry

When considering the issue of transportation costs, firms hold more than the issue of freight rates as important.

Several factors other than transportation costs are included. Four other major costs have been:

a) the additional cost of keeping on hand large inventories at more distant points of supply

b) additional costs of dealing with customers at a distance

c) terminal costs and charges, which have been high for railroads while the costs of truck transportation is rising with gasoline prices

d) additional costs that arise when customers are dissatisfied and business is lost because of slower service.[7]

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7 Malinowski, Kinnard, op.cit. p.15

Industries for which transfer costs are important tend to locate near the appropriate mode of transportation.[8] A good example is the High Value Instrument Industry S.I.C. 38[9] which tends to locate near points of air shipment. Also, many manufacturing firms locate near interstate highways and freeways since they use large trucks to ship their finished products and to receive their material inputs.

3. Market Oriented Industry

Industries included in this group are divided into two categories:

1) those that sell directly to customers, for example. S.I.C. 20 Food and Kindred Products, and

2) those that sell to other industries, e.g. wholesalers, like breweries that sell to retail liquor stores.

In both cases the firm is market-oriented with respect to the final product.[10] Such industries have tended to follow population. The plant space demands for industries in this group are integrally related to growths and shifts in population.

Conversely firms that produce for other industries are affected by changes in demand from firms they market to.

Industries with consumer markets usually seek reductions in transportation costs and distribution time by locating in as close proximity as possible to these markets.

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8 Kinnard, Jr., Wm., "Highways as a Factor in Small Manufacturing Plan Location Decisions," Small Business Management Research Reports, August 1961, p.23.

9 See Appendix A for an explanation of SIC code.

10 Malinowski, Kinnard, op.cit., p.17

Industries with goods that perish quickly will seek locations near consumption points, just as industries that need personal service and customer contact will. S.I.C. 27, Printing and Publishing Trades, is a good example of the latter category.

Goods with bulk and high transports costs also need production facilities near consumption points. S.I.C. 24, which includes producers and suppliers of building materials, requires space near population nodes so as to reduce transportation costs.

For the above reasons, the industries that are usually found in most urban communities are food processors; construction industries and printing industries. Population shifts then, have been seen to pace the demand for industrial space with regard to these industries.

4. Input Oriented Industry

Industries that need locations close to the source of their raw materials to aid in reducing transportation costs of raw materials to the plant fall in the category of supply oriented industry. These industries have been characterized by plants that need a lot of fuel (for example S.I.C. 33 Primary Metals) with those that need a complex type of fuel (S.I.C. 22 Glass Products which uses natural gas). Both of these kinds of plants therefore need locations near fuel sources. The costs of moving the requisite fuel for production.

The second group includes firms that are bound to site specific locations because their manufacturing process causes weight reduction in the raw material. S.I.C. 25 Furniture is an example. When bulk in the raw material is greatly reduced in the manufacturing process and when transportation costs are important, then that industry will need to have its location in close proximity to the source of its raw material.

5. "Footloose" Industries

Industries that do not have as major locational determinants any of the previously discussed factors and are relatively indifferent to input or output costs are in this category. They have been seen to be more attracted to areas with certain amenities for the firm. This group includes the fastest growth industries. SIC 38 Precision Instruments fits this category.

B. Land Requirements

1. Total Land Needs for Industry

Industries can be classified by the total land needed, employees per acre and parking space needed. Industrial sites should provide for 14 types of functions and must provide for at least these ten:

1. Processing or production
2. Material storage
3. Finished goods storage
4. Offices
5. Washrooms, lunch rooms, locker rooms
6. Heating and ventilating equipment
7. Repair and tool shops
8. Parking (employees)
9. Parking (visitors)

10. Loading and unloading[11]

Land should also be appropriate for:

1. Landscaping
2. Employee recreation
3. Garages for truck fleets
4. Internal walks (for large plants)[12]

Industries that require sites of 10 acres or less are called ancillary industries. In this category are found industries that offer subcontracted work, prefabrication and custom services to larger manufacturing companies, for example, S.I.C. 34 Fabricated Metals; S.I.C. 36 Electrical Machinery; S.I.C. 38 Precision Instruments; S.I.C. 27 Printing; and S.I.C. 23 Apparel.

Industries that require sites of 100 or more acres lie at the opposite end of the spectrum. Included in this category are industries that require high capital investments, such as S.I.C. 33 Primary Metals; S.I.C. 37 Transportation Equipment (especially aircraft manufacture); and S.I.C. 28 Chemicals.

2. Site Employment Densities

Another way that industries have been classified is by the number of employees on the major shift per acre. Those industries with a low ratio of employees per acre are termed labor-extensive; industries displaying a high concentration of employees per acre are termed labor intensive.

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11 This list is adapted from an article by Stuart P. Walsh, "Buy Enough Land," Orange Co. Industrial News, Santa Anna, California, 1958, p.26.

12 Ibid

Industries with low ratios of employment per acre, i.e., ten or fewer per acre, generally have fairly large total land areas. Examples of industries that fall into this group include Chemical Plants, steel and sluminum mills, and other industries that process raw materials. Labor extensive industries are capital intensive; they display a high ratio of capital investment perworker.

Labor extensive industries include instrument manufacturing, electronics and other industries that require highly skilled and professional personnel.[13]

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13 For a more indepth discussion of these concepts, see: Chapin, Stuart, F., Urban Land Use Planning,University of Illinois Press, 1965; also Felton, Maurice, "New Factors in Plant Site Selection," The Valuation Consultant, Vol. VI, No. 3, August 1969; and Grasskamp, James, "Physical-Technical Context of Real Estate Feasibility," in Society of Real Estate Appraiser: Chicago 1970.

Although there are firms of all sizes in the majority of industries that occupy both central and outlying sites and both old and new buildings, Table II gives both the general dimensions of industries and the number of employees they require per acre.[14]

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A study done by The Center for Urban Studies noted that in using "density characteristics" for estimating space requirements of industry two issues are very important. The first was that distortions can appear when no allowances are made for differences in the frequency of plant operations. Deceptively high employment densities are the outcome than of grouping single shift plants with plants that operate two or more shifts. The second is that there is a pitfall in using two-digit S.I.C. group data to characterize industrial density. William Kinnard in this study used two-digit "primary metals" (SIC 33) data and found a mean ratio of 833 square feet of land per worker but further refinements produced these variations for SIC 33

SIC 33 (undifferentiated)	862 sq.ft. per worker
SIC 331	1,816 sq.ft. per worker
SIC 334	872 sq.ft. per worker
SIC 339	1,122 sq.ft. per worker

Thus, whenever possible, it is important to employ three-digit, or even four-digit, codes when analyzing the industrial density of an area as using just S.I.C. Major group data may disguise significant variations among the industrial densities of its subgroups, see: Mid -Chicago Economic Development Study: Vol. III, Technical Supplement, Economic Development of Mid-Chicago (Chicago, William Kinnard 1966) pp89-91, 91-92

For the trends in the area of employees required by industry, see: Muncy, Dorothy, Space for Industry, Technical Bulletin No. 23, Washington, Urban Land Institute, 1954

3. Flexibility of Use of Manufacturing Buildings

Buildings for manufacturing processes are classified by various industrial developers as follows: single purpose, limited purpose, and general purpose. Developers have noted that whenever possible, industrialists desire buildings for flexible use rather than buildings built for one specific product or process.[15]

Industrialists have found that buildings designed for general purposes have longer economic lives than those structures built for a specific process: single purpose buildings have been subject to a high degree of functional obsolescence; general purpose buildings conversely have been seen easier to sell when vacated and easier to re-finance.

Special purpose buildings and their initial capital outlays are intended to provide optimum efficiency when initially constructed. The resultant effect is that they are less adaptable for other uses. S.I.C. 33 Primary Metal Products and S.I.C. 29 Petroleum Processes are in the category of industries that need special purpose buildings.

Processing plants are also likely to require special purpose buildings, sometimes even single purpose to allow for the exacting requirements of the particular user.

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15 Based on interviews with Mr. Franklin King and Cabot, Cabot and Forbes Development Co. and Mr. George Slye of the Spaulding and Slye Development Co., Boston, Mass., August 1973.

Light manufacturing and assembly functions can be provided for in general purpose and less specialized structures.[16]

An important point in Robert Boley's monograph Industrial Districts: Principles in Practice, was that after having assessed what the benefits for the location of specific industries were the designer should then "provide as much flexibility as possible in the layout plan."[17]

The reason for this advice lies in the fact that detailed structural development plans are difficult to re-adapt, changes are difficult and costly.

4. Industrial Parking Needs

A. Employees and Visitors

Developers have estimated that the following factors determine the size of the parking area needed for an industry:

1) Land Costs for parking only if they are too high, they can prohibit a plant location.
2) The number of vehicles and type of parking required for each shift (if shifts overlap, a proportionate increase in the total number of vehicles to be stored must be made).
3) Generally speaking, rectangular parking losts with access on two sides are least expensive because the shape and contour of the lot influence the total capacity of the lot.
4) Parking lots should have close proximity to the plant.

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16 Empirical evidence supporting this phenomenon in Boston is the conversion of the building that formerly housed Freedom Foods, Inc. on Columbia Road, Dorchester. It was formerly a supermarket, it now serves to house electronic assembly functions.

17 Boley, Robert E., Technical Bulletin Number 44, Urban Land Institute, December 1962, p.14.

TABLE II

Table of Industrial Densities

Industry Land Use Group	Industry and S.I.C. Code	Acres per 1000 Employees	Employees per Acre
I	Intensive	30	33
	23 Apparel		
	36 Electrical Machinery		
	38 Instruments		
II	Intermediate Intensive	40	25
	27 Printing and Publishing		
	37 Transportation Equipment		
III	Intermediate Extensive	90	11
	20 Food and Kindred		
	24 Lumber and Wood Product		
	25 Furniture and Fixtures		
	26 Pulp, Paper		
	28 Chemicals		
	30 Rubber Products		
	33 Primary Metals		
	34 Fabricated Metals		
	35 Machinery except ele.		
	39 Misc. Manufacturing		
IV	Extensive	375	3
	29 Petroleum and Coal		
	31 Leather and Leather Goods		
	32 Stone Clay and Glass		
	All industries not included	125	2
	Public Utilities	200	5

U.S. Department of Commerce, Office of Area Development, Future Development of the San Francisco Bay Area, 1960-2020, Washington: U.S. Government Printing Office, 1959.

Authors note: This exhibit is the outcome of a study done by William N. Kinnard in Philadelphia.

Because this thesis is primarily concerned with a plant locating in the city and hiring predominantly local neighborhood residents as employees, this variable of parking space has less relevance for discussion. Rooftop parking is a viable alternative in those situations where the requirement to hire local residents will not be fully realized or where more workers than the community can provide will be needed. Rooftop parking will require reinforced roof construction but is nonetheless a viable option for manufacturing plants because it allows the plant ground floor area to be maximized to the fullest extent possible and yet allow setbacks and landscaping.

B Parking for Truck Loading and Unloading

The amount of space requisite for truck loading depends on several variables:

1) the size of the market the firm serves
2) the amount of freight shipped (in and out)
3) the dimensions of the trucks serving the plant
4) the total floor area of the plant[18]

Municipal governing bodies have specified the parking and unloading area standards for most urban communities, dependant again, upon the above factors.

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18 Based on interviews with Franklin King of the Cabot, Cabot and Forbes Development Co., Boston, Mass., August 1973.

C. The Economic Effects on Community and Tax Base

There are several ways to assess the importance of industrial activity in urban communities. Planners commonly have measured the number of employees, and the Small Business Administration uses this measure as the dividing line between "small" and "large" firms although they oft times apply other criteria. Conversely, the dollar volume of a business is employed to distinguish "small" firms from "large" firms in the wholesaling, retailing and service trades.

The monetary means by which the roll of industry in the economy may be measured include: wages paid to employees; profits to the firm; gross receipts or sales; and value added. Value added is a very significant variable; most analyses have shown it to be the best dollar measure for comparing the relative economic importance of manufacturing activity among industries and/or among different geographic areas.[19]

Value Added by manufacture is derived for each industrial firm (and thereby for all establishments in an Industrial Group)[20] by subtracting input goods cost from the value of the shipments, and adjusting for the net change in finished goods that are in the completed inventory.

