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Manufacturing in the St. Louis central business district

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MANUFACTURING IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT

by

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PREFACE

Because of the population explosion, the tremendous growth of urban areas, and the urban improvement programs of many of the cities of the world (including St. Louis) there is a great need to study the "what, where, and why" of urban activities--that is, what is where, and why is it there?" The "what" in this thesis are manufacturing establishments; the "where" is the St. Louis Central Business District; and the "why" are the factors of localization associated with the manufacturing establishments.

Chapter I of this thesis introduces the reader to the nature of the problem and the purpose of the thesis. In it are discussed: (1) the significance of the study, (2) the character of manufacturing in Central Business Districts and what the writer expects to find in the St. Louis Central Business District, (3) the factors of localization that have been associated with manufacturing establishments found in Central Business Districts, and (4) the methodology that was used in preparing the thesis. This chapter, then, lays the framework for the following two chapters.

Chapter II discusses what the writer found in the St. Louis Central Business District regarding the character

of manufacturing. In it are discussed: (1) the amount of manufacturing in the St. Louis Central Business District, (2) the significance of manufacturing in the Central Business District compared to manufacturing found in the rest of the City, (3) the types of industries found in the Central Business District, (4) the important major groups, (5) the size of the manufacturing establishments, (6) the location of the manufacturing establishments, and (7) other aspects of the character of manufacturing in the St. Louis Central Business District.

Chapter III discusses: (1) the six most important factors of localization that are associated with the manufacturing establishments of the two most important two-digit major groups in the St. Louis Central Business District (Apparel and Other Textile Products, and Printing and Publishing), and (2) the advantages and disadvantages representatives of these two major groups reported in being located in the St. Louis Central Business District. The six factors of localization that will be discussed are: labor, materials, market, transportation, external economies, and communication.

Chapter IV summarizes the entire thesis and presents the writer's conclusions. In this chapter are also mentioned the limitations of the conclusions and other topics for investigation.

This thesis was written in the field of economic geography principally because of the strong interest the writer has in this branch of geography. This interest has been intensified by the following forces: (1) the friendly nature and inspiration of his thesis advisor, (2) the associated interests of the other members of the S. I. U., Edwardsville, earth sciences faculty, and (3) the several courses the writer has had in economic geography. The writer is grateful to the entire earth sciences faculty for enforcing, training, and guiding this interest. The moral support given him by this group of academicians has also been an impetus in helping him attain his academic training.

Therefore, in making his acknowledgments to the many people who helped make this thesis a reality the writer would first of all like to express his sincere appreciation to his thesis advisor, Dr. Robert Koepke, for his academic advice, patience, and perseverance in helping to: (1) formulate the ideas of the thesis, and (2) write both the prospectus and the many drafts. The writer would next like to thank the other members of the thesis committee for their helpful comments and suggestions.

He would also like to thank the 112 respondents whom he interviewed. These people are in business primarily to make a profit, and in some cases,I suspect, the time lost by them in the interview was also profits lost. However,

without the help of these people it is certain that this thesis would have never been completed.

To his wife, Phyllis, he is affectionately grateful for her patience and indulgence throughout the two and one-half years it took to complete this thesis and for typing the first, intermediate, and final drafts. To Mrs. Helen Buford also go many thanks for typing the final copy.

Finally, the writer would like to thank the other intermittently forgotten people who were involved in realizing a research project such as this. Some of these people gave their assistance in various ways, while others gave the writer encouragement which is also important and is often overlooked.

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CHAPTER I

INTRODUCTION

The Significance of the Study

This thesis proposes to study: (1) the character of manufacturing in the St. Louis Central Business District, (2) six factors of localization, and (3) the advantages and disadvantages of manufacturers being located there. The writer found during his research of the literature dealing with this topic that although many authors have contributed substantially to the field of manufacturing geography by their studies of specific industries, industrial regions, and individual industrial cities, few authors have discussed at significant length the more local distribution of industries within cities. This thesis will discuss at significant length the local distribution of industries within the St. Louis Central Business District.

The Central Business District: its definition and importance

> The Central Business Index Method developed by Clark University geographers Murphy and Vance . . . defines the central business district as an area of contiguous blocks, each of which has at least fifty percent of its floor space devoted to offices, retail and service establishments, transient hotels, or commercial amusement, the total of which is at least equal to the land area of the block.[1]

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[1]St. Louis City Plan Commission, A Plan for Downtown St. Louis (St. Louis, 1960), p. 7.

The Central Business District of cities (hereafter also called "CBD") is an area of prime importance. This importance has been pointed out by several researchers, two of them being Ronald R. Boyce and Gerald W. Breese. In 1966, Boyce[2] stated in the Journal of Geography that "well over one-half of all employment in most central cities occurs in, or very near, the central business district." In 1949, Breese[3] said:

> The central business district is in effect a great aortic arch, essential to the functioning of the whole metropolitan area. If there is one feature of the central business district which is most prominent, it is that the district and the metropolitan area of which it is the center are inexorably tied together in a web of reciprocal relationships. The intense symbiotic state of affairs is the key to the understanding of the metropolis itself . . . . The constellation of functions in the central business district consists of social, cultural, political, and service functions, as well as the predominant administrative and trade functions generally associated with central business districts.

Manufacturing, a function of the CBD

Although Breese does not mention manufacturing as a major function in the Central Business District, it is, nevertheless, a part of it. From data collected on two of the largest cities in the United States (Philadelphia and

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[2]Ronald R. Boyce, "Public Policy and the CBD," Journal of Geography, LXV (May, 1966), p. 228.

[3]Gerald W. Breese, The Daytime Population of the Central Business District of Chicago (Chicago: The University of Chicago Press, 1949), p. 30.

St. Louis) it is estimated that manufacturing accounts for from ten to fifteen percent of the land use in that area generally known as the Central Business District. Of 1,395 acres in the Central Business District of Philadelphia in 1954, 199 acres (14%) were in industrial use.[4] The St. Louis City Plan Commission stated that of 219.03 acres in Census Tract 25-C (the CBD as defined by the Census Bureau) in 1960, 25.3 acres (12%) were used by manufacturing.[5]

It is estimated that from ten to twenty percent of the number of structures in the CBD's of Chicago and St. Louis are in manufacturing and associated uses. The Real Estate Research Corporation found for the core of the Central Area of Chicago in 1966 that of a total of 516 buildings in this area, 69 (13%) were used for wholesaling, warehousing, and manufacturing.[6] The writer presumes this core area to be essentially the same as the CBD. Of a total of 321 structures in office, retail, warehouse, and

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[4] "Industrial: Includes manufacturing, storage, and transportation facilities, such as factories, power stations, warehouses, storage yards, railroads, docks, airports, and terminals for trucks, buses and street cars." Philadelphia City Planning Commission, Land Use in Philadelphia, 1944-1954 (Philadelphia, 1956), p. 10.

[5] St. Louis City Plan Commission, St. Louis Land Use Statistics (St. Louis, 1963), p. 9.

[6] Real Estate Research Corporation, Economic and Land Use Studies of Chicago: Central Area Transit Study (Chicago, 1966), p. 4.

loft operations[7] in Downtown St. Louis in 1957, 58 (18%) were for warehouse and loft operations alone.[8]

Furthermore, within the City Plan Commission's St. Louis Central Business District[9] in 1955 manufacturing accounted for 21% of the total floor space, whereas retailing accounted for only 17%.[10] This area, however, is larger than the CBD area as defined by the Murphy-Vance Central Business Index Method[11] which will be used in this investigation (Map 1).

Manufacturing in the CBD as a part of the Metropolitan Area's total manufacturing

The CBD's of several cities in the United States contain a substantial part of each city's or metropolitan area's total manufacturing. Hoover and Vernon[12] found that

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[7]Loft operations: This is assumed to mean manufacturing operations in loft-type buildings.

[8]St. Louis Chamber of Commerce, Downtown St. Louis Survey, 1957 (St. Louis, 1957), pp. 2 and 3.

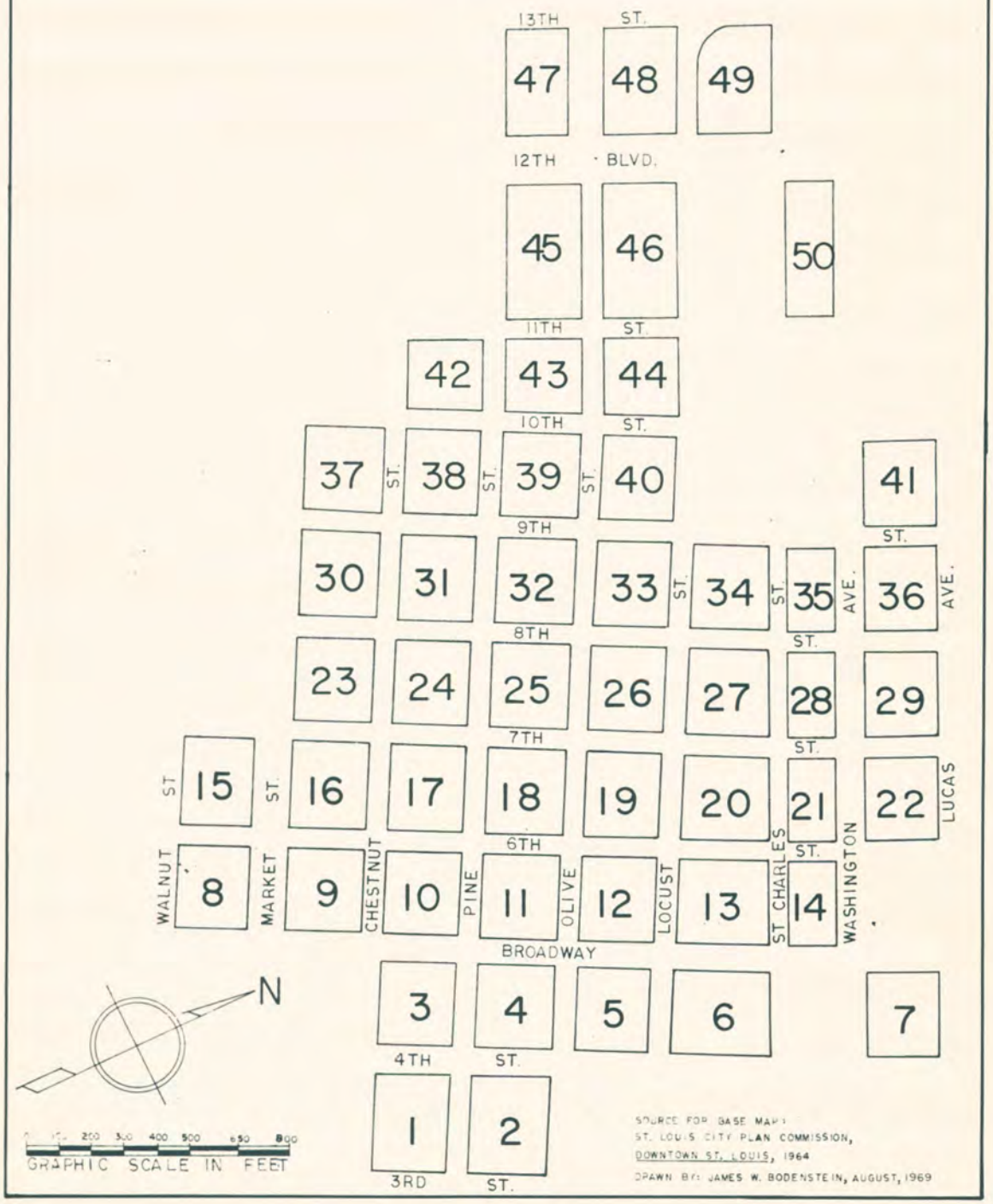
[9]This is the Central Business District as defined by the St. Louis City Plan Commission. This area extended generally from 3rd to 20th, east and west, and from Poplar to Cole, north and south. St. Louis City Plan Commission, A Plan for Downtown St. Louis, op. cit., p. 7.

[10]Ibid.

[11]Raymond E. Murphy and J. E. Vance, Jr., "Delimiting the CBD," Economic Geography, XXX (1954), pp. 189-222.

[12]Edgar M. Hoover and Raymond Vernon, Anatomy of a Metropolis (Cambridge: Harvard University Press, 1959), p. 13.

MAP I
STUDY AREA
(MODIFIED ST. LOUIS MURPHY—VANCE CBD)



in 1956 the Central Business District of Manhattan (below 59th Street) contained 27.4% of the New York Metropolitan Region's manufacturing employees. The Chicago Plan Commission[13] stated in 1952 that only four of the forty-nine industrial districts in Chicago contained a large number of industries, one of which was district 19 (the CBD) with 461 establishments. McLeod[14] stated in his thesis on manufacturing in Philadelphia that for the CBD in 1954 there were 47,094 persons employed in the manufacturing industry in an area of 1.53 square miles resulting in a density of 30,780 manufacturing employees per square mile. He also found that although the CBD constituted only slightly over 1% of all land in the City of Philadelphia, it contained 14% of Philadelphia's employees in the manufacturing industry.

Comparisons of these cities, however, should be considered as indications of differences and similarities rather than the actual differences and similarities, for the methods used in delimiting the areas discussed were not explained in the articles and reports. Therefore, there might be a wide discrepancy in the definition of the areas studied. Consequently, any comparison of manufacturing activities in Central Business Districts must be made with

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[13] Chicago Plan Commission, Chicago Industrial Study: Summary Report (Chicago, 1952), p. 16.

[14] Donald E. McLeod, "The Distribution of Manufacturing Industry, Philadelphia, 1940 and 1954" (unpublished Master's thesis, University of Pennsylvania, 1960), p. 30.

this situation in mind. Until a standard method of defining the Central Business District of cities is accepted and widely used in studies an accurate comparison of the CBD's of cities is impossible. The writer believes that this study, which uses a standard method of defining the CBD, is a step in that direction.

Other studies

Ten studies--three books, four articles, two Master's theses, and one Ph.D. dissertation--that relate to the general topic of manufacturing in CBD's have been found. Hoover and Vernon,[15] in their study of the New York Metropolitan Region, discuss manufacturing in the CBD. Hall[16] has edited three articles which deal with three manufacturing industries that have concentrated in the New York City CBD. Reeder's study[17] deals with the decentralization of industry in the Central Area or Inner Zone (which is much larger than the CBD) of Chicago, but he does not describe the character and location of manufacturing in the CBD, which is the nature of this thesis. Rannells[18], using statistical

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[15] Hoover and Vernon, op. cit.

[16] Max Hall (ed.), Made in New York (Cambridge: Harvard University Press, 1959).

[17] Leo Reeder, "The Central Area of Chicago--A Re-examination of the Process of Decentralization," Land Economics, XXVIII (November, 1952), pp. 369-373.

[18] John Rannells, The Core of the City (New York: Columbia University Press, 1956).

methods, discusses the arrangement and interrelationships of functions within the Central Business District of Philadelphia. However, he does not study the smaller Murphy-Vance CBD, nor does he confine his study to manufacturing. McLeod[19] and Lee,[20] respectively, discuss manufacturing in Philadelphia and Edmonton *in toto*, but they only incidentally discuss manufacturing in the CBD. Pred[21] presents the location of manufacturing in the metropolitan area of San Francisco, but he merely informs the reader cartographically that certain types of manufacturing exists in an area which presumably is the CBD. Thomas[22] gives a brief but outdated presentation of manufacturing in the "Downtown" section of St. Louis. Kerr and Spelt's article[23] on Toronto came closest to resembling the writer's topic, but it did not investigate the Murphy-Vance type of CBD

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[19] McLeod, *op. cit.*

[20] Terence Richard Lee, "A Manufacturing Geography of Edmonton, Alberta" (unpublished Master's thesis, University of Alberta; Edmonton, Alberta; May, 1963).

[21] Allen Pred, "Intrametropolitan Location of Manufacturing," *Annals of the Association of American Geographers*, LIV (June, 1964), pp. 165-180.

[22] Lewis F. Thomas, *The Localization of Business Activities in Metropolitan St. Louis* (Ph. D. dissertation, University of Chicago; Washington University Studies--New Series: "Social and Philosophical Sciences," No. 1; St. Louis, 1927).

[23] Donald Kerr and Jacob Spelt, "Manufacturing in Downtown Toronto," *Geographical Bulletin*, X (1958), pp. 5-20.

with which this thesis is concerned. Murphy, Vance, and Epstein[24] discuss the internal structure of the CBD of moderate-sized cities in the United States, but they were not primarily concerned with manufacturing, nor were they concerned with larger cities. These studies, then, do relate to the subject of this thesis, but they did not discuss manufacturing in depth in the Murphy-Vance Central Business District which is the purpose of this thesis.