Manufacturing, which is the largest employer among industrial divisions in the national economy, is the largest single source of business taxes collected. In analyzing the fiscal effects of industry, it becomes apparent that to speak only about the stimulus manufacturing provides to the property tax is not sufficient.

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19 Wassily, W.Leontif, "The Structure of the United States Economy," Scientific American, April 1965, Vol 212, No. 4, p.10.

20 See Appendix A for an explanation of The Standard Industrial Classification and Industry Groups.

There is also the multiplier effect that is felt in a community when new employment income is generated. When the external stimulus is in the form of a new or expanded industry, this effect is more likely to happen rather than just an increase in service trade or commercial activity. Homer Hoyt founded his "economic base" theory on this premise.[21] Simply stated, his theory is based upon specialization in industry and intra industry exchange of products. According to Hoyt's theory, business firms in a community tend to specialize in goods production, some of which is consumed locally and the remainder is "exported." Manufacturing firms generally display the highest degree of specialization and are the largest exporters. As the export markets of the community expand, the export firms located there will also increase their purchases of locally produced goods. In a concomittant fashion, their workers will increase in both number and income. In this way, the income and export sector produces or causes increases in demand for more local businesses. The entire impact on the community's economy exceeds the increase in exports which stimulated the increase in the economic activity. Hoyt calls this effect the economic base multiplier.[22]

When the potential growth of a community is seen as being a function of the amount of its export activity, these activities are called basic activities. Activities that support these basic ones and serve the local

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21 Homer Hoyt: One Hundred Years of Land Values in Chicago: (University of Chicago Press 1933). The Utility of the Economic Base Method in Calculating Urban Growth. Land Economics XXXVII No. 1, Feb. 1961; also, "Importance of Manufacturing in Basic Employment," S.I.R. Newsletter (Washington: Society of Industrial Realtors, Jan.1970.

22 Ibid

markets are called non-basic. The relationship between basic and non-basic activities, usually measured in employment units, defines the local multiplier.[23]

So far the discussion on the impact of industrial firms on the community has emphasized employment, and justifiably so as employment is the most important of the factors that is influenced by changes in the number and activities of basic industries. Charles M. Tiebout[24] takes a broader view of the impact of industry on a community and uses the employment multiplier to forecast this impact:

> First the growth or decline of employment in basic industries is forecast for some time period. Then associated non-basic employment growth or decline can be determined. These projections can help greatly in forecasting changes in population, income, land use and the tax base. Forecasts of trends in these fields, in turn can be used in planning, zoning capital budgeting, taxes and expenditures, housing, transportation, electric, gas, telephone and other utility services as well as needs for many other services. 25

An income multiplier occurs when a new industry purchases most of its supplies within the community in which it is located and in so doing, the industry tends to increase activity in the supplying industries, or even attract other industries that would be dependent on the new industry which would further increase consumer expenditure. Consequently income and sales

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23 Ibid

24 The Community Income Base Study (New York: Committee for Economic Development, Dec. 1962)

25 Tiebout, op.cit., p.14

taxes increase with expanded business activity. These effects have led some researchers to estimate the local income multiplier to be approximately two times the original investment. This means a new plan with a $750,000 annual payroll will be expected to cause a total increase in local incomes of $1,500.000.

John E. Moes, in his study of metropolitan Witchita, Kansas, found that the addition of one industrial worker to supply outside markets led to an increase of about one and one third workers that would be engaged in serving local markets.[26]

Having discussed some important effects of industry on a community, consideration will now be given to the application of the selection criteria for industries in urban communities.

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25 John E. Moes, Local Subsidies for Industry, (Chapel Hill, North Carolina, University of North Carolina Press 1968); also see Chamber of Commerce of the U.S., What New Industrial Jobs Means to a Community, (Washington: Wm. Kinnard 1962).

CHAPTER TWO

THE EVOLUTION OF CRITERIA FOR INDUSTRY SELECTION

The object of this Chapter is to take a set of industries and, on the basis of their actual performance, create a method of ranking the industries so as to list them in order of preference for central city locations. Those industries that appear to contribute most to the goals of a community should receive the highest ranking. The tests that will be utilized in ranking these industries will be called criteria and are the focus of this Chapter.

The performance of six specific industries during the trend period 1966-1969 for black male participants in the City of Boston is the basis for the discussion of these criteria.

The percentages that will be shown represent the percent of the entire workforce that black males compose (except where elsewhere noted).

A data base existed for obtaining the black participation in the following years and locations: 1966 the Boston SMSA; 1969 the Boston SMSA and; 1969 the City of Boston

Criterion 1: The Industry must have the ability to attract and retain in employment residents of the community in which it is to be located.

A. A Description of the Data Base

In order to understand how a figure for black participation percentages for the City of Boston and hence a pattern for the City during the period 1966-1969, was established the 3 data sources are explained.

1) SMSA 1966: data on the percentage of black participation in the largest seven manufacturing industries were provided by the United

States Equal Employment Opportunity Commission Report Number One (E.E.O.C. Report #1)[1]

2) SMSA 1969: The 1970 Census, Second and Fourth Count Summary Tapes provided data for the black percentage participation rat or the SMSA.[2]

3) City 1969: The 1970 Census Sixth Count Summary Tapes provided data for percentage participation rates in Boston.[3]

There exists no data base from which percentage participation rate figures for Boston in 1966 could be obtained. In order to arrive at a good estimation of these rates for each industry the following equation was employed:

$$\frac{\text{1966 SMSA PARTICIPATION PERCENTAGE}}{\text{1966 CITY PARTICIPATION PERCENTAGE}} = \frac{\text{1969 SMSA PARTICIPATION PERCENTAGE}}{\text{1969 CITY PARTICIPATION PERCENTAGE}}$$

This equation and the derived rates are explained in greater detail in Section 2, "The City," of this Chapter.

1970 CENSUS MATERIAL

This data was taken from computer printouts of Second, Fourth and Sixth Court Summary Tapes. These reports gave much unpublished data that was

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1 Job Patterns for Minorities and Women in Private Industry, 1966 (U.S. Equal Employment Opportunity Commission, Washington, D.C.).

2 Manpower Package Number 10

3 Manpower Package Number 1

arranged in a comprehensive yet concise manner. Appendices B and C contain the material extracted for the purposes of this analysis.

E.E.O.C. DATA

E.E.O.C. personnel surveyed 43,000 employers in the United States who accounted for 26 million employees. Three major categories were used to classify these workers:

1) white collar;
2) skilled craftsmen;
3) semi-skilled or unskilled.

The subsequent reports included all industries with 100 or more employees and industries that held Federal contracts or first tier purchase order of $50,000 or more with 50 or more employees.

This portion of the analysis was delimited by the reporting technique of the E.E.O.C. report. Information was provided by the E.E.O.C. only on those industries that ranked in the top 15 in Massachusetts and in the Boston SMSA in 1966.

These industries accounted for 71% of the total SMSA industrial employment and the figures reported for black participation in these 15 industries show that 61% of black industrial participants were employed in these 15 industries.

The manufacturing sector industries that ranked among the top 15 industries in the SMSA in order of size in 1966 is as follows:

1) SIC 36 Electrical Machinery
2) SIC 35 Metal Machinery
3) SIC 38 Instruments

4) SIC 20 Food and Kindred Products

5) SIC 31 Leather Products

6) SIC 37 Transportation Equipment

7) SIC 27 Printing and Publishing

These seven industries constitute the university of 1966 SMSA manufacturing industries with participation rate data for black employees and hence comprises those industries for which a) participation rate patterns (1966-1969) were possible to derive; and b) a calculation of 1966 black participation rates for the City of Boston was estimated by the above equation.

B Participation Rates: Code D, Major Group Industries Boston City and S.M.S.A. Trends 1966-1969

1. THE S.M.S.A.

The data on Table III capsulizes the E.E.O.C. data required to analyze the proportion of blacks in each industry in 1966 for the S.M.S.A. SIC 35 Metal Machinery is shown as having the highest percentage of black participation among manufacturing industries and SIC 27 Printing and Publishing displays the lowest percentage black participants among coded industries.

A summary of the calculations provided by the 1970 Census tapes for both the City of Boston and the SMSA is presented in Table IV. It is interesting to note that, in comparing the data for the SMSA for the two time periods, the only manufacturing sector that had a net gain in total employment was SIC 37 Transportation Equipment. In this three year period all of the industries that comprised the largest 15 SMSA industries in 1966 lost between a low of 3,700 jobs for SIC 20 Food and Kindred, and 21,000 jobs -- for SIC 36 Electrical Machinery.

In reference to the present analysis, we see that SIC 20 Food and Kindred Products in the SMSA for 1969 had the greatest percentage of black employees; a position that it retained from 1966 when it also led all manufacturers in the SMSA in this category.

The only SIC whose figures suggest a relatively constant number of total participation on the SMSA level over the entire period is SIC 35 Metal Machinery Manufacturing whose SMSA total employment figure in 1966 was reported at 31,340 and in 1969 showed 31,112 employees. In terms of black participants in this industry the numbers changed from 878 2.8% black employees in 1966 to 704 in 1969 2.3% of the work force.

2. THE CITY

In order to get some indication of the pattern of black participation in the seven industries under analysis, a best estimate of employment percentage in Boston was derived by the equation in Table V. Basically what it indicates is that, all things being equal, if there was any kind of proportional relationship between the percentage of black employees engaged in different manufacturing activities in the City in 1969 and the S.M.S.A. in 1969 then it is more than likely that there is the same proportional relationship between the percentages of black participation for the various manufacturing firms in Boston and the SMSA in 1966.

The analysis then proceeds to derive for each SIC (except SIC 31 Leather whose figures were unclear) a best possible percentage figure that enable an estimation of what the 1966 participation rate in Boston for black employees was.

TABLE III

E.E.O.C. DATA

BOSTON SMSA 1966

MANUFACTURING SECTOR

SIC		TOTAL EMPLOYMENT	BLACK EMPLOYMENT	% BLACK
20	Food	18,757	764	4.1
27	Printing	13,839	239	1.7
31	Leather	18,309	343	1.9
35	Metal Machinery	31,340	878	2.8
36	Electrical Machinery	68,779	1,343	2.0
27	Transportation Equipment	14,776	267	1.8
38	Precision Instruments	21,488	475	2.2

TABLE IV

MEDIAN WAGES OF BLACK PARTICIPANTS
BY INDUSTRY, THE CITY OF BOSTON
AND THE SMSA 1969

		1969 City	1969 SMSA
SIC 20 Food	Median Wage:	6,135*	6,119*
	Wage Distribution:	32.9/5.9**	33.0/5.7**
	% Black Employees:	20.6%	6.8%
SIC 23 Apparel	Median Wage:	5,828	5,885
	Wage Distribution:	32.1/4.3	31.3/6.6
	% Black Employees:	10%	4.5%
SIC 27 Printing Publishing	Median Male Wage:	6,500	6,119
	Wage Distribution:	27.2/7.1	29.8/8.5
	% Black Employees:	7.6%	2.5%
SIC 28 Chemicals	Median Male Wage:	6,500	6,500
	Wage Distribution:	31.9/8.0	31,9/8.0
	% Black Employees:	3.3%	3.3%
SIC 30 Rubber and Plastics	Median Male Wage:	6,250	6,777
	Wage Distribution:	28.1/6.1	27.2/9.5
	% Black Employees:	23.4%	3.4%
SIC 34 Fabricated Metals	Median Male Wage:	6,584	6,607
	Wage Distribution:	22.3/13.4	23.9/15.9
	% Black Employees:	16.7%	4.1%
SIC 35 Metal Machinery	Median Male Wage:	6,397	6,571
	Wage Distribution:	28.5/11.4	27.7/15.9
	% Black Employees:	13.1%	2.3%
SIC 36 Electric Machinery	Median Wage:	6,642	6,948
	Wage Distribution:	20.4/10.6	20.1/19.7
	$ Black Employees:	18.8%	3.1%

TABLE IV (Cont'd)

MEDIAN WAGES OF BLACK PARTICIPANTS
BY INDUSTRY, THE CITY OF BOSTON
AND THE SMSA 1969

		1969 City	1969 SMSA
SIC 37 Transportation Equipment	Median Wage:	7,214	7,483
	Wage Distribution:	19,5/8.6	18.7/11.8
	% Black Employees:	20.3%	3.9% *
SIC 38 Instruments	Median Wage:	6,964	7,397*
	Wage Distribution:	28.8/9.6	22.6/21.2
	% Black Employees:	19.7%	4.9%

*
The figures for median wages and wage distribution are computed for black male participants.