St. Louis for the laboratory

St. Louis is a logical place in which to make this type of investigation. The reasons for this are: (1) St. Louis is important as an industrial area, (2) manufacturing exists in the St. Louis Central Business District, and (3) St. Louis is comparable in size to previously studied cities.

St. Louis is one of the largest industrial centers in the United States. In terms of manufacturing employees it was the ninth largest Standard Metropolitan Statistical Area in the United States in 1963, with 259,686 manufacturing employees.[25]

Manufacturing does exist in the St. Louis Central Business District, for, as previously mentioned, of 219.03

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[24] Raymond E. Murphy, J. E. Vance, Jr., and Bart J. Epstein, "Internal Structure of the CBD," Economic Geography, XXXI (1955), pp. 21-46.

[25] U. S. Bureau of the Census, U.S. Census of Manufactures: 1963: Missouri (Washington, D.C.: U.S. Government Printing Office, 1964), p. 26-6.

acres in the Census Bureau's Central Business District in 1960, 25.3 acres (12%) were used by manufacturing activities. It was also mentioned that of a total of 321 structures in office, retail, warehouse, and loft operations in Downtown St. Louis in 1957, 58 (18%) were used for warehouse and loft operations alone. Within the City Plan Commission's Central Business District in 1955 manufacturing and manufacturing with sales accounted for 15% of the total floor space. Furthermore, there were 863,558 sq. ft. of floor space in use by manufacturing and manufacturing with sales within the CBD in 1955 as defined by the Murphy-Vance Central Business Index Method.[26] This manufacturing related space was 5% of the total floor space in that area in that year.

The City of St. Louis was the seventh largest city in the United States in 1960.[27] Therefore, a study of it would be important, and it would be comparable to the previously cited studies which also dealt with major cities--e. g., New York City, Chicago, Philadelphia, San Francisco, and Toronto.

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[26] St. Louis City Plan Commission, A Plan for Downtown St. Louis, op. cit., p. 6.

[27] U. S. Bureau of the Census, Population: 1960, Vol. I, Part A, pp. 1-106-111.

The St. Louis Murphy-Vance Central Business District for the Study Area

It was decided to choose the Central Business District for the study area because there was found very little literature on manufacturing in this area of the city. Because of this it is assumed that there exists only a priori general opinions regarding manufacturing activities in the Central Business Districts of cities. Therefore, at the suggestion of his thesis advisor, the writer decided the CBD would be a prime area for investigating manufacturing.

The St. Louis CBD as delimited by the Murphy-Vance Central Business Index Method in 1955 is the area chosen for study (Map 1). This method was used by the St. Louis City Plan Commission to outline the CBD as it existed in both 1931 and 1955. Forty-nine blocks were contained in the Murphy-Vance area for both years. The 1955 CBD was chosen for the study area because it was assumed that it would more closely approximate the CBD as it exists today. However, there were some slight modifications applied to it to better suit the purpose of this thesis. A special rule that was set by Murphy and Vance said: "a block that does not reach the required index values [see pages 29-32 for explanation of Murphy-Vance methodology] but is surrounded by blocks that do is considered part of the CBD."[28] Blocks

[28] Murphy and Vance, op. cit., p. 219.

16, 20, and 38 were not considered part of the CBD by the City Plan Commission, but the writer included them because of the above special rule. Block 50 should not have been included in the study, but one establishment in that block was inadvertently included in the analysis of the data; hence, it was also included in the thesis.

The reasons for choosing the Murphy-Vance CBD for the study area are: (1) to facilitate future comparisons of CBD's of other cities, and (2) to keep the time necessary for the field work to a minimum. The Murphy-Vance Central Business Index Method is based on definite criteria used in delimitation of the CBD and presents a precisely defined area. This area is, therefore, a more "true" Central Business District by definition (since it is arrived at quantitatively) than is the more popularly known and larger Central Business District as defined by the City Plan Commission or some other government agency using arbitrary methods. This will facilitate future comparisons of CBD's of other cities which the writer deems as an important criterion for choosing his study area. The authors, themselves (Murphy and Vance), said that "the method should be applicable to large cities" and "the method is sufficiently objective that the resulting areas obtained by workers in different cities should be reasonably comparable.[29]

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[29] Ibid., p. 221.

The St. Louis CBD as delimited by the Murphy-Vance method is of such a size that the writer can investigate manufacturing in it in a reasonable length of time. Interviewing representatives of the manufacturing establishments will be the method used in obtaining the basic data, and the number of interviews will determine the amount of time necessary to do the field work.

Character of Manufacturing

It has been shown that "Manufacturing in the St. Louis Central Business District" is a significant topic in geography. A basic question that needs to be answered now is: "What is the character of manufacturing in the St. Louis CBD?" Specifically, the next step in this section is to describe the aspects of the character of manufacturing which will be investigated.

An initial step in this thesis was to survey the literature relating to the topic. From this the researcher: (1) learned whether the study had been done before, (2) learned what has previously been learned, (3) derived pertinent questions to investigate, (4) got ideas on methodology and organization, and (5) arrived at some basis by which to compare this study's findings.

A result of this survey was the resolution to investigate the following three questions concerning the character of manufacturing in the St. Louis Central Business

District:

1. What types of industries are found here?
2. What is the size of each establishment in terms of: (1) number of employees, and (2) amount of floor space?
3. Where are the establishments located: (1) in the CBD, and (2) within the buildings?

Types of Manufacturing

One objective of this thesis will be to ascertain the types of industries that locate in the Central Business District. This will be discussed in this section in two aspects: (1) the entire gamut of industries that have been found by other researchers to exist either in or very near the CBD, and (2) the most important types that have been found in other CBD's.

Seventeen major industry groups, or 80% of a total of twenty-one classified as manufacturing by the U.S. Bureau of the Budget,[30] have been found to exist either in or very near Central Business Districts. These seventeen major industry groups (with their Standard Industrial Classification numbers) are: Food and Kindred Products (20); Tobacco

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[30] U. S. Bureau of the Budget, Standard Industrial Classification Manual (Washington, D. C.: U. S. Government Printing Office, 1967.)

Manufactures (21); Textile Mill Products (22); Apparel and Other Textile Products (23); Lumber and Wood Products (24); Furniture and Fixtures (25); Paper and Allied Products (26); Printing and Publishing (27); Chemicals and Allied Products (28); Leather and Leather Products (31); Stone, Clay and Glass Products (32); Primary Metal Industries (33); Fabricated Metal Products (34); Machinery, Except Electrical (35); Electrical Equipment and Supplies (36); Instruments and Related Products (38); and Miscellaneous Manufacturing Industries (39). (See also Table 3, page 49.) Thus, only four major industry groups--Ordnance and Accessories (19); Petroleum and Coal Products (29); Rubber and Plastics Products, NEC (30); and Transportation Equipment (37)--have not been found in or near CBD's. McLeod[31] substantiates this diversity of industries in this area of the city when he found that of nineteen industries with which his thesis was concerned, thirteen (68%) were represented in the CBD. Therefore, any or all of these industries can be expected to be found either in or very near the St. Louis CBD, and it is the writer's intention to ascertain which of these industries locate precisely in the CBD.

The second part of this section on types of industries will be concerned with the most important types that have been found in other CBD's and can, therefore, also be

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[31] McLeod, op cit., p. 33.

expected to be found in the St. Louis CBD. According to the findings of a number of authors,the printing and apparel industries seem to predominate. The Chicago Plan Commission,[32] for example, found that together the printing and apparel industries accounted for 85% of the manufacturing employment in the Chicago Central Business District (District 19). Kerr and Spelt[33] found that of a total of 152 establishments and 6,728 employees in Downtown Toronto, the most important major group was Printing and Publishing, employing 1,515 people representing 22.5% of the total employment in the area. McLeod[34] stated in his thesis on manufacturing in Philadelphia in 1954 that apparel with 17,000 employees and printing with 14,000 employees together accounted for over 65% of the total number of manufacturing employees in the CBD. Another industry which may be important in the CBD is the Miscellaneous Manufacturing Industries--viz., jewelry manufacturing, for Connell,[35] in his thesis "Land Uses That Require a Central Business District Location," decided that newspaper publishing, lithographing, and jewelry manufacturing are appropriate and may require a CBD location.

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[32] Chicago Plan Commission, op. cit., p. 23.

[33] Kerr and Spelt, op. cit., p. 8.

[34] McLeod, op. cit., p. 33.

[35] Arnall Turner Connell, "Land Uses That Require a Central Business District Location," (unpublished Master's thesis; Georgia Institute of Technology; Atlanta, Georgia; May, 1955), p. 73.

From a careful examination of the St. Louis Chamber of Commerce's Directory of Manufacturers, 1962[36] it is estimated that these three major groups--Printing and Publishing, Apparel and Other Textile Products, and Miscellaneous Manufacturing Industries--will account for approximately 75% of both the manufacturing establishments and manufacturing employees in the St. Louis CBD. Table 1 shows the types of industries, along with their estimated number of establishments and employees, that were listed in the directory as being located in the CBD in 1962.

Size of the establishments

Another aspect of the character of manufacturing in the St. Louis Central Business District is the "size" of the establishments measured by: (1) number of employees, and (2) amount of floor space. Lee,[37] in his thesis on manufacturing in Edmonton, Alberta, found that for the CBD "the usual number of workers in each plant is low, often less than twenty, and the largest firm employs less than one hundred workers".

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[36] St. Louis Chamber of Commerce, Directory of Manufacturers, 1962 (St. Louis: Chamber of Commerce of Metropolitan St. Louis, 1962).

[37] Lee, op. cit., p. 60.

TABLE 1

MANUFACTURING IN THE ST. LOUIS CBD*

Major Industry Group (With S.I.C. Number)	Est. No. of Establishments	Est. No. of Employees	Est. No. Employees Per Establishment
20: Food	2	275	138
23: Apparel	81	7330	91
25: Furniture	4	200	50
26: Paper			
In General	5	350	70
Bags	3	975	327
Labels	1	25	25
27: Printing & Pub.	56	1775	32
28: Chemicals	3	125	42
31: Leather Products			
Leather	2	50	25
Shoes	1	25	25
Trunks	1	25	25
34: Fabricated Metal	3	75	25
35: Machinery	2	50	25
38: Scientific Instr.			
Optical	8	200	25
Medical Equipment	2	50	25
39: Misc. Mfrs.			
Jewelry	24	600	25
Advertising	2	50	25
Games	1	25	25
Others:			
Metal	1	25	25
Apparel Equipment	1	25	25
Stamps	1	25	25
Tool and Die	1	25	25
Others	6	325	54
Totals (as of 1962)	211	12,630	60

*This was the area within the streets of Broadway, 12th, Market, and Lucas. The figure of 12,630 was arrived at by totaling the middle values of various class intervals used by the St. Louis Chamber of Commerce in their Directory of Manufacturers, 1962. The figure of 211 was obtained by winnowing from this same directory only those establishments which, according to their street address, were located in the Murphy-Vance CBD.

From an examination of the St. Louis Chamber of Commerce's Directory of Manufacturers, 1962 it appears that the number of employees in the typical establishment in the St. Louis CBD is less than 50. The totals from Table 1 reveal an average of 59.8 employees per establishment. A part of this investigation will be to ascertain: (1) the employment per establishment, (2) the range of employment per establishment, and (3) the average employment per establishment. This will be done for both the CBD as a whole and for each major group in the CBD.

A second way of measuring the "size" of the establishments is by floor space. Lee[38] stated in the section of his thesis that pertains to the Central Business District in Edmonton that "the majority of factories studied had an area of less than 10,000 square feet . . . ." It will be interesting to know whether this is true for the St. Louis CBD, so another intention of this thesis is to determine: (1) the floor space per establishment, (2) the range of floor space per establishment, and (3) the average floor space per establishment. This will also be done for both the CBD as a whole and for each major group in the CBD. The writer will also determine the average manufacturing employee density for both the CBD, and for each major group in the CBD.

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[38] Ibid.

Location of the establishments

The third basic question of the character of manufacturing in the St. Louis CBD which this thesis intends to investigate is: Where are the establishments located: (1) in the CBD, and (2) within the buildings? Kerr and Spelt,[39] in their study, "Manufacturing in Downtown Toronto," learned that the printing and jewelry trades clustered somewhat near the Central Business District, implying perhaps a peripheral location. Breese,[40] besides finding manufacturing within the Chicago CBD, also found that manufacturing is found on its periphery. There is, then, the possibility that there might be some pattern of distribution in or peripheral to the CBD. These findings, therefore, will be applied to the St. Louis Central Business District--that is, answers to the following two questions will be sought:

1. Will there by any pattern of distribution in terms of type of industry?
2. Will there generally be a peripheral location of establishments?

Lastly, in regard to the location of manufacturing establishments in the St. Louis CBD, this thesis intends to determine their location within the buildings. Murphy

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[39] Kerr and Spelt, op. cit., pp. 8 and 9.

[40] Breese, op. cit., p. 38.

and his colleagues[41] found in their study of CBD's of moderate-sized American cities that within 400 yards of the peak land value intersection industrial land use is more important on the second floor than on any other floor; next in importance is the first floor, and last in importance is the upper floors above the second. It will be interesting to learn whether this is true for a larger city such as St. Louis.

An adjunct to this section on the character of manufacturing in the St. Louis CBD will be to ascertain whether the firms own or rent their premises. Kerr and Spelt[42] found in their study that approximately 53% of the firms in Downtown Toronto (81 out of 152) rent their premises.

Factors of Localization

Another basic question which this thesis will attempt to answer is: Why are manufacturing establishments found in the St. Louis CBD? Manufacturing, like any other business, locates where it can make the largest profit, and profit, of course, is what is left after total costs are subtracted from total revenue. The total costs for a manufacturer result from assembly, production, and distribution. Assembly involves the purchase of raw materials and

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[41] Murphy, Vance, and Epstein, op. cit., p. 39.
[42] Kerr and Spelt, op. cit., p. 9.

the assembling of them at the point of production; production involves the processing of these materials; and distribution involves disseminating the finished product to the market.

These three activities--assembly, production, and distribution--are inextricably related to many factors which influence the industrialist to locate where he does. E. Willard Miller[43] says that seven primary factors must be considered for the successful operation of any manufacturing endeavor: raw materials, power, fuel, market, labor, transportation, and capital. In addition, he says there are other factors that need to be considered for particular types of manufacturers, some of them being: climatic conditions, water supply, waste disposal facilities, tax structures, and governmental policies. It will be seen later in this thesis that of these factors the following will pertain to firms located in the St. Louis CBD: materials, market, labor, transportation, tax structures, and governmental policies.

Seventeen articles[44] relating to this thesis mention the following thirteen factors as having an influence on a

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[43] E. Willard Miller, A Geography of Manufacturing (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1962), p. 3.

[44] Ruth Bass, "Internal Structure of a Central Business--Industrial District: A Factor Analysis of the South of Market Street District of San Francisco," (unpublished Master's thesis; Louisiana State University and Agricultural and Mechanical College, August, 1962); Breese, op. cit.;

firm's decision to locate in or near the Central Business District: labor, materials, market, transportation, external economies, communication, loft space, speed, centrality, rent, government, specialization of functions, and personal factors. By "speed" is meant the promptness by which the product can be manufactured and delivered to the customer. From his reading of these studies the writer concluded that of these thirteen factors the following six are the most important: labor, materials, market, transportation, external economies, and communication.

Labor

Labor was mentioned in twelve of the studies as

Connell, op. cit., D. R. Diamond, "The Central Business District of Glasgow," Proceedings of the IGU Symposium in Urban Geography, Lund, 1960 (lund Studies in Geography, Series B: "Human Geography," No. 24; Lund, Sweden: Royal University of Lund, 1962); W. Erie Gustagson, "Printing and Publishing," Made in New York, ed. Max Hall (Cambridge: Harvard University Press, 1959); Hall, op. cit.; Harvard Researchers, "Downtown Rises Above Gray Belt," Business Week (February 21, 1959), p. 29; Roy B. Helfgott, "Women's and Children's Apparel," Made in New York, ed. Max Hall (Cambridge: Harvard University Press, 1959); Hoover and Vernon, op. cit.; Kerr and Spelt, op. cit.; Lee, op. cit.; Louis K. Lowenstein, "The Location of Urban Land Uses," Land Economics, XXXIX (1963), pp. 413-415; William Edward Maledon, "Changes in the St. Louis Manufacturing Profile, 1939-1958" (unpublished Master's thesis, St. Louis University, St. Louis, 1964); McLeod, op. cit.; Philadelphia City Plan Commission, The Plan for Center City Philadelphia (Philadelphia, 1963); Thomas, op. cit.; and David Ward, "The Industrial Revolution and Emergence of Boston's CBD," Economic Geography, XLII (April, 1966), pp. 152-171.

affecting the location of a firm in the CBD.[45] Several aspects are possible in analyzing its location relationships. One point of view is the availability or supply of labor. Of five studies referring to the availability of labor, Helfgott and Gustagson[46] concur that labor is the most important factor of localization for the apparel, and printing and publishing industries, respectively.