**
In the wage distribution category for the notation X/Y: the X denotes the percentage of black male employees that earned less than $5,000 in 1969; the Y denotes the percentage of black male employees that earned over $10,000 in 1969.

Source: 1970 Census Second, Fourth and Sixth Count Summary Tapes.

Table V suggests that in Boston for year 1966 SIC 35 Metal Machinery employed the highest percentage of black participants followed by SIC 20 Food, SIC 36 Electrical Machinery and SIC 37 Transportation Equipment. A look at Table VI which graphs the participation trends for the City and the SMSA for these six industries shows that black participants in manufacturing activity took a percentage loss in SIC 35 Metal Machinery in Boston of 27%. SIC 27 Transportation Equipment shows the largest percentage gain (11%) and SIC 38 Precision Equipment follows with 10.9%. SIC 27 Printing shows the smallest percentage gain in black participants with a net gain of 2.5%.

The SMSA shows simultaneously that all of the industries that gained in the percentage of black participants in the city also gained in the percentage of black participants in the SMSA. SIC 38 Precision Instruments and SIC 20 Food show the largest gain at 2.7% and SIC 35 shows the only industry losing black participants with a loss of .5%.

The findings of this analysis show then that in decending order, these industries have shown the ability to attract and retain in employment the target group employees over a three year period the target group:

SIC	Industry
37	Transportation Equipment
38	Precision Instruments
20	Food and Kindred Products
36	Electrical Machinery

The decline in the percentage of black employees in an industry that has previously employed a comparatively high number of blacks can be partially explained by a statement of Donald N. Stone, Deputy Director of the Boston Office of Commerce and Manpower. In writing about large durable goods producers in Boston, Stone states:

TABLE V

FORMULA: $\frac{\text{1966 Boston SMSA Participation}}{\text{1968 Boston City Participation}} = \frac{\text{1969 Boston SMSA Participation}}{\text{1968 Boston Participation}}$

		1966 BOSTON ESTIMATION
SIC 20 Food	$\frac{4.1}{(X)} = \frac{6.8}{20.6}$	12.4%
SIC 27 Printing	$\frac{1.7}{(X)} = \frac{2.5}{7.6}$	5.1%
SIC 35 Non Electric Machinery	$\frac{2.8}{(X)} = \frac{2.3}{13.1}$	15.8%
SIC 36 Electric Machinery	$\frac{2.0}{(X)} = \frac{3.1}{18.8}$	12.1%
SIC 37 Transportation Equipment	$\frac{1.8}{(X)} = \frac{3.9}{20.3}$	9.3%
SIC 38 Precision Instruments	$\frac{2.2}{(X)} = \frac{4.9}{19.7}$	8.8%

TABLE VI

PERCENTAGE CHANGES IN BLACK PARTICIPATION BY INDUSTRY:

CITY AND SMSA 1966-1969

	1966 CITY	1969 CITY	CITY % CHANGE	1966 SMSA	1969 SMSA	SMSA % CHANGE
SIC 20 Food	12.9%	20.6%	+7.8%	4.1%	6.8%	+2.7%
SIC 27 Printing	5.1%	7.6%	+2.5%	1.7%	2.5%	+.8%
SIC 35 Metal Machinery	15.8%	13.1%	-2.7%	2.5%	2.3%	-.5%
SIC 36 Electric Machinery	12.1%	18.8%	+6.7%	2.0%	3.1%	+1.1%
SIC 37 Transportation Equipment	9.3%	20.3%	+11.0%	1.8%	3.9%	+2.1%
SIC 38 Precision Instruments	8.8%	19.7%	+10.9%	2.2%	4.9%	+2.7%

> The standardization of components and the regularized outward style changes in final durable goods means that there are few costs of uncertainty to minimize. Reliance on sub-contractors who specialize in certain aspects of production can be minimized. Instead a firm can produce its own components thus increasing in size. Larger and less variable production runs result in greater automation and consequently more floor space per worker. Since inventory will not lose its value due to style change, durable producers may purchase and store for the long term thus becoming their own suppliers. This has the effect of breaking the spatial link between the producer and his supplier ... By doing internally what is done by sub-contractors and suppliers in non-durable product, the durable goods producer replaces the external economics of agglomeration with his own internal economies. [1]

The effects of this trend perhaps have been felt significantly by SIC 35 Metal Machinery and is perhaps a plausible part of the answer to why this industry has lost 2.7% of its 1966 number of black participants in Boston and .5% of its black participants in the SMSA. It is important to remember that these trends of industry serve to exacerbate the plight of inner city residents in their attempts to secure the kinds of employment in areas inwhich they have skill.

Although Table 10 suggests that in terms of Boston, the above 4 industries are the only ones that, without reservation, fit the first criterion it is important that SIC 35 be included in further analysis because of the numbers of black employees it retained and SIC 27 if only because it ranked among the top 7 industries largest manufacturing industries in the SMSA for 1966.

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[1] See: Stone, Donald, Confer in Paper #11, A Model of Intra-Metropolitan Industrial Location, Conference of the American Institute of Planners, Atlanta, Georgia, Oct. 1973, pp 9-11.

Criterion 2: The industry must have a wage level of at least $5,000 annually and employ between 11-33 people per acre developed.

A. Determining Employment Density: The Table of Industrial Densities[2]

By virtue of the fact that the Table of Industrial Densities has been arranged for previous manufacturing planning studies[3] to facilitate the identification of industries by four specific factors which include: a) industry land use group; b) Standard Industrial Classification Code; c) number of acres the industry requires per 1000 employees; and d) number of employees required per acre, a composite look at whether or not the six industries under present analysis still qualify can now be taken. (See Table V)

In Table VII the industries that are now being tested are underlined. The labor-intensive industry group includes two of the industries being tested, SIC 36 Electrical Machinery and SIC 38 Precision Instruments, as they both require approximately 33 employees per acre. SIC 37 Transportation Equipment requires about 25 employees per acre as does SIC 27 Printing and Publishing and are classified as intermediate intensive in terms of their labor requirements. The remainder of the industries that are included in the present test, SIC 20 Food and SIC 35 Metal Machinery Manufacturing, fall neatly into the most extended definition of those industries that must provide required employment density. Both of these last two industries require 11 employees per acre.

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2 The reader will remember that Exhibit 2 of Chapter One aided in determining various industrial space/employee land needs, now it can be used as a planning instrument.

3 One such study done for Arthur D. Little on The Usefulness of Philadelphia's Industrial Plant: An Approach to Industrial Renewal (Camb. W. Kinnard, 1960

TABLE VII

LABOR DENSITY OF INDUSTRIES BY MEDIAN WAGE
AND WAGE DISTRIBUTION FOR BLACK PARTICIPANTS
BOSTON 1969

	INDUSTRY (SIC)	MEDIAN WAGE* ($)	WAGE DISTRIBUTION % below $5,000	% above $10,000
I Job Intensive Industry	23 Apparel	5,828,(3,425)**	32(81)**	4(0.0)
	36 Electrical Machinery	6,642,(4,706)	20(59)	11(.7)
	38 Instruments	6,964,(4,580)	29(62)	10(0.0)
II Intermediate Intensive Industry	27 Printing	6,500,(4,800)	27(53)	7(2.6)
	37 Transportation Equipment	7,214,(2,500)	20(60)	9(0.0)
III Intermediate Extensive Industry	20 Food	6,135,(3,732)	34(77)	7(1.2)
	24 Wood	0	0.0(0.0)	0.0(0.0)
	25 Furniture	3,900,(3,200)	51(100.0)	0.0(0.0)
	26 Paper	5,642,(2,090)	31(83)	6(0.0)
	28 Chemicals	7,078,(2,375)	27(100.0)	9(0.0)
	30 Rubber and Plastics	6,250,(4,071)	28(72)	6(0.0)
	33 Primary Metals	4,846,(0)	53(0.0)	0.0(0.0)
	35 Metal Machinery	6,397,(5,697)	29(47)	11(0.0)
	39 Miscellaneous Manufacturing	4,590,(3,307)	56(78.2)	8(0.0

Represents median wage figure of black male employees for Boston in 1969. Source: 1970 Census Manpower Package No. 10.

*

Census Op.Cit.

**

Parentheses enclose figures for black females, for 1969 in Boston 1970 Census Op.Cit.

The only industry that does not survive the test of being (even in an extended definition) labor intensive is SIC 31 Leather Products. The reason that SIC 31 does not qualify is because its process of manufacture requires only about 3 employees per acre and is, therefore, defined as being labor extensive. For this reason SIC 31 will no longer be considered as a prime prospect for central city industrial development.

B. Annual Median Wages

In terms of the median wages paid in 1969 to black male participants for the sic industries in Boston, Table VII clearly shows that all of the industries surpass the guideline of a $5,000 median annual salary.

C. Wage Distributions

The discussion of the distribution of the payroll among employees takes on increasing importance when the industry is also given the test of providing sufficient upward mobility for the community employees; i.e., there has to be evidence of an accessible career ladder within a proposed industry.

SIC 36 did very well as did SIC 37 when examined for evidencing career mobility for black male participants in Boston for the year 1969. (As for both SIC's 80% of the target groups employees earned over $5,000). SIC 34 Fabricated Metals ranks third among industries in which the target group employees earned above the minimum requirement in 1969, and along with SIC 36 evidenced the greatest percentage of black male participants who earned over $10,000). SIC 38 Precision Instruments came next and SIC 37 Transportation Equipment followed; these industries show percentages of 10 and 9 percent respectively.

The group of industries for present purposes of analysis with the greatest percentage of target group employed earning less than $5,000 in 1969 is led by SIC 20 (34%), followed by SIC 35 and 38 at 29%.

In summary, all of the industries that have been examined thus far have passed Part A of Criterion 2, as they all are labor-intensive in terms of production of their commodity. Part B of Criterion 2 again was not too restrictive a criterion for the industries in question. Part C was another story. None of the industries that this analysis has been devoted to thus far will be eliminated because of poor performance on this "quiz" however, as the acid test was intended to be Part A of Criterion 2.

The nine industries that also appear on Table VII are included in the analysis at this point even though they lack a data base that tests their performance under the first two criteria.

The last criteria is most critical and it will enable some, if only superficial, discussion on these nine industries that remain.

Criterion 3: Multi-Level Adaptability

A. The Importance of Production Planning Studies

The function of manufacturing is defined as the act of transforming raw materials into things that society consumes. The monitoring process for the act of manufacturing is termed production planning; it is defined as the process of, with a specific commodity in mind and prior to constructing space, allocating the personnel, materials, machines, tools, and money requisite for a pre-determined production level of that commodity.

Production planning, then, is responsible for attaining some or all of the following ends: 1) operating the plant over-time, at a pre-determined level of efficiency; 2) attaining a prescribed amount of benefits for the

firm; 3) assuring the full utilization of available plant facilities; and 4) reducing costs by means of continual research and development.[4]

This activity is considered by manufacturing engineers to be the basis of manufacturing activities. It is further felt by these professionals that the productivity of a firm is guided by the quality of the continual production planning (termed by these engineers as processing).

Well organized processes will assure efficient, beneficial operations; conversely poor processes will make for costly inefficient operations.

Urban oriented production planners are guided by the judgements of manufacturing engineers by virtue of the fact that these engineers not only have the requisite information on the specific manufacturing processes involved in a proposed urban industry, but also have knowledge of how those processes inter-relate such that planning for the development of urban multi-stored industrial space can be economically facilitated.

B. The Two Divisions of Industries in the Manufacturing Sector: Plant Industries and Process Oriented Industries

The manufacturing sector can basically be divided into two groups of activities or types of firms. The first group includes industrial firms whose activities are specific to the layout of a proposed plant. The second group is composed of industries whose activities allow for more flexibility in plant space utilization.

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4 Herbert, Wage, Manufacturing Engineering, McGraw Hill, (New York 1963), p.1.

1. Plant-Layout Specific Industries

Industries included in this group are those whose manufacturing process or product affect significantly or determine the manner in which their plant is situated, and hence affect or determine the design of the building. This category of industries require the situation of the equipmentto follow a specific sequence of operations and, therefore, plant-layout oriented firms require plants built for continual one-way (horizontal) material flow until the product is finished.[5]

2. Process Adaptable Industries

Manufacturers with different but related processes and products are included in the process layout category. SIC 34 Fabricated Metal Production is an example of an activity oriented towards processes and products rather than plant layout because it requires the grouping of all grinding and buffing operations in separate areas called "functional units." Firms that compose this category have more flexible use of men, personel, and equipment.[6]

Manufacturers in the latter category can generally adapt to multi-storied buildings. Of the six industries under analysis only one, SIC 20 Food and Kindred Products for most of its activities, requires a specific plant layout.

In review, then, the industries that do not require that a plant layout be specific to their production process, and, therefore, can be housed in multi-storied buildings, include the following from the original seven in the analysis:

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5 Ibid, p.5

6 Boley: Industrial Districts: Principles in Practice, Technical Bulletin, No. 44, U.L.I., p.14

SIC 27 Printing and Publishing

SIC 35 Metal Machinery

SIC 36 Electrical Machinery

*SIC 37 Transportation Equipment

SIC 38 Instruments

Manufacturing engineers have found that due to the multitude of detail in industrial construction, and also because of the continual changes in the appreciations of construction materials and methods in this area, when one is attempting to discern whether or not a specific industry is adaptable to multi-level space, the cost of the finished product is the most important variable. The firm must receive benefits that outweigh its operating costs. The cost benefit relationships will be discussed in greater depth in Chapter Four.

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* Sometimes may require more than 10 acres.

CHAPTER THREE

MATRIX FOR THE CHOICE OF URBAN INDUSTRY

The matrix displayed in this Chapter allows the reader to use the selected criteria, for choosing among any of the fourteen major group manufacturing industries analyzed in this thesis, so as to determine whether or not that industry can locate in a particular urban community.

A. Components of the Matrix

Under the column headed industry are all of the industries that have been discussed with their major industrial classification numbers.

The column numbered one, headed Attraction and Retention 1966-1969 provides either yes or no statements based on the record of that industry during the three years (1966-1969) not only in the amount of percentage gains or losses in target group participants in the city, but also based on their gains and losses of this target group in the SMSA. Thus, a two-level analysis has gone into the decision of "yes" or "no" under this criterion. Where there wasn't any data for the analysis "no data" is shown.

Criterion 2 is shown in the third column and is headed, Wages - Job Density. What is tabulated here are, again, "yes" or "no" answers for each industry in reference to wage levels (the median annual wage must be over $5,000 in 1969). The second portion of the column works in essentially the same manner. The "yes" or "no" response indicates whether the industry is labor intensive or not, and the roman numerals serve to define which Industry Land Use Group the industry falls into, where:

(33 employees per acre) indicates labor intensive industry (I)

(25 employees per acre) indicates intermediate intensive industry (II)

(11 employees per acre) indicates intermediate extensive industry (III)

The plant orientation issue for these industries and hence their adaptability to multi-storied buildings is in the column numbered 3 and headed Adaptability. If the major portion of activities within that industry are process oriented, the industry is determined adaptable and given a "yes." If the activity of the industry require a specific plant layout for its goods to be produced it is determined not adaptable and given a "no" response.

The Summary column provides the final decision. Where required, any contingencies that enable or inhibit central city locations for a specific industry using these criteria and hence that could change the decision that is provided in this column on any of the other three are noted.

The column headed Inner City Rating ranks the fourteen industries discussed in the analysis on a 1-4 scale where (1) denotes prime possibilities; (2) good possibilities; (3) acceptable possibilities (these usually have attached contingencies) and; (4) those industries that are not acceptable given the guidelines and criteria set forth in this thesis.

B. Industries and Their Ratings

Three Major Groups of industries surface as incompatible with the ends for urban environment. These three industries are SIC 28 chemicals, SIC 30 Rubber and Plastics, and SIC 33 Primary Metals. The reason they are incompatible is their huge land and utility requirements.[1] In the case of SIC 33 in 1969 the target group participants did not earn on average, $5,000 in wages.

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[1] See: Charles Sargent; Land for Industry, Urban Land, Vol. 23, No. 2, Feb. 1964, p.5.

MATRIX

INDUSTRY	Attraction & Retention 1966-1969	Wages yes-no	Job Density (density group)	Adaptability Type Orientation
SIC 20 Food	yes	yes	yes III	no, plant layout oriented
SIC 23 Apparel	no data	yes	yes I	yes, process oriented
SIC 24 Wood	no black employees (1969)	yes		
SIC 25 Furniture	no data	no	yes III	yes, process oriented
SIC 26 Paper	no data	yes	yes III	no, plant layout oriented
SIC 27 Printing	no	yes	yes II	no, plant layout oriented
SIC 28 Chemicals	yes	yes	yes III	no, plant layout oriented
SIC 30 Rubber and Plastics	no data	yes	yes III	no, plant layout oriented
SIC 33 Petroleum Metals	no data	yes	yes III	no, plant layout oriented
SIC 34 Fabricated Metals	no data	yes	yes III	yes, process oriented
SIC 35 Metal Machinery	no	yes	yes III	yes, process oriented
SIC 36 Electrical Machinery	yes	yes	yes I	yes, process orientation
SIC 37 Transportation Equipment	yes	yes	yes II	no, plant layout oriented
SIC 38 Instruments	yes	yes	yes I	yes, process orientation
SIC 39 Miscellaneous Manufacturing	no data	no	yes III no IV	yes, process oriented

MATRIX

Rating Legend
1 prime possibility
2 good
3 acceptable
4 not acceptable

INDUSTRY	Summary Decision yes-no	
SIC 20 Food	yes	4
SIC 23 Apparel	yes, contingent on 1	3
SIC 24 Wood	no	4
SIC 25 Furniture	no, doesn't meet wages	4
SIC 26 Paper	no, not adaptable	4
SIC 27 Printing	yes, adaptable job and business printing of small scale	1
SIC 28 Chemicals	no, not adaptable	4
SIC 30 Rubber and Plastics	no, not adaptable environmental	4
SIC 33 Petroleum Metals	no, wages low not adaptable	4
SIC 34 Fabricated Metals	yes, contingent on 1	2
SIC 35 Metal Machinery	yes, 1 shows growth	3
SIC 36 Electrical Machinery	yes	1
SIC 37 Transportation	no, requires more than 10 acres	4
SIC 38 Instruments	yes	1
SIC 39 Miscellaneous Manufacturing	no, wages too low, no labor extensive	4
		4

Explanations for number (4) ratings for the other seven industries are noted in the Summary column.

Three industries received number (3) in this rating system. SIC 23 Apparel may actually rate a number(2) but a higher rating is contingent upon its performance under Criterion 1: Attraction and Retention of the target group.

SIC 20 Food and Kendred Products again may rate a number (2). The reason it has a (3) is because the nature of the majority of its activities are plant layout oriented and hence incompatibility arises.

SIC 35 Metal Machinery received a (3) in rating because a (2) or possibly even a (1) would be contingent upon on its present growth in the percentage of target group participatnts. In the trend period 1966-1969 for the city this industry did show growth in the participation rate of black male participants.

Only one industry was rated as a good possible industry for urban adaptation, SIC 34 Fabricated Metals.

This concludes discussion on those manufacturing activities that are consistent with the criteria employed in this thesis for a particular urban location. The matrix, however, is also intended for broader planning applications. The use of such planning instruments, whenver they address broad segments of society as this one is intended to do, are usually closely related to the policies of governing public agencies. Chapter Four serves as the recommendation section and treats discussion of this subject.

CHAPTER FOUR

REMARKS AND RECOMMENDATIONS

There are limited amounts of funds available to public agencies for investment in programs for public welfare, why then should public agencies use investment funds to re-establish manufacturing districts in the inner city as this thesis has suggested? The critical question is: if ranked with other public investment proposals, would the benefits of industrialization programs outweigh the costs of such programs.

The reader will probably ask at this point "why use this kind of analysis? Why don't you decide on those types of programs that, guided by regular accounting procedures, prove profitable?" The answer is that activities that count as benefits or losses to one part of the economy or two one or more persons or groups, do not always count as benefits or losses to the economy as a whole. Therefore, in using a cost/benefit analysis, concern can be given to an entire local economy and to the welfare of a defined society, instead of to just a small part of that economy or society.

Donald N. Stone in his monograph, Urban Industrial Development in Boston has noted that:

> Local industrial subsides are opposed because it is felt that they are conducive to a 'beggar thy neighbor' attitude by localities which pirate firms from other cities and in so doing 'artificially' re-arrange the pattern of industrial activities. All of this leads to the inefficiencies which reduce the gross regional/ metropolitan product. 1

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1 See Donald N. Stone, Urban Industrial Development in Boston, B.E.D.I.C.

But further he notes:

> ... from the point of view of the firms, the subsidy increases inefficiency otherwise the firm would not accept it. Second if there are market imperfections in the city's land market, its information dissemination or its housing market then the subsidy in compensating for this imperfection would put localities in the metropolitan area or state on a more equal footing. 2

The means by which private corporations and businesses pursue their objectives, with either "tried and true" experience or by using mathematical programming, are guided by the mandate that requires revenues to exceed costs in operational terms:

$$R_j > C_j \text{ at location } j$$

where R_j = revenues at site j

and C_j = costs at site j

The profit motive as a guide for the direction of a firms operations does not deny the fact that these enterprises do generate benefits for the employees, and customers, and also to the general public by virtue of taxes. But these benefits accrue only so long as they coincide with the generation of profits for the enterprise. If the firm "runs in the red" for too long it will "go under" unless it receives a public subsidy. If it is to survive such a situation and remain a private concern, (and hopefully expand the scale of its operations), it has to generate profits over a span of time, or

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2 Ibid

attract investors. The "invisible hand" of Adam Smith that directs the profit orientation would supposedly then take control and steer the firm to survival in the business world and enable it to give benefits to society at large.[3] The scenario in which only profit as a motive becomes a benefit for society has been looked at in two ways:

1) that perfect competition exists in all economic interactions and;
2) that all effects related to individual welfare are priced correctly in the market.[4]

Since the two points above portray an ideal economic setting and since this setting in reality does not exist, it could be questioned whether or not another set of output and prices could not better serve the public interest than the present set of outputs, and prices.

By using a cost/benefit analysis to appraise the merit of urban industrial development, the question posed above is not so different than that type of question that an accountant in a private concern would pose. The difference is in the fact that the questions this thesis addresses concern a wider group of people. Instead of asking whether only the entrepreneurs will be better off, these questions address whether a broader cross-section of society will be better off due to public agency input in urban industrial development programs. Instead of using the term revenue in such an analysis, the

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3 Samuelson, Paul, Economics (McGraw-Hill 1973), p.633

4 A.P. Lerner advanced this point in his book, The Economics of Control, p.17

term social benefit is substituted. Instead of costs, the term opportunity costs will be used, (i.e., the social value forgone when resources are transferred from other economic activities to re-establish urban manufacturing activity.)