Another aspect of labor quite closely related to availability is accessibility. The writer differentiates between the two by meaning availability to be the supply, or amount of labor in the area and accessibility to be the location of labor in the area, or the ease by which it can be brought to the point of consumption. Four studies refer to the accessibility of labor. Kerr and Spelt[47] succinctly epitomize the other three: "Those workers who do not live in the area can reach factories easily because of good public transportation facilities."

Another aspect of labor mentioned in seven of the articles was labor type. Four types of labor were mentioned: (1) skilled, (2) unskilled, (3) female, and (4)

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[45]Breese, op. cit., p. 38; Gustagson, op. cit., p. 147; Helfgott, op. cit., pp. 23 & 49; Hoover and Vernon, op. cit., p. 53; Kerr and Spelt, op. cit., pp. 12 & 13; Lee, op. cit., p. 102; Lowenstein, op. cit., p. 414; Maledon, op. cit., p. 28; McLeod, op. cit., pp. 36 & 37; Philadelphia City Plan Commission, The Plan for Center City Philadelphia, op. cit., p. 24; Thomas, op. cit., pp. 12 & 47; and Ward, op. cit., pp. 160 and 161.

[46]Helfgott, op. cit., p. 49; and Gustagson op. cit., p. 147.

[47]Kerr and Spelt, op. cit., p. 12.

foreign-born. Five studies mentioned skilled labor as being related to manufacturing in or near the CBD; two studies, each, mentioned both unskilled and female labor; and two articles mentioned foreign-born labor.

Materials

Four articles mentioned the factor of materials in relation to the location of manufacturing firms in or near the CBD.[48] Maledon[49] says that "industries which use jointly produced materials have a tendency to grow in the same area". Hoover and Vernon[50] said that "to avoid stockpiling their materials in disproportionately large amounts, they [small plants] have clung close to the center of the urban cluster, where they can get materials on short notice; . . . ."

Market

The next major factor influencing a firm's decision whether or not to locate in or near the Central District is market. Seven articles mentioned market as being important to a firm's downtown location.[51] Both Gustagson and Lee

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[48]Hoover and Vernon, op.cit., p. 53; Kerr and Spelt, op. cit., p. 13; Maledon, op. cit., p. 28; and Thomas, op. cit., p. 47.

[49]Maledon, op. cit., p. 28.

[50]Hoover and Vernon, op. cit., p. 53.

[51]Connell, op. cit., pp. 69 & 70; Gustagson, op.cit., pp. 158, 159, 162, & 163; Kerr and Spelt, op. cit., pp. 11 & 12; Lee, op. cit., p. 102; Lowenstein, op.cit., pp. 413 & 414; Maledon, op. cit., pp. 28, 74 & 75; and McLeod, op. cit., pp. 36-38.

agree that printing in particular requires a location that is close to its customers who are mainly other businesses also located downtown.[52]

Transportation

Seven articles mentioned transportation as a factor of localization.[53] Lee[54] writes about the transportation factor in relation to labor: "There is much to be gained for a clothing factory from a site near the main bus routes. Most of its employees tend to be women who travel by public transport rather than by car."

External economies

Another factor which is especially important for firms locating in the Central Business District of a city is "external economies," or "economies of agglomeration," which are the economies gained from firms clustering together. In other words, they are the business relationships of a firm with other similar or complimentary firms located in the immediate area. A large number of similar or complimentary firms in or near the CBD is an advantage to an industrialist located here, for this relieves the small

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[52] Gustagson, op. cit., pp. 158, 162, & 163; and Lee, op. cit., p. 102.

[53] Bass, op. cit., p. 4; Hoover and Vernon, op. cit., pp. 40 & 41; Kerr and Spelt, op. cit., pp. 11 & 12; Lee, op. cit., p. 102; Lowenstein, op. cit., p. 414; McLeod, op. cit., pp. 36-38; and Philadelphia City Plan Commission, The Plan for Center City Philadelphia, op. cit., p. 24.

[54] Lee, op. cit., p. 102.

establishment of having to maintain the entire gamut of processes and services necessary to produce a product. The authors of eight articles, books, Master's thesis, and/or reports mentioned this factor.[55] This factor is very important in the apparel industry, as Helfgott[56] describes so well in the following quotation:

> The concentration of apparel firms in the Garment Center [of New York City] begets the concentration of other businesses. Many kinds of manufacturing and services ancillary to the women's and children's apparel industries have planted themselves in the same neighborhood. Here are some examples: the design, display, and selling of textiles; sponging (cloth shrinking); factoring (textile banking); trucking; agencies that provide the pretty models; the supplying of thread and trimming; embroidery; the manufacture of belts; and the repairing of machinery.
>
> A firm which has its plant located at some distance from the garment center loses these external economies, and it must have a sufficiently large volume of production before it can achieve internal economies.

Communication

Five articles mentioned communication in connection with location.[57] Continuing Helfgott's quotation,[58] he

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[55]Connell, op. cit., p. 38; Diamond, op. cit., p. 528; Hall, op. cit., p. 14; Helfgott, op. cit., p. 63; Hoover and Vernon, op. cit., pp. 50 & 51; Maledon, op. cit., pp. 36-38; Philadelphia City Plan Commission, The Plan for Center City Philadelphia, op. cit., p. 24; and Ward, op. cit., pp. 160 & 161.

[56]Helfgott, op. cit., p. 63.

[57]Gustagson, op. cit., p. 165; Hall, op. cit., p. 14; Harvard Researchers, op. cit., p. 29 quoting Dr. Raymond Vernon; Helfgott, op. cit., p. 65; and McLeod, op. cit., p. 37.

[58]Helfgott, op. cit., p. 65.

relates communication with the ancillary services:

> Just where . . . the ancillary services locate depends upon their need for direct face-to-face communication.
>
> Embroidery, trucking, pleating, and stitching are all trim to the finished garment, and hence are located within or adjacent to the Garment Center. Most of belt production is in a similar situation; . . . .

The writer contends, therefore, that the following six factors are the most important in answering the question --Why are manufacturing establishments found in the St. Louis CBD?: labor, materials, market, transportation, external economies, and communication. These factors will be discussed in Chapter III. To investigate these factors, answers to the following questions will be sought:

1. Of the following four types of labor--skilled, unskilled, female, and foreign-born--what is the percentage of each of the total manufacturing employees in the St. Louis CBD?
2. How available are the above four types of labor to manufacturers in the St. Louis CBD?
3. What kind of materials (raw[unprocessed] or processed) are mainly used by manufacturers in the St. Louis CBD?
4. Where do manufacturers in the St. Louis CBD obtain their materials?

5. From what type(s) of establishments (such as other manufacturers or wholesalers, etc.) do the manufacturers in the St. Louis CBD obtain their materials?
6. Is the market for manufacturers in the St. Louis CBD mainly: (1) other manufacturing establishments, (2) individual people, or (3) non-manufacturing establishments?
7. Where is the market for manufacturers in the St. Louis CBD--is it the CBD, the City, the S. M. S. A., or outside the S. M. S. A.?
8. What medium of transportation do the manufacturers in the St. Louis CBD mainly use to: (1) receive their materials, (2) deliver their products, and (3) transport their labor?
9. What is the role of "external economies" to manufacturers in the St. Louis CBD?
10. How significant is face-to-face communication to manufacturers in the St. Louis CBD, and where is it mostly done?

Methodology

The Murphy-Vance Central Business Index Method

One purpose of this section is to briefly describe the Murphy-Vance Central Business Index Method. The reasons for selecting the study area as defined by the Murphy-Vance

Method were mentioned earlier (see page 12).