Of course, this type of analysis is not a society cure-all. Economists have found that cost/benefit analyses tend to simulate the effects of an ideal price system that would then require an ideal cost/benefit analysis that would be most difficult to employ. For example, as a result of a perfect price system, the resources would have to be optimally allocated; but this fact alone would not assure one that social and private benefits would be equal throughout such an economy. Alfred Marshall described this phenomenon as the "divergence between private and social return" when he discussed the external economics of production.[5]

The criteria of Cost/Benefit Analysis (C/B) require, among other things, that the benefits exceed costs. Because of this, C/B analysis can be mistaken by some with a particular social judgement as an economic arrangement which can make everyone better off. Kenneth Arrow has shown that consensus for the selection of one alternative, with the benefits and costs of that choice pleasing everyone, is impossible in a democracy.[6]

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5 See Principles of Economics 8th Edition

6 Arrows work attempted to devise a theorm on democratic group decisions and confronted the problem of setting up reasonable prcedures to reconcile differing desires into group decision. He demonstrated that it is impossible to select among all possible sets of alternatives without violating at least one of the four criteria he had initially thought plausibly acceptable: Included in Social Choice and Individual Values; Cowles Commission Monograph No. 12, New York, John Wiley and Son, 1951.

It appears then, for publicly sponsored programs aimed at re-establishing urban industrial districts to be socially approved, that it is not enough for the findings in C/B analyses to be positive. The finding must also show that the resultant distributional changes are not regressive and no gross inequities for a community or its residents will ensue.

The distributional changes that I speak of are those changes implemented by subsidy which will make more broad cross sections of society better off in the form of positive net benefits. In the words of Donald N. Stone:

> ... a redistribution of activities which could stabilize efficiency and increase equity would be especially valuable. And it is possible that efforts to specialize in a few industries would include different industries because of land or labor shortages to move to other areas where they too, can be a part of a specialization system.

Herein Stone sees a need for total concern for efficiency ... "a dollar is a dollar no matter who spends it," to quote him, and equity concerns are herein ignored. This phenomenon is called a Pareto improvement and is the basis for this chapter.[7]

This test disregards the quantitative changes that accrue from changes brought about by the resultant income distribution. The test of Pareto improvements in C/B analysis then disregards distributional outcomes as economists attach no weight to these outcomes.[8] This test shows conversely only that the total of the gains exceeds the total of the losses. It is instructive in this respect to observe the resultant distributions brought about by model inner city industrial programs and the recommendations made for those programs.

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[7] See Urban Industrial Development In Boston, Confer-In Paper #76, Boston Economic Development and Industrial Commission; Boston City Hall. The Pareto Criterion is that: "Any change which harms no one and which makes some people better off must be considered to be an improvement. Source Manuel d"Economic Politique 2nd Ed. (Gerard, Paris, 1927).

[8] See J. deGraff, Theoretical Welfare Economics, pp. 25-27, 60-70.

Granted that the Pareto Calculation is seldom used by decision makers but it is important to note that any increase in competitive activity and/or progressive change in the structure makes it more apparent that a Pareto Improvement has taken place.

In viewing taxes and subsidies as equalizers of income (taxes and subsidies are herein defined as generators of redistributive transfers), any potential Pareto improvement is changed into an actual Pareto improvement.

In the context of the "real world," where industrial projects have the potential to be distributionally regressive,[9] this thesis has attempted to say something about the distributions that ought to ensue from public agency action to re-establish industry in the central city for the benefit of residents.

The lack of data and time inhibits this writer from placing a value on all the requirements and effects which different industries might have or cause. These are the spillover effects[10] (positive or negative) that industrial realtors and private developers do not address and/or the literature review did not contain. These spillover effects can be measured in principle, but it is more difficult to assign to them reliable dollar figures for each industry to be re-located. Due to this fact it was virtually impossible in this thesis to project the spillover effects of an industry according to a proposed location in Boston.

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9 Classical economic theory defines redistributive transfers as they apply to taxes the incidence of taxation wherein a portion of the tax on manufactured goods is passed on to the consumer in the form of higher prices.

10 Effects that do not register on the market but can be measured in terms of money although as Pegou said, "with the measuring rod of money" the amount of variance in the compensation of a society or person.

In summation my focus was:

1) to let the readers know why I addressed the question of revitalization of inner city manufacturing
2) to provide a methodology for determining which industries should be located in the central city area
3) to prevent equating probable political situations with the C/B analysis technique; because as with most discussion of political situations, the right of independent criticism is reserved for the reader.

In conclusion the industries that were rated as prime possibilities for central city locations as an outcome of this analysis would be:

SIC 36 Electrical Machinery

SIC 38 Precision Instruments

SIC 27 Printing and Publishing

The first two of the above industries have met the three basic criteria but where as Printing has met the criteria of wages and labor density it has not met criterion number one or three it is included as the foregone discussion has shown it to be one of the basic industries in urban communities.[11]

SIC 34 Fabricated Metals was rated as a good possibility because this industry met all of the criteria except number one where no data was available. If further research shows a pattern of its attracting and retaining in employing this target group, then its rating would change to a one.

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11 See Chapter I, Market Oriented Industry

SIC 20 Food and Kindred Products, SIC 23 Apparel and SIC 35 Metal Machinery all rated a number three. SIC 23 Apparel, qualifies for a location in the central city with the contingency that its record of performance under the first criteria is proven statistically good. Although SIC 35 Metal Machinery received a no response for the first criterion, the reader will remember that this industry has ranked among the largest employers of black workers. SIC 20 Food and Kindred Products was rated an acceptable possibility also even though it failed to meet the criterion of adaptability. The reason that it was given a three was again that in Chapter One this industry was seen to be a basic one for urban communities, thus the failure to meet the third criterion is partially off-set.

The reader should bear in mind that although SIC 24 was discussed in Chapter One as being one of the basic industries for the central city the matrix rates it a number four as an outcome of this analysis. The reason for its being given a four is because this industry had no black participants in 1969 in tabulations for the city. The remaining industries are shown not acceptable for central city locations because of a myriad of that would arise due to the needs for their manufacturing processes.[12]

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12 For detailed analyses of these needs, the reader should refer to: Charles Sargent, Land for Industry, Urban Land, Vol. 23 No. 2, Feb. 1964; Melvin Greenhut, Plant Locations in Theory and Practice, Chapel Hill, University of North Carolina Press 1965, and; Robert Boblett, Factors in Industrial Location, S.I.R. Newsletter, July-August 1969.

TABLE VIII

MATRIX

INDUSTRY	Attraction & Retention 1966-1969	Wages yes-no	Job Density (density group)	Adaptability Type Orientation
SIC 20 Food	yes	yes	yes III	no, plant layout oriented
SIC 23 Apparel	no data	yes	yes I	yes, process oriented
SIC 24 Wood	no black employees (1969)	yes		
SIC 25 Furniture	no data	no	yes III	yes, process oriented
SIC 26 Paper	no data	yes	yes III	no, plant layout oriented
SIC 27 Printing	no	yes	yes II	no, plant layout oriented
SIC 28 Chemicals	yes	yes	yes III	no, plant layout oriented
SIC 30 Rubber and Plastics	no data	yes	yes III	no, plant layout oriented
SIC 33 Petroleum Metals	no data	yes	yes III	no, plant layout oriented
SIC 34 Fabricated Metals	no data	yes	yes III	yes, process oriented
SIC 35 Metal Machinery	no	yes	yes III	yes, process oriented
SIC 36 Electrical Machinery	yes	yes	yes I	yes, process orientation
SIC 37 Transportation Equipment	yes	yes	yes II	no, plant layout oriented
SIC 38 Instruments	yes	yes	yes I	yes, process orientation
SIC 39 Miscellaneous Manufacturing	no data	no	yes III no IV	yes, process oriented

TABLE VIII (Cont'd)

MATRIX INDUSTRY	Summary Decision yes-no	Rating Legend 1 prime possibility 2 good 3 acceptable 4 not acceptable
SIC 20 Food	yes	4
SIC 23 Apparel	yes, contingent on 1	3
SIC 24 Wood	no	4
SIC 25 Furniture	no, doesn't meet wages	4
SIC 26 Paper	no, not adaptable	4
SIC 27 Printing	yes, adaptable job and business printing of small scale	1
SIC 28 Chemicals	no, not adaptable	4
SIC 30 Rubber and Plastics	no, not adaptable environmental	4
SIC 33 Petroleum Metals	no, wages low not adaptable	4
SIC 34 Fabricated Metals	yes, contingent on 1	2
SIC 35 Metal Machinery	yes, 1 shows growth	3
SIC 36 Electrical Machinery	yes	1
SIC 37 Transportation	no, requires more than 10 acres	4
SIC 38 Instruments	yes	1
SIC 39 Miscellaneous Manufacturing	no, wages too low, no labor extensive	4 4

APPENDIX A

The Standard Industrial Classification System

APPENDIX A

The Standard Industrial Classification System

The United States Bureau of the Budget published The Standard Industrial Classification System, for purposes of identification and analysis, groups industries. This system is usually referred to as S.I.C. It aids planners in two ways; firstly it helps define and separate the areas of concern in industry by showing the types of finished goods and processes closely related to one another. More importantly, this coding scheme helps to identify the characteristics of similar processes and activities that are related.

This system of code identification speaks to types of economic activity in the United States economy and goes into successivley greater detail as the size of the activity grouping decreases.

There are four stages of classification and code identification which are arranged in decreasing order of size in the component group; these are the one digit Divisions, the two digit Major Groups, the three digit Groups and the four digit Sub-Groups.

Manufacturing which has the Division Code D consists of 21 Major Groups (2 digit) that have 148 Groups (3 digit) which, further delineated, have 422 Sub-Groups (4 digit).

As an example of the working of the system consider S.I.C. 34 Fabricated Metal Products. Table VI shows SIC 34 is composed of 9 Groups that have statistical reports. SIC 342 Cutlery, Hand Tools and General Hardware, is subdivided into 4 Sub-Groups:

Cutlery SIC 3421,

Hand and Edge Tools SIC 3423,

Hand Saws and Saw Blades SIC 3425, and

Hardware, not elsewhere classified SIC 3429

Source: U.S. Bureau of the Budget Standard Industrial Classification Manual (Washington: U.S. Government Printing Office 1967) pp

TABLE IX

The Nine Three Digit Groups of Major Group 34, Fabricated Metal Products in the Standard Industrial Classification System

SIC CODE	GROUP TITLE
341	Metal cans
*342	Cutlery, hard tools, and general hardware
343	Heating apparatus (except electric) and plumbing fixtures
344	Fabricated structural metal products
345	Screw machine products and bolts, nuts, screws, rivits and washers
346	Metal stamping
347	Coating, engraving and allied services
348	Miscellaneous fabricated wire products
349	Miscellaneous fabricated metal products

Source: U.S. Bureau of the Budget, Standard Industrial Classification Manual (Washington: U.S. Government Printing Office 1967) pp. 137

APPENDIX B

PARTICIPATION RATES
1969 CITY OF BOSTON
FOR SELECTED INDUSTRIES

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 20 FOOD, CANNING, PRESERVING, PRODUCE, SEAFOOD, BEVERAGES

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	865	100.0	579	100.0	286	100.0
White	699	80.8	476	82.2	223	78.0
Black	159	18.4	103	17.8	56	19.6
Other races	7	.8	0	0.0	7	2.4
Spanish American	48	5.5	41	7.1	7	2.4

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	578	103	41
Median earnings	$6,918	$5,976	$6,458
Percent with earnings	100.0	100.0	100.0
Below 2,000	3.6	0.0	0.0
Below 4,000	15.9	9.7	36.6
Below 5,000	24.6	30.1	36.6
Below 6,000	38.2	50.5	36.6
Above 10,000	14.4	5.8	0.0
Above 15,000	3.1	0.0	0.0
Female			
Total with earnings	289	56	0
Median earnings	$4,216	$4,111	0
Percent with earnings	100.0	100.0	100.0
Below 1,000	8.0	8.9	0.0
Below 2,000	17.6	21.4	0.0
Below 3,000	30.4	21.4	0.0
Below 4,000	45.0	46.4	0.0
Below 5,000	68.2	78.6	0.0
Above 10,000	1.7	8.9	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 20 FOOD - MEAT PRODUCTS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	993	100.0	722	100.0	271	100.0
White	784	79.0	562	77.8	222	81.9
Black	195	19.6	149	20.6	46	17.0
Other races	14	1.4	11	1.5	3	1.1
Spanish American	58	5.8	58	8.0	0	0.0

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	741	147	64
Median earnings	$7,845	$7,475	$5,111
Percent with earnings	100.0	100.0	100.0
Below 2,000	8.2	10.9	35.9
Below 4,000	15.7	15.0	45.3
Below 5,000	19.2	17.7	45.3
Below 6,000	30.6	30.6	87.5
Above 10,000	17.4	12.9	0.0
Above 15,000	2.2	0.0	0.0
Female			
Total with earnings	286	46	10
Median earnings	$5,882	$4,400	$3,500
Percent with earnings	100.0	100.0	100.0
Below 1,000	7.3	32.6	0.0
Below 2,000	10.8	32.6	0.0
Below 3,000	14.0	32.6	0.0
Below 4,000	18.9	41.3	100.0
Below 5,000	29.0	63.0	100.0
Above 10,000	0.0	0.0	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 20 FOOD - OTHER FOOD INDUSTRIES

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	1,988	100.0	1,212	100.0	776	100.0
White	1,648	82.9	980	80.9	668	86.1
Black	319	16.0	222	18.3	97	12.5
Other races	21	1.1	10	.8	11	1.4
Spanish American	41	2.1	32	2.6	9	1.2

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	1,220	215	32
Median earnings	$7,086	$6,013	$3,454
Percent with earnings	100.0	100.0	100.0
Below 2,000	6.5	7.9	25.0
Below 4,000	12.8	14.9	59.4
Below 5,000	23.1	34.9	87.5
Below 6,000	38.0	49.8	87.5
Above 10,000	17.0	5.1	0.0
Above 15,000	1.3	0.0	0.0
Female			
Total with earnings	782	97	9
Median earnings	$3,780	$4,178	$4,500
Percent with earnings	100.0	100.0	100.0
Below 1,000	10.5	21.6	0.0
Below 2,000	14.2	21.6	0.0
Below 3,000	24.0	25.8	0.0
Below 4,000	57.3	42.3	0.0
Below 5,000	81.2	85.6	100.0
Above 10,000	0.0	0.0	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 23 APPAREL

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	5360	100.0	1292	100.0	4068	100.0
White	4267	79.6	1102	85.3	3165	77.8
Black	537	10.0	163	12.6	374	9.2
Other races	556	10.4	27	2.1	529	13.0
Spanish American	235	4.4	80	6.2	155	3.8

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	1324	162	92
Median earnings	$6252	$5828	$5628
Percent with earnings	100.0	100.0	100.0
Below 2,000	8.5	0.0	0.0
Below 4,000	20.4	11.1	13.0
Below 5,000	32.3	32.1	26.1
Below 6,000	46.4	53.7	64.1
Above 10,000	16.1	4.3	13.0
Above 15,000	5.5	0.0	0.0
Female			
Total with earnings	4344	398	161
Median earnings	$3417	$3425	$3431
Percent with earnings	100.0	100.0	100.0
Below 1,000	5.9	6.3	8.7
Below 2,000	18.5	19.6	15.5
Below 3,000	38.6	39.9	42.2
Below 4,000	66.0	63.6	60.2
Below 5,000	83.8	80.9	85.1
Above 10,000	.9	0.0	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 24 WOOD PRODUCTS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	44	100.0	44	100.0	0	0.0
White	44	100.0	44	100.0		
Black						
Other races						
Spanish American	14	31.8	14	31.8		

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	44		14
Median earnings	$5,846		$5,875
Percent with earnings	100.0	100.0	100.0
Below 2,000	25.0		
Below 4,000	25.0		
Below 5,000	25.0		
Below 6,000	54.5		57.1
Above 10,000	11.4		
Above 15,000	0.0		
Female			
Total with earnings			
Median earnings			
Percent with earnings			
Below 1,000			
Below 2,000			
Below 3,000			
Below 4,000			
Below 5,000			
Above 10,000			

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 25 FURNITURE

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	799	100.0	636	100.0	163	100.0
White	682	85.4	557	87.6	125	76.7
Black	107	13.4	79	12.4	28	17.2
Other races	10	1.3	0	0.0	10	6.1
Spanish American	23	2.9	23	3.6	0	0.0

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	641	84	23
Median earnings	$7,012	$3,900	$6,812
Percent with earnings	100.0	100.0	100.0
Below 2,000	12.0	27.4	0.0
Below 4,000	20.0	51.2	0.0
Below 5,000	24.2	51.2	21.7
Below 6,000	34.8	70.2	21.7
Above 10,000	12.5	0.0	0.0
Above 15,000	2.2	0.0	0.0
Female			
Total with earnings	173	24	16
Median earnings	$4,414	$3,200	$4,000
Percent with earnings	100.0	100.0	100.0
Below 1,000	10.4	16.7	0.0
Below 2,000	24.9	41.7	50.0
Below 3,000	27.7	41.7	50.0
Below 4,000	38.7	83.3	50.0
Below 5,000	65.9	100.0	100.0
Above 10,000	0.0	0.0	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 26 PAPER AND ALLIED PRODUCTS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	1,264	100.0	866	100.0	398	100.0
White	975	77.1	620	71.6	355	89.2
Black	279	22.1	246	28.4	33	8.3
Other races	10	.8	0	0.0	10	2.5
Spanish American	56	4.4	42	4.8	14	3.5

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	878	242	51
Median earnings	$7,202	$5,642	$5,100
Percent with earnings	100.0	100.0	100.0
Below 2,000	3.5	5.0	0.0
Below 4,000	19.7	26.9	49.0
Below 5,000	23.0	31.4	49.0
Below 6,000	35.6	60.3	58.8
Above 10,000	15.8	5.8	0.0
Above 15,000	5.2	2.1	0.0
Female			
Total with earnings	401	30	13
Median earnings	$3,824	$4,090	$4,071
Percent with earnings	100.0	100.0	100.0
Below 1,000	15.2	33.3	0.0
Below 2,000	24.4	33.3	0.0
Below 3,000	34.2	46.7	46.2
Below 4,000	53.4	46.7	46.2
Below 5,000	71.6	83.3	100.0
Above 10,000	0.0	0.0	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 27 PRINTING AND PUBLISHING

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	6,016	100.0	3,551	100.0	2,465	100.0
White	5,508	91.6	3,211	90.4	2,297	93.2
Black	458	7.6	317	8.9	141	5.7
Other races	50	.8	23	.6	27	1.1
Spanish American	87	1.4	73	2.1	14	.6

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	3,591	324	64
Median earnings	$7,379	$6,500	$5,545
Percent with earnings	100.0	100.0	100.0
Below 2,000	11.4	11.1	12.5
Below 4,000	21.4	21.9	31.3
Below 5,000	28.1	27.2	31.3
Below 6,000	36.5	45.1	65.6
Above 10,000	24.1	7.1	
Above 15,000	5.2	1.5	
Female			
Total with earnings	2,467	152	14
Median earnings	$4,513	$4,800	$3,500
Percent with earnings	100.0	100.0	100.0
Below 1,000	9.5	17.8	
Below 2,000	21.9	23.7	
Below 3,000	30.9	34.2	
Below 4,000	42.9	36.8	100.0
Below 5,000	56.7	53.3	100.0
Above 10,000	3.3	2.6	

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 28 CHEMICAL AND ALLIED

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	1,172	100.0	710	100.0	462	100.0
White	1,017	86.8	578	81.4	439	95.0
Black	140	11.9	123	17.3	17	3.7
Other races	15	1.3	9	1.3	6	1.3
Spanish American	5	.4	5	.7	0	0.0

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	701	120	5
Median earnings	$7,745	$7,078	$5,500
Percent with earnings	100.0	100.0	100.0
Below 2,000	6.1	5.0	0
Below 4,000	11.3	11.7	0
Below 5,000	16.3	26.7	0
Below 6,000	26.4	32.5	100.0
Above 10,000	28.8	9.2	0
Above 15,000	8.3	0.0	0
Female			
Total with earnings	455	21	0
Median earnings	$4,456	$2,375	0
Percent with earnings	100.0	100.0	100.0
Below 1,000	7.9	19.0	0
Below 2,000	18.2	42.9	0
Below 3,000	25.7	61.9	0
Below 4,000	44.2	85.7	0
Below 5,000	56.9	100.0	0
Above 10,000	3.5	0	0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 30 RUBBER AND MISC. PLASTICS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	897	100.0	670	100.0	227	100.0
White	687	76.6	508	75.8	179	78.9
Black	210	23.4	162	24.2	48	21.1
Other races	0	0.0	0	0.0	0	0.0
Spanish American	46	5.1	41	6.1	5	2.2

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	771	199	58
Median earnings	$6,823	$6,250	$5,666
Percent with earnings	100.0	100.0	100.0
Below 2,000	4.5	8.0	0.0
Below 4,000	10.9	16.6	0.0
Below 5,000	19.8	28.1	29.3
Below 6,000	38.8	47.7	60.3
Above 10,000	19.5	6.0	0.0
Above 15,000	1.4	0.0	0.0
Female			
Total with earnings	251	58	5
Median earnings	$4,741	$4,071	$3,500
Percent with earnings	100.0	100.0	100.0
Below 1,000	6.0	0.0	0.0
Below 2,000	13.1	10.3	0.0
Below 3,000	21.9	29.3	0.0
Below 4,000	33.5	48.3	100.0
Below 5,000	55.8	72.4	100.0
Above 10,000	2.0	0.0	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 31 LEATHER: Footwear Except Rubber

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	1,316	100.0	701	100.0	615	100.0
White	1,059	80.5	547	78.0	512	83.3
Black	253	19.2	154	22.0	99	16.1
Other races	4	.3	0	0.0	4	.7
Spanish American	87	6.6	66	9.4	21	3.4

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	750	154	78
Median earnings	$5,741	$4,800	$3,523
Percent with earnings	100.0	100.0	100.0
Below 2,000	10.1	8.4	9.0
Below 4,000	25.9	31.8	62.8
Below 5,000	37.7	54.5	69.2
Below 6,000	54.3	69.5	69.2
Above 10,000	8.7		
Above 15,000	3.2		
Female			
Total with earnings	633	94	21
Median earnings	$4,372	$4,173	875
Percent with earnings	100.0	100.0	100.0
Below 1,000	11.4	14.9	61.9
Below 2,000	15.5	14.9	61.9
Below 3,000	23.2	22.3	61.9
Below 4,000	38.7	41.5	61.9
Below 5,000	69.0	90.4	100.0
Above 10,000			

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 33 PRIMARY IRON AND STEEL INDUSTRIES

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	278	100.0	257	100.0	21	100.0
White	222	79.9	201	78.2	21	100.0
Black	56	20.1	56	21.8	0	0.0
Other races	0	0.0	0	0.0	0	0.0
Spanish American	0	0.0	0	0.0	0	0.0

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	302	60	0
Median earnings	$6,655	$4,846	0
Percent with earnings	100.0	100.0	100.0
Below 2,000	8.3	16.7	0.0
Below 4,000	24.5	31.7	0.0
Below 5,000	32.8	53.3	0.0
Below 6,000	43.7	53.3	0.0
Above 10,000	7.6	0.0	0.0
Above 15,000	0.0	0.0	0.0
Female			
Total with earnings	21	0	0
Median earnings	$5,687	0	0
Percent with earnings	100.0	100.0	100.0
Below 1,000	0.0		
Below 2,000	0.0		
Below 3,000	0.0		
Below 4,000	0.0		
Below 5,000	23.8		
Above 10,000	0.0		

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 34 FABRICATED METALS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	3,085	100.0	2,250	100.0	835	100.0
White	2,559	82.9	1,888	83.9	671	80.4
Black	514	16.7	356	15.8	158	18.9
Other races	12	.4	6	.3	6	.7
Spanish American	104	3.4	70	3.1	34	4.1

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	2,288	358	70
Median earnings	$7,632	$6,584	$5,666
Percent with earnings	100.0	100.0	100.0
Below 2,000	5.9	7.8	15.7
Below 4,000	13.9	14.8	44.3
Below 5,000	18.0	22.3	44.3
Below 6,000	26.9	39.4	52.9
Above 10,000	19.1	13.4	10.0
Above 15,000	2.4	0	0
Female			
Total with earnings	829	157	34
Median earnings	$5,567	$5,239	$5,500
Percent with earnings	100.0	100.0	100.0
Below 1,000	4.3	2.5	0.0
Below 2,000	10.4	22.3	0.0
Below 3,000	16.0	31.2	20.6
Below 4,000	23.0	40.1	20.6
Below 5,000	34.9	46.5	35.3
Above 10,000	3.6	9.6	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 35 METAL MACHINERY