Raymond E. Murphy and J. E. Vance, Jr.[59] said in their article "Delimiting the CBD": "The development of a practical technique for delimiting the CBD [is] essentially a geographic problem . . . ." They devised such a technique in 1952 and tested it on nine moderate-sized American cities.[60]

The writers were convinced that detailed land-use mapping furnished the most practical common denominator for the determinator of comparable CBD's. They decided that the really essential central business functions appeared to be the retailing of goods and services for a profit and the performing of various office functions. These establishments, it was decided, were the ones upon which any delimitation of the CBD would be based. Industrial establishments (except newspapers), among others,[61] were considered as

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[59]Murphy and Vance, op. cit., pp. 189 and 190.

[60]The nine cities Murphy, Vance, and Epstein studied ranged in size from approximately 100,000 to 200,000 population. The authors, themselves, referred to these cities as moderate-sized cities. The cities were: Worcester, Mass.; Roanoke, Va.; Grand Rapids, Mich.; Mobile, Ala.; Tulsa, Okla.; Salt Lake City, Utah;, Phoenix, Ariz.; Tacoma, Wash.; and Scaramento, Calif. Murphy, Vance, and Epstein, op. cit.

[61]The following were considered as non-central business in character: permanent residences (including apartment houses and rooming houses), governmental and public (including parks and public schools as well as establishments carrying out city, county, state, and federal governmental functions), organizational establishments (churches, fraternal orders, colleges, etc.), industrial establishments (except newspapers), wholesaling, vacant buildings or stores, vacant lots, and commercial storage. Murphy and Vance, op. cit., p. 204.

non-central business in character.

They mapped the land use in the central areas of the cities (the obvious area and enough land beyond to encompass any land that could possibly be thought of as to be included in the CBD) on three maps for each block: one for the ground floor, one for the second floor,and a third that generalized the remaining floors. Each non-central business unit on each floor was indicated by an "X". Each other space unit was marked with the letter "C", which indicated the presence of any central business use.

They calculated three ratios for each block in order to arrive at some mathematical basis by which to classify it. The first of these was the Total Height Index, obtained by dividing the total floor space of each block (measured in square inches at a scale of 1 inch to 200 feet) at all levels by the total ground-floor space. (THI = total floor space/total ground-floor space.) The Central Business Height Index was obtained by dividing the total floor area of all central business uses in the block by the total ground-floor area of the block. (CBHI = central business space/total ground-floor space.) The Central Business Intensity Index was the proportion of all floor space in the block that was in central business uses. (CBII = [central business space/total floor space] x 100.).

A combination of the Central Business Height Index and the Central Business Intensity Index was considered to

result in a more realistic delimitation than any one ratio or any other combination of ratios. By using this combination of indexes a block, to be considered CBD in character, must have a Central Business Height Index of one or more and a Central Business Intensity Index of fifty per cent or more. This means that each block, to be considered part of the CBD, must have at least: (1) the equivalent of the ground-floor space of the block in central business uses, and (2) 50 per cent or more of its total floor space in central business uses.[62]

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[62] In addition, the following special rules were set up:

1. To be considered part of the CBD a block must be part of a contiguous group surrounding the peak value intersection (the locality with the maximum pedestrian concentration, and not infrequently, the point of greatest vehicular congestion). Even though a block touches the other only at one corner it is considered contiguous.

2. A block that does not reach the required index values but is surrounded by blocks that do is considered part of the CBD.

3. A block completely occupied by the buildings and grounds of a city hall or other municipal office building, a municipal auditorium, city police or fire department headquarters, or a central post office is included within the CBD if it is adjacent to blocks meeting the standard requirements. This also includes courthouses, state capital buildings, and certain federal buildings in addition to the post office, e.g., a federal court building or other office building the activities of which are closely integrated with those of the city and the region. In no instance should such government buildings as those described in this paragraph result in the extension of the CBD for more than one block beyond normal CBD blocks. Thus where there is a group of state buildings occupying several blocks that border the CBD, as in some state capitals, the whole group is considered non-CBD.

4. If the structures mentioned in Rule 3 occupy only a part of a block which is contiguous to other CBD blocks and if the inclusion of these establishments as central business would bring the two indexes of the block to the required totals then the block is considered part of the CBD. Ibid., p. 219.

Questionnaires

The information used in this thesis was obtained by asking the respondents questions appearing in one of two prepared questionnaires (Questionnaires A and B in the Appendix). The use of a prepared questionnaire performed two functions: (1) it kept the total information congruent, and (2) it focused the line of questioning on the objective of the interview. The objective of the interview, of course, was to determine: (1) the character of manufacturing in the St. Louis CBD, (2) the factors involved in its location, and (3) the advantages and disadvantages of being located there. The questionnaires were pre-tested on manufacturing establishments in the East St. Louis Central Business District before they were applied to the St. Louis CBD.

Selecting establishments and interviewing

Each manufacturing establishment in the study area was interviewed. Except for a 25% random sample of two major groups all the establishments were interviewed with the shorter Questionnaire A. Twenty-five percent of the establishments in Major Groups23 and 27 were interviewed with the longer Questionnaire B which contained the same questions as in Questionnaire A plus other questions pertaining to factors of localization and advantages and disadvantages of being located in the CBD.

Most of the establishments were selected from the Missouri Directory of Manufacturers[63] according to their addresses while the others were chosen on sight while doing the field work. This was done either by: (1) scrutinizing the Building Directory in some buildings for manufacturing firms, (2) asking the doorman or elevator operator whether there were any manufacturing establishments in the building, or (3) merely studying the sign outside an establishment to determine whether or not the establishment might be involved in manufacturing. Wherever it was doubtful the interviewer inquired whether or not the establishment did any manufacturing.

Each establishment (except for the 25% random sample) selected from the Missouri Directory of Manufacturers was sent Letter A (see the Appendix) in advance explaining the nature of the thesis and the purpose of the interview. The twenty-five per cent random sample was sent Letter B (also in the Appendix). The twenty-five per cent random sample was selected by listing in alphabetical order and numbering all the establishments listed in the Missouri Directory of Manufacturers as appearing in the study area. A book of random numbers was then referred to, and the sample was

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[63] Missouri Division of Commerce and Industrial Development, Missouri Directory of Manufacturers (1966 ed.; Jefferson City, Mo.: Missouri Division of Commerce and Industrial Development, 1966).

chosen according to the numbers selected from the table of random numbers.

The President, Vice President, Secretary-Treasurer, or General Manager was the preferred respondent. However, at some establishments these people were not available, so in those cases whenever it was unsatisfactory to make an appointment for a later time with the preferred person the most responsible person at the establishment at the time was interviewed.

At the first personal contact the interviewer introduced himself and his purpose and presented his business card. During the introduction he emphasized the confidentiality of the interview--in other words, no data pertaining to a specific firm would appear in the thesis. The respondent was then asked if he had the time and if he would consent to the interview. If he answered in the affirmative the interview commenced; if he answered in the negative the writer probed for an explanation and strived to rectify the situation by either explaining more fully the nature and importance of the interview or to make an appointment for a later time or date. In no case was the respondent "high-pressured" into the interview. A potential inducement was to offer the respondent a report of the findings after the field work was completed and the data was processed.

The interviewing process began on the north side of the southernmost east-west named street (Market Street) of

the approximate CBD (4th-12th and Market-Lucas--see Map 2) and proceeded westward from the southeasternmost establishment within the study area; then eastward along the southern side of the next street to the north (Chestnut). This was repeated for all the east-west streets until the northern side of Lucas Street was reached. Thereafter, the process began on the north-south numbered streets, commencing on the western side of the eastermost street (4th Street) and with the northermost establishment. The interviewing moved alternately south and north and westward street-by-street until the western side of 12th Street was reached. After this the approximate CBD was once again canvassed, searching out establishments that might not have been listed in the Missouri Directory of Manufacturers.