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	3,886	100.0	3,049	100.0	837	100.0
White	3,360	86.5	2,678	87.8	682	81.5
Black	510	13.1	359	11.8	151	18.0
Other races	16	.4	12	.4	4	.5
Spanish American	90	2.3	44	1.4	46	5.5

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	3,111	368	51
Median earnings	$7,516	$5,397	$3,608
Percent with earnings	100.0	100.0	100.0
Below 2,000	6.7	7.1	13.7
Below 4,000	14.4	22.6	58.8
Below 5,000	18.0	28.5	58.8
Below 6,000	28.6	42.1	74.5
Above 10,000	20.1	11.4	0.0
Above 15,000	4.3	0.0	0.0
Female			
Total with earnings	867	151	46
Median earnings	$5,302	$5,097	$4,769
Percent with earnings	100.0	100.0	100.0
Below 1,000	.5	0.0	
Below 2,000	3.2	5.3	
Below 3,000	11.4	13.2	
Below 4,000	24.7	29.8	28.3
Below 5,000	42.4	47.0	56.5
Above 10,000	3.5	0.0	

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 36 ELECTRICAL MACHINERY

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	5,500	100.0	3,594	100.0	1,906	100.0
White	4,394	79.9	3,006	83.6	1,388	72.8
Black	1,034	18.8	522	14.5	512	26.9
Other races	72	1.3	66	1.8	6	.3
Spanish American	173	3.1	151	4.2	22	1.2

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	3,686	564	145
Median earnings	$7,626	$6,642	$6,435
Percent with earnings	100.0	100.0	100.0
Below 2,000	6.8	2.7	6.2
Below 4,000	13.5	13.5	15.9
Below 5,000	19.6	20.4	33.8
Below 6,000	29.3	39.2	40.7
Above 10,000	24.9	10.6	3.4
Above 15,000	6.0	.9	0.0
Female			
Total with earnings	1,996	539	31
Median earnings	$4,737	$4,706	$3,944
Percent with earnings	100.0	100.0	100.0
Below 1,000	5.5	7.8	0.0
Below 2,000	10.1	9.8	0.0
Below 3,000	14.5	12.4	22.6
Below 4,000	32.2	28.4	51.6
Below 5,000	56.4	59.0	77.4
Above 10,000	1.2	.7	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 37 TRANSPORTATION EQUIPMENT

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	3,182	100.0	2,891	100.0	291	100.0
White	2,527	79.4	2,281	78.9	246	84.5
Black	646	20.3	604	20.9	42	14.4
Other races	9	.3	6	.2	3	1.0
Spanish American	72	2.3	64	2.2	8	2.7

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	2,893	591	64
Median earnings	$7,823	$7,214	$4,769
Percent with earnings	100.0	100.0	100.0
Below 2,000	4.5	4.4	0.0
Below 4,000	10.5	11.0	34.4
Below 5,000	15.8	19.5	54.7
Below 6,000	22.8	35.7	54.7
Above 10,000	18.0	8.6	0.0
Above 15,000	1.1	0.0	0.0
Female			
Total with earnings	301	50	8
Median earnings	$5,364	$2,500	$2,500
Percent with earnings	100.0	100.0	100.0
Below 1,000	6.6	30.0	0.0
Below 2,000	11.3	40.0	0.0
Below 3,000	20.9	60.0	100.0
Below 4,000	24.9	60.0	100.0
Below 5,000	41.5	6.0	100.0
Above 10,000	1.3	0.0	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 38 INSTRUMENTS AND RELATED PRODUCTS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	2,228	100.0	1,423	100.0	805	100.0
White	1,765	79.2	1,157	81.3	608	75.5
Black	440	19.7	248	17.4	192	23.9
Other races	23	1.0	18	1.3	5	.6
Spanish American	48	2.2	33	2.3	15	1.9

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	1,458	260	33
Median earnings	$7,633	$6,964	$7,791
Percent with earnings	100.0	100.0	100.0
Below 2,000	4.6	9.6	21.2
Below 4,000	14.5	20.0	21.2
Below 5,000	19.5	28.8	21.2
Below 6,000	30.9	39.6	21.2
Above 10,000	26.9	9.6	42.4
Above 15,000	6.7	0.0	33.3
Female			
Total with earnings	822	195	15
Median earnings	$5,088	$4,580	$4,062
Percent with earnings	100.0	100.0	100.0
Below 1,000	10.1	10.8	46.7
Below 2,000	16.2	17.4	46.7
Below 3,000	19.0	20.0	46.7
Below 4,000	31.8	33.3	46.7
Below 5,000	47.9	62.1	100.0
Above 10,000	5.2	0.0	0.0

PARTICIPATION TABLE 1969 CITY OF BOSTON

SIC 39 MISC. MANUFACTURES AND DURABLE GOOD

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	2,852	100.0	1,783	100.0	1,069	100.0
White	2,247	78.8	1,348	75.6	899	84.1
Black	576	20.2	406	22.8	170	15.9
Other races	29	1.0	29	1.6	0	0.0
Spanish American	111	3.9	71	4.0	40	3.7

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	1,766	409	65
Median earnings	$5,536	$4,590	$3,346
Percent with earnings	100.0	100.0	100.0
Below 2,000	16.9	20.3	23.1
Below 4,000	33.5	42.1	63.1
Below 5,000	43.8	55.5	70.8
Below 6,000	55.3	64.3	80.0
Above 10,000	12.2	8.3	9.2
Above 15,000	2.0	1.5	0.0
Female			
Total with earnings	995	142	40
Median earnings	$3,628	$3,307	$4,000
Percent with earnings	100.0	100.0	100.0
Below 1,000	14.8	16.2	0.0
Below 2,000	29.4	31.0	0.0
Below 3,000	41.4	47.2	50.0
Below 4,000	55.1	56.3	50.0
Below 5,000	72.0	78.2	82.5
Above 10,000	1.1	0.0	0.0

APPENDIX C

PARTICIPATION RATES
1969 SMSA
FOR SELECTED INDUSTRIES

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 20 FOOD - BAKERY PRODUCTS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	1,827	100.0	1,365	100.0	462	100.0
White	1,671	91.5	1,241	90.9	430	93.1
Black	147	8.0	120	8.8	27	5.8
Other races	9	.5	4	.3	5	1.1
Spanish American	28	1.5	23	1.7	5	1.1

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	1,393	145	23
Median earnings	$7,698	$5,289	$7,437
Percent with earnings	100.0	100.0	100.0
Below 2,000	9.2	6.2	0.0
Below 4,000	17.7	29.7	0.0
Below 5,000	22.3	46.2	0.0
Below 6,000	28.9	59.3	0.0
Above 10,000	22.8	0.0	30.4
Above 15,000	5.0	0.0	0.0
Female			
Total with earnings	446	27	5
Median earnings	$3,533	$1,300	$5,500
Percent with earnings	100.0	100.0	100.0
Below 1,000	19.7	44.4	0.0
Below 2,000	34.1	63.0	0.0
Below 3,000	44.6	63.0	0.0
Below 4,000	54.7	100.0	0.0
Below 5,000	67.3	100.0	0.0
Above 10,000	2.0	0.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 20 FOOD - BAKERY PRODUCTS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	486	100.0	384	100.0	102	100.0
White	338	69.5	268	69.8	70	68.6
Black	139	28.6	112	29.2	27	26.5
Other races	9	1.9	4	1.0	5	4.9
Spanish American	0	0.0	0	0.0	0	0.0

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	398	137	0
Median earnings	$6,369	$5,078	0
Percent with earnings	100.0	100.0	100.0
Below 2,000	12,8	6.6	0.0
Below 4,000	26.1	31.4	0.0
Below 5,000	34.7	48.9	0.0
Below 6,000	45.7	62.8	0.0
Above 10,000	6.5	0.0	0.0
Above 15,000	0.0	0.0	0.0
Female			
Total with earnings	108	27	0
Median earnings	$3,333	$1,300	0
Percent with earnings	100.0	100.0	100.0
Below 1,000	22.2	44.4	0.0
Below 2,000	37.0	63.0	0.0
Below 3,000	43.5	63.0	0.0
Below 4,000	63.0	100.0	0.0
Below 5,000	67.6	100.0	0.0
Above 10,000	3.7	0.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 20 FOOD CANNING, PRESERVING, SEAFOOD AND BEVERAGES

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	2,740	100.0	2,093	100.0	647	100.0
White	2,569	93.8	1,985	94.8	584	90.3
Black	164	6.0	108	5.2	56	8.7
Other races	7	.3	0	0.0	7	1.1
Spanish American	86	3.1	73	3.5	13	2.0

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	2,120	108	73
Median earnings	$8,146	$6,055	$4,357
Percent with earnings	100.0	100.0	100.0
Below 2,000	4.6	0.0	46.6
Below 4,000	11.3	9.3	56.2
Below 5,000	16.3	28.7	56.2
Below 6,000	25.3	48.1	56.2
Above 10,000	30.9	5.6	8.2
Above 15,000	10.5	0.0	0.0
Female			
Total with earnings	648	56	0
Median earnings	$4,272	$4,111	0
Percent with earnings	100.0	100.0	0
Below 1,000	9.4	8.9	0.0
Below 2,000	19.0	21.4	0.0
Below 3,000	28.7	21.4	0.0
Below 4,000	43.5	46.4	0.0
Below 5,000	67.3	78.6	0.0
Above 10,000	1.5	8.9	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 20 FOOD (Meat Products)

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	2,425	100.0	1,874	100.0	551	100.0
White	2,201	90.8	1,708	91.1	493	89.5
Black	201	8.3	151	8.1	50	9.1
Other races	23	.9	15	.8	8	1.5
Spanish American	81	3.3	74	3.9	7	1.3

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	1,906	155	80
Median earnings	$8,253	$7,275	$5,074
Percent with earnings	100.0	100.0	100.0
Below 2,000	6.5	10.3	28.8
Below 4,000	11.6	15.5	47.5
Below 5,000	14.8	21.9	47.5
Below 6,000	21.7	34.2	81.3
Above 10,000	26.5	12.3	8.8
Above 15,000	9.1	0.0	8.8
Female			
Total with earnings	571	50	17
Median earnings	$5,929	$4,600	$3,850
Percent with earnings	100.0	100.0	100.0
Below 1,000	5.4	30.0	0.0
Below 2,000	10.3	30.0	0.0
Below 3,000	12.8	30.0	0.0
Below 4,000	18.2	38.0	58.8
Below 5,000	28.0	58.0	100.0
Above 10,000	1.0	0.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 20 FOOD - OTHER FOOD INDUSTRIES

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	8,012	100.0	5,018	100.0	2,904	100.0
White	7,532	94.0	4,762	93.2	2,770	95.4
Black	404	5.0	289	5.7	115	4.0
Other races	76	.9	57	1.1	19	.7
Spanish American	75	.9	57	1.1	18	.6

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	5,149	282	57
Median earnings	$8,236	$5,857	$4,388
Percent with earnings	100.0	100.0	100.0
Below 2,000	7.4	13.5	24.6
Below 4,000	13.2	19.9	43.9
Below 5,000	19.0	35.1	59.6
Below 6,000	26.9	52.5	59.6
Above 10,000	29.1	5.0	19.3
Above 15,000	7.7	0.0	0.0
Female			
Total with earnings	2,906	115	18
Median earnings	$3,989	$4,054	$4,000
Percent with earnings	100.0	100.0	100.0
Below 1,000	11.0	21.7	0.0
Below 2,000	18.5	21.7	0.0
Below 3,000	26.7	25.2	50.0
Below 4,000	50.2	47.8	50.0
Below 5,000	76.3	87.8	100.0
Above 10,000	1.3	0.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 23 APPAREL