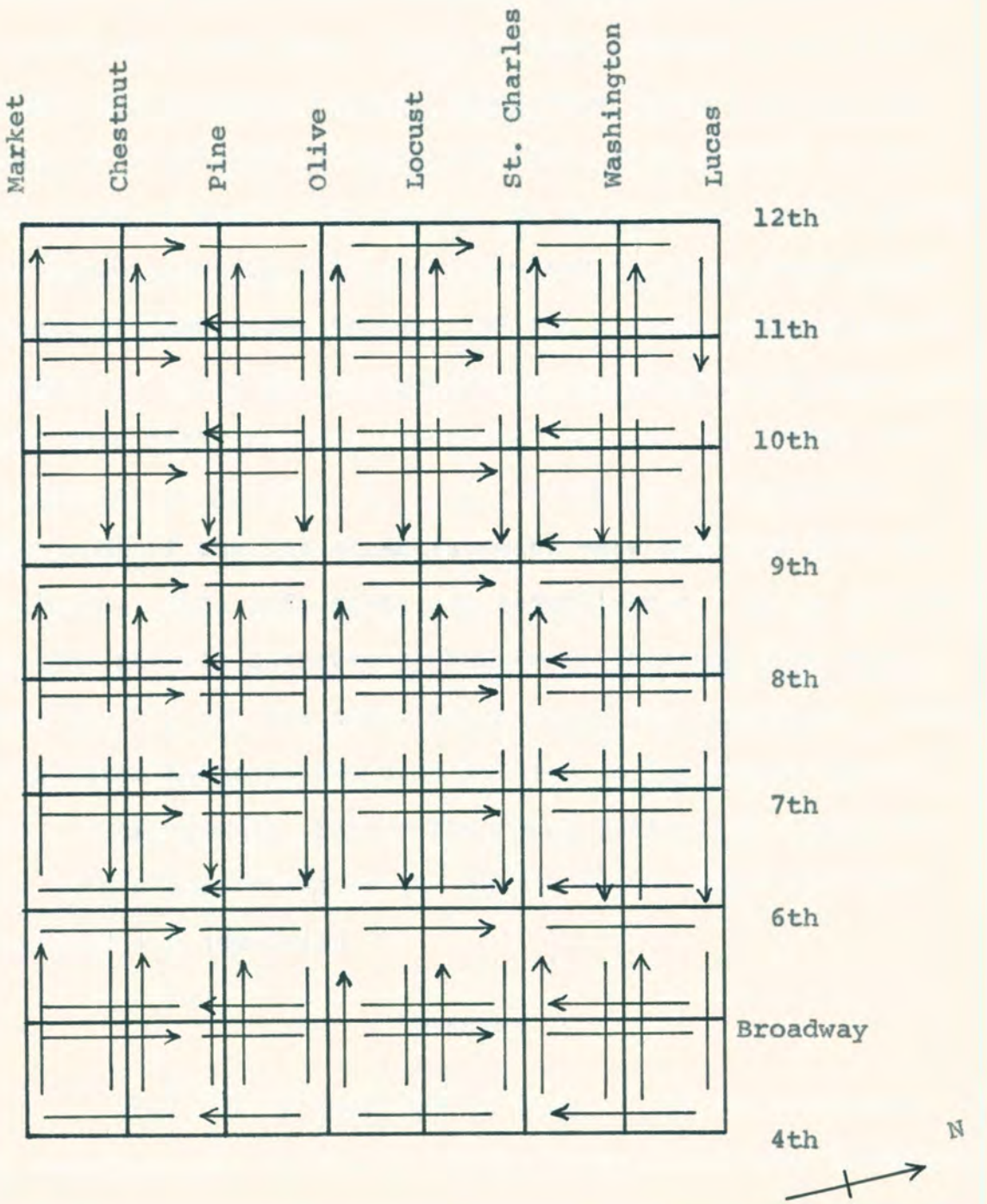
After the approximate Murphy-Vance CBD area had been thoroughly canvassed interviewing began on the remaining streets of the study area. This turned out to be only one block of each of the named streets from 12th to 13th S Street. This completed the field work.

Altogether, 112 establishments were interviewed. However, after comparing the addresses with the Murphy-Vance map (Map 1), and after consulting the Standard Industrial Classification Manual, 1967 and my thesis advisor, thirty-one establishments were determined to be outside the study area, and fifteen establishments were determined to be non-manufacturing establishments. Only those establishments

Map 2

INTERVIEW COVERAGE DIAGRAM

(Approximate Murphy-Vance CBD)



that had 50% or more of their overall operations in manufacturing were selected for analysis. Five establishments did their manufacturing process elsewhere than in the study area, and these interviews were terminated once this was learned. Of the thirty-one establishments determined to be outside the study area, thirteen were located in the 1100 block of Washington Avenue, eight were located in the 1000 block of Washington Avenue, and three were located in the 900 block of Washington Avenue, or twenty-four of the thirty-one establishments (77%) were located in three consecutive blocks of Washington Avenue. Of the fifteen establishments determined to be non-manufacturing establishments, seven did less than fifty percent manufacturing, and the others were determined to be other S. I. C. industries. Therefore, fifty-one of the 112 establishments were excluded from the analysis. This left sixty-one establishments to be analyzed. Besides the 112 interviews which were obtained four more were sought, but the respondents would not cooperate. These four establishments are also located in the Murphy-Vance CBD. Consequently, 97% of the total interviews sought and 94% of the interviews sought in the Murphy-Vance CBD were successfully completed.

Summary

This thesis proposes to study: (1) the character of manufacturing in the St. Louis Central Business District,

(2) the location factors of this manufacturing, and (3) the advantages and disadvantages for being located there. The Central Business District of cities is an area of prime importance, for Boyce[64] said that "well over one-half of all employment in most central cities occurs in, or very near, the Central Business District." From data on three of the largest cities in the United States (Chicago, Philadelphia, and St. Louis), it is estimated that manufacturing and its associated uses accounts for from ten to fifteen percent of the land use and from ten to twenty percent of the total number of structures in that area generally known as the Central Business District. The CBD's of several cities in Anglo-America also contain a substantial part of each city's or metropolitan area's total manufacturing.

It was decided to choose the 1955 St. Louis Murphy-Vance CBD as the study area for investigation. The reasons for this decision are: (1) very little literature was found regarding manufacturing in the Central Business District, (2) St. Louis is an important industrial center, (3) manufacturing exists in the St. Louis CBD, (4) St.

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[64] Boyce, op. cit., p. 228.

Louis is comparable in size to previously studied cities, (5) the St. Louis Murphy-Vance CBD will facilitate future comparisons with other cities, and (6) its size will lend itself to expeditious study.

A result of the survey of the literature relating to the topic was the resolution to investigate the following three questions concerning the character of manufacturing in the St. Louis Central Business District:

1. What types of industries are found there?
2. What is the size of the establishments in terms of: (1) number of employees, and (2) amount of floor space?
3. Where are the establishments located: (1) in the CBD, and (2) within the buildings?

Evidently, according to the findings of a number of authors, the: (1) Printing and Publishing, and (2) Apparel and Other Textile Products major groups seem to predominate in the CBD. A third one is expected to be found there (Miscellaneous Manufacturing Industries--viz., jewelry manufacturing). The number of employees for the typical establishment in the St. Louis CBD appears to be less than fifty. In regard to question number "3" above, answers to the following three questions will be sought:

1. Will there be any pattern of distribution in terms of type of industry?
2. Will there be generally a peripheral location of establishments?
3. Will manufacturing be most important on the second floor of buildings, and if not, where will it be most important?

Another basic question which this thesis will attempt to answer is: Why are manufacturing establishments found in the St. Louis CBD? From his reading of previous studies related to the topic, the writer contends that the following six factors are the most important in answering the above questions: labor, materials, market, transportation, external economies, and communication. To investigate these factors, answers to the following questions will be sought:

1. Of the following four types of labor--skilled, unskilled, female and foreign-born--what is the percentage of each of the total manufacturing employees in the St. Louis CBD?
2. How available are the above four types of labor to manufacturers in the St. Louis CBD?
3. What kind of materials (raw [unprocessed] or processed) are mainly used by manufact-

urers in the St. Louis CBD?

4. Where do manufacturers in the St. Louis CBD obtain their materials?
5. From what type(s) of establishments (such as manufacturers or wholesalers) do the manufacturers in the St. Louis CBD obtain their materials?
6. Is the market for manufacturers in the St. Louis CBD mainly: (1) other manufacturing establishments, (2) individual people or (3) non-manufacturing establishments?
7. Where is the market for manufacturers in the St. Louis CBD--is it the CBD, the City, the S. M. S. A., or outside the S. M. S. A.?
8. What medium of transportation do the manufacturers in the St. Louis CBD mainly use to: (1) receive their materials,,(2) deliver their products, and (3) transport their labor?
9. What is the role of "external economies" to manufacturers in the St. Louis CBD?
10. How significant is face-to-face communication to manufacturers in the St. Louis CBD, and where is it

mostly done?