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	14,066	100.0	4,594	100.0	9,472	100.0
White	12,791	90.9	4,400	95.3	8,391	88.6
Black	631	4.5	167	3.6	464	4.9
Other races	644	4.6	27	.6	617	6.5
Spanish American	342	2.4	147	3.2	195	2.1

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	4,759	166	159
Median earnings	$7,892	$5,885	$5,014
Percent with earnings	100.0	100.0	100.0
Below 2,000	8.9	0.0	6.3
Below 4,000	18.2	10.8	29.6
Below 5,000	24.2	31.3	49.7
Below 6,000	31.9	52.4	71.7
Above 10,000	35.9	6.6	15.1
Above 15,000	19.7	0.0	3.1
Female			
Total with earnings	10,111	493	201
Median earnings	$3,454	$3,531	$3,229
Percent with earnings	100.0	100.0	100.0
Below 1,000	6.9	6.3	13.9
Below 2,000	20.0	18.1	24.4
Below 3,000	38.2	36.3	45.8
Below 4,000	64.2	62.1	64.2
Below 5,000	81.9	79.3	88.1
Above 10,000	1.1	1.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 26 PAPER

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED						
White						
Black						
Other races						
Spanish American						

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings			
Median earnings			
Percent with earnings			
Below 2,000			
Below 4,000			
Below 5,000			
Below 6,000			
Above 10,000			
Above 15,000			
Female			
Total with earnings			
Median earnings			
Percent with earnings			
Below 1,000			
Below 2,000			
Below 3,000			
Below 4,000			
Below 5,000			
Above 10,000			

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 27 PRINTING

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	23,600	100.0	15,288	100.0	8,312	100.0
White	22,929	97.2	14,842	97.1	8,087	97.3
Black	594	2.5	406	2.7	188	2.3
Other races	77	.3	40	.3	37	.4
Spanish American	152	.6	123	.8	29	.3

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	15,422	413	114
Median earnings	$9,010	$6,119	$8,193
Percent with earnings	100.0	100.0	100.0
Below 2,000	10.4	15.0	7.0
Below 4,000	17.5	25.7	17.5
Below 5,000	20.9	29.8	17.5
Below 6,000	25.8	48.7	43.0
Above 10,000	41.1	8.5	25.4
Above 15,000	12.6	1.2	5.3
Female			
Total with earnings	8,263	199	18
Median earnings	$4,303	$4,812	$3,642
Percent with earnings	100.0	100.0	100.0
Below 1,000	11.8	13.6	0.0
Below 2,000	23.7	21.1	0.0
Below 3,000	33.0	29.1	0.0
Below 4,000	45.7	33.7	72.8
Below 5,000	60.0	53.8	77.8
Above 10,000	4.0	2.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 28 CHEMICALS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	8,141	100.0	6,233	100.0	1,908	100.0
White	7,821	96.1	5,962	95.7	1,859	97.4
Black	269	3.3	231	3.7	38	2.0
Other races	51	.6	40	.6	11	.6
Spanish American	45	.6	30	.5	15	.8

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	6,266	6,500	8,727
Median earnings	$9,500	$6,500	$8,727
Percent with earnings	100.0	100.0	100.0
Below 2,000	4.5	4.2	0.0
Below 4,000	8.6	18.3	0.0
Below 5,000	11.3	31.9	0.0
Below 6,000	16.5	44.6	16.7
Above 10,000	45.4	8.0	26.7
Above 15,000	17.4	0.0	0.0
Female			
Total with earnings	1,974	36	15
Median earnings	$4,690	$4,000	$7,636
Percent with earnings	100.0	100.0	100.0
Below 1,000	8.6	11.1	00.0
Below 2,000	15.8	25.0	0.0
Below 3,000	24.9	36.1	0.0
Below 4,000	38.8	50.0	0.0
Below 5,000	55.0	58.3	26.7
Above 10,000	3.2	0.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 30 RUBBER AND PLASTICS (MISC.)

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	7,422	100.0	5,040	100.0	2,382	100.0
White	7,160	96.5	4,832	95.9	2,328	97.7
Black	249	3.4	195	3.3	54	2.3
Other races	13	.2	13	.3	0	0.0
Spanish American	128	1.7	110	2.2	18	.8

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	5,325	232	127
Median earnings	$7,972	$6,777	$5,775
Percent with earnings	100.0	100.0	100.0
Below 2,000	6.2	9.9	8.7
Below 4,000	13.0	17.2	18.9
Below 5,000	18.4	27.2	32.3
Below 6,000	25.9	44.0	51.1
Above 10,000	29.8	9.5	0.0
Above 15,000	10.7	0.0	0.0
Female			
Total with earnings	2,647	82	18
Median earnings	$4,566	$4,500	$3,800
Percent with earnings	100.0	100.0	100.0
Below 1,000	6.2	0.0	0.0
Below 2,000	14.2	7.3	0.0
Below 3,000	23.9	20.7	27.8
Below 4,000	37.5	34.1	55.6
Below 5,000	59.5	65.9	55.6
Above 10,000	1.7	0.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 33 PRIMARY METALS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED						
White						
Black						
Other races						
Spanish American						

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings			
Median earnings			
Percent with earnings			
Below 2,000			
Below 4,000			
Below 5,000			
Below 6,000			
Above 10,000			
Above 15,000			
Female			
Total with earnings			
Median earnings			
Percent with earnings			
Below 1,000			
Below 2,000			
Below 3,000			
Below 4,000			
Below 5,000			
Above 10,000			

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 34 FABRICATED METALS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	13,908	100.0	10,951	100.0	2,957	100.0
White	13,265	95.4	10,501	95.9	2,764	93.5
Black	576	4.1	395	3.6	181	6.1
Other races	67	.5	55	.5	12	.4
Spanish American	196	1.4	140	1.3	56	1.9

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	11,166	397	140
Median earnings	8,728	$6,607	$6,384
Percent with earnings	100.0	100.0	100.0
Below 2,000	5.9	9.6	7.9
Below 4,000	11.8	15.9	35.0
Below 5,000	15.0	23.9	35.0
Below 6,000	21.4	39.3	39.3
Above 10,000	37.0	15.9	24.3
Above 15,000	12.0	2.3	0.0
Female			
Total with earnings	3,052	184	51
Median earnings	$5,166	$4,500	$5,450
Percent with earnings	100.0	100.0	100.0
Below 1,000	5.0	2.2	0.0
Below 2,000	11.8	21.7	0.0
Below 3,000	19.3	34.8	31.4
Below 4,000	31.5	47.3	31.4
Below 5,000	46.3	52.7	41.2
Above 10,000	3.5	8.2	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 35 METAL MACHINERY

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	31,112	100.0	25,172	100.0	5,940	100.0
White	30,256	97.2	24,555	97.5	5,701	96.0
Black	706	2.3	507	2.0	199	3.4
Other races	150	.5	110	.4	40	.7
Spanish American	376	1.2	264	1.0	112	1.9

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	25,601	516	264
Median earnings	$9,001	$6,571	$7,253
Percent with earnings	100.0	100.0	100.0
Below 2,000	4.6	5.0	8.0
Below 4,000	9.6	22.7	19.3
Below 5,000	13.1	27.7	19.3
Below 6,000	19.5	39.9	28.0
Above 10,000	39.8	15.9	10.6
Above 15,000	12.5	1.2	1.9
Female			
Total with earnings	5,955	199	116
Median earnings	$5,098	$5,219	$4,421
Percent with earnings	100.0	100.0	100.0
Below 1,000	4.3	2.5	7.8
Below 2,000	10.3	6.5	7.8
Below 3,000	19.2	15.1	13.8
Below 4,000	29.8	27.6	43.1
Below 5,000	47.7	42.7	59.5
Above 10,000	3.0	0.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 36 ELECTRIC MACHINERY

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	46,970	100.0	29,842	100.0	17,128	100.0
White	45,260	96.4	28,927	96.9	16,333	95.4
Black	1,461	3.1	732	2.5	729	4.3
Other races	249	.5	183	.6	66	.4
Spanish American	528	1.1	403	1.4	125	.7

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	30,507	773	391
Median earnings	$9,744	$6,948	$7,829
Percent with earnings	100.0	100.0	100.0
Below 2,000	4.2	4.3	6.6
Below 4,000	8.9	13.3	10.2
Below 5,000	12.5	20.1	19.4
Below 6,000	17.9	36.9	27.9
Above 10,000	47.7	19.7	31.5
Above 15,000	19.3	4.1	10.7
Female			
Total with earnings	17,604	751	142
Median earnings	$4,752	$4,670	$3,955
Percent with earnings	100.0	100.0	100.0
Below 1,000	5.2	8.5	7.0
Below 2,000	11.6	12.8	14.8
Below 3,000	19.3	16.9	19.7
Below 4,000	33.4	32.8	51.4
Below 5,000	55.5	58.5	71.8
Above 10,000	1.9	.5	4.9

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 37 TRANSPORTATION EQUIPMENT

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED	23,035	100.0	20,569	100.0	2,466	100.0
White	22,063	95.8	19,661	95.6	2,402	97.4
Black	893	3.9	837	4.1	56	2.3
Other races	79	.3	71	.3	8	.3
Spanish American	241	1.0	198	1.0	43	1.7

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	20,776	824	198
Median earnings	$8,738	$7,483	$6,317
Percent with earnings	100.0	100.0	100.0
Below 2,000	3.8	4.2	4.0
Below 4,000	8.2	11.4	21.7
Below 5,000	11.5	18.7	39.9
Below 6,000	17.3	33.3	43.4
Above 10,000	34.0	11.8	8.6
Above 15,000	9.1	1.8	3.0
Female			
Total with earnings	2,489	64	43
Median earnings	$5,322	$2,533	$4,093
Percent with earnings	100.0	100.0	100.0
Below 1,000	4.5	29.7	0.0
Below 2,000	7.8	37.5	0.0
Below 3,000	15.5	60.9	46.5
Below 4,000	21.8	60.9	46.5
Below 5,000	42.5	60.9	83.7
Above 10,000	2.7	7.8	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 38 INSTRUMENTS

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Nu	%
TOTAL EMPLOYED	15,401	100.0	10,252	100.0	5,149	100.0
White	14,558	94.5	9,783	95.4	4,775	92.7
Black	762	4.9	422	4.1	340	6.6
Other races	81	.5	47	.5	34	.7
Spanish American	178	1.2	102	1.0	76	1.5

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings	10,414	434	102
Median earnings	$10,012	$7,397	$6,814
Percent with earnings	100.0	100.0	100.0
Below 2,000	4.2	7.4	13.7
Below 4,000	8.6	16.1	13.7
Below 5,000	12.0	22.6	13.7
Below 6,000	17.6	32.5	28.4
Above 10,000	50.1	21.2	25.5
Above 15,000	19.6	5.5	10.8
Female			
Total with earnings	5,225	338	76
Median earnings	$4,994	$4,639	$3,571
Percent with earnings	100.0	100.0	100.0
Below 1,000	5.7	6.2	36.8
Below 2,000	11.4	13.6	36.8
Below 3,000	17.1	15.3	44.7
Below 4,000	29.9	33.7	53.9
Below 5,000	50.1	59.2	94.7
Above 10,000	4.5	0.0	0.0

PARTICIPATION TABLE 1969 BOSTON SMSA

SIC 39 MISC. MANUFACTURING

EMPLOYED PERSONS 16 YEARS + BY RACE/ETHNIC GROUP AND SEX

	Both Sexes		Male		Female	
	Number	%	Number	%	Number	%
TOTAL EMPLOYED						
White						
Black						
Other races						
Spanish American						

EMPLOYED PERSONS 16 YEARS AND BY EARNINGS

RACE/ETHNIC GROUP	TOTAL	BLACK	SP.AM.
Male			
Total with earnings			
Median earnings			
Percent with earnings			
Below 2,000			
Below 4,000			
Below 5,000			
Below 6,000			
Above 10,000			
Above 15,000			
Female			
Total with earnings			
Median earnings			
Percent with earnings			
Below 1,000			
Below 2,000			
Below 3,000			
Below 4,000			
Below 5,000			
Above 10,000			

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