Each manufacturing establishment in the Murphy-Vance Central Business District was interviewed with either Questionnaire A or Questionnaire B. A twenty-five per cent random sample of establishments in Major Groups 23 and 27 were interviewed with Questionnaire B; all others were interviewed with Questionnaire A. Most of the establishments were selected from the Missouri Directory of Manufacturers (1966 edition) according to their addresses while the others were chosen on sight while doing the field work. The President, Vice-President, Secretary-Treasurer, or General Manager was interviewed at most of the establishments.

Altogether, 112 establishments were interviewed. However, after: (1) comparing the addresses with the Murphy-Vance CBD map (Map 1), and (2) consulting the Standard Industrial Classification Manual,1967 and my thesis advisor, fifty-one establishments were excluded from analysis. This left sixty-one establishments which will be analyzed in the following chapters.

CHAPTER II

CHARACTER OF MANUFACTURING

In Chapter I it was shown that this thesis has two major parts: (1) to determine the character of manufacturing, and (2) to study the factors of localization. Chapter II will discuss the character of manufacturing in the St. Louis Central Business District. In this chapter the following qualities will be discussed on the basis of the writer's field investigation: (1) the amount of manufacturing in the St. Louis CBD, (2) the significance of manufacturing in the CBD compared to the rest of the City, (3) the types of industries found in the CBD, (4) the important major groups (two-digit S.I.C. industries), (5) the size of the establishments, (6) the location of manufacturing in the CBD and within the buildings, and (7) other aspects of the character of manufacturing in the St. Louis CBD. The findings for these qualities will be compared to the findings of other researchers who have also studied, albeit in less detail, manufacturing in the Central Business Districts of cities. There will be a summary and conclusions of these qualities at the end of the chapter.

Amount of Manufacturing in the St. Louis CBD

Altogether, there were sixty manufacturing establishments found in the St. Louis CBD. One additional establishment, which is the reason for the inclusion of Block 50 in the thesis, was inadvertently included in the analysis of the data; hence, the statistics in the chapter will include this establishment.[65] These sixty-one establishments account for: 1,181 total employees; 871 production employees; 337,104 square feet of total floor space; 253,157 square feet of total floor space used for the manufacturing process alone; a total of 75 floors used; and 69 floors used for the manufacturing process alone.

The Significance of Manufacturing in the CBD Compared to the Rest of the City

The amount of manufacturing in the CBD is very little when compared to manufacturing found in the rest of the City. The sixty-one establishments account for approximately three per cent of the 1,970 manufacturing establishments found in the City in 1963. The 1,181 total employees

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[65] This establishment accounts for approximately only 2% of the sixty-one establishments, manufacturing employment and floor space used by the manufacturing establishments in the CBD. It belongs to the Printing and Publishing major group, and it accounts for approximately 3% of this major group's establishments in the CBD and 6% of its employment and floor space in the CBD. It is felt that the inclusion of this establishment does not significantly alter the statistics.

account for only about 1% of the total number of 129,069 manufacturing employees that were employed in the City in that same year. The 871 production employees also account for only about 1% of the total number of 88,807 production employees in the City also in that year.[66]

Types of Industries Found in the CBD

A large variety of industries were found in the St. Louis CBD. Almost one-half of the twenty-one major groups (two-digit Standard Industrial Classification Industries) that the U. S. Bureau of the Budget has classified as manufacturing were found here.

Altogether, there were found in the St. Louis CBD: nine major groups representing 43% of a total of twenty-one listed by the U. S. Bureau of the Budget, eighteen industry groups (three-digit S. I. C. industries) representing 12% of a total of 148 listed by the U. S. Bureau of the Budget, and twenty-six separate industries (four-digit S. I. C. industries) which represent 6% of a total of 422 listed by the U. S. Bureau of the Budget. A list of short titles for the major groups, industry groups, and industries found in the St. Louis Central Business District appear in Table 2.

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[66] U. S. Bureau of the Census, Census of Manufacturers, 1963, Vol. III: Area Statistics (Washington, D. C.: U. S. Government Printing Office, 1966), p. 26-7.

TABLE 2

NUMERICAL INDEX OF OFFICIAL S. I. C. SHORT TITLES OF MAJOR GROUPS, INDUSTRY GROUPS, AND INDUSTRIES FOUND IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT[a]

Major Group	Industry Group	Industry Number	Short Title[b]
20			FOOD AND KINDRED PRODUCTS
	207		Confectionery and Related Prod.
		2071	Confectionery products
23			APPAREL AND OTHER TEXTILE PROD.
	232		Men's and Boy's Furnishings
		2329	Men's and boy's clothing, nec.
	233		Women's and Misses' Outerwear
		2335	Women's and misses' dresses
		2337	Women's and misses' suits and coats
		2339	Women's and misses' outerwear, nec.
	237		Fur Goods
		2371	Fur goods
	238		Miscellaneous Apparel and Acces.
		2389	Apparel and accessories, nec.
	239		Misc. Fab. Textile Products
		2391	Curtains and draperies
		2395	Pleating and stitching
27			PRINTING AND PUBLISHING
	272		Periodicals
		2721	Periodicals
	275		Commercial Printing
		2751	Commercial printing, lithographic
		2752	Commercial printing, litho.
		2753	Engraving and plate printing
	278		Blankbooks and Bookbinding
		2782	Blankbooks and looseleaf binders
	279		Printing Trade Services
		2791	Typesetting
		2794	Electrotyping and Stereotyping
28			CHEMICAL AND ALLIED PRODUCTS
	283		Drugs
		2834	Pharmaceutical preparations
	289		Miscellaneous Chem. Products
		2893	Printing ink

TABLE 2--Continued

Major Group	Industry Group	Industry Number	Short Title[b]
32			STONE, CLAY AND GLASS PRODUCTS
	329		Misc. Non-Metallic Min. Prod.
		3292	Asbestos products
35			MACHINERY, EXCEPT ELECTRICAL
	354		Metal Working Machinery
		3544	Spec. dies, tools, jigs & fix.
36			ELEC. EQUIPMENT & SUPPLIES
	366		Communication Equipment
		3662	Radio & TV communication equip.
38			INSTRUMENTS & RELATED PRODUCTS
	385		Ophthalmic Goods
		3851	Ophthalmic goods
39			MISCELLANEOUS MANUF. INDUSTRIES
	391		Jewelry, Silverware & Plated Ware
		3911	Jewelry, precious metal
		3913	Lapidary work
	399		Miscellaneous Manufactures
		3993	Signs & advertising displays
		3999	Manufactures, nec.

[a]U. S. Bureau of the Budget, op. cit., pp. 591-597.

[b]Abbreviations: "nec"--not elsewhere classified, "ex"--except, and "misc"--miscellaneous.

The nine major groups found in this study are approximately one-half of seventeen major groups found by other researchers either in or very near CBD's of other cities. A list of those found by the other researchers is included in Table 3. The nine major groups found in the St. Louis CBD were also found by the other researchers in other CBD's, or in other words, no new major groups were found in the St. Louis CBD.

TABLE 3

MAJOR GROUPS FOUND IN OTHER CBD'S

S. I. C. Number	S. I. C. Short Title
20*	Food & Kindred Products
21	Tobacco Manufactures
22	Textile Mill Products
23*	Apparel & Other Textile Products
24	Lumber & Wood Products
25	Furniture & Fixtures
26	Paper & Allied Products
27*	Printing & Publishing
28*	Chemical & Allied Products
31	Leather & Leather Products
32*	Stone, Clay & Glass Products
33	Primary Metal Industries
34	Fabricated Metal Products
35*	Machinery, Except Electrical
36*	Electrical Equip. & Supplies
38*	Instruments & Related Products
39*	Misc. Manufacturing Industries

*Found in the St. Louis CBD.

Important Major Groups

Five criteria were used for measuring the importance of the major groups in the CBD: (1) number of establishments, (2) total employment, (3) production employment, (4) total floor space, and (5) floor space used for the manufacturing process alone. Production employment indicates only employees directly involved in the actual manufacturing process of the product(s) of the establishments; in

other words, this excludes the administrative, clerical, maintenance, and delivery components of the establishments. Floor space used for the manufacturing process alone excludes floor space used for office work, storage, sales and delivery purposes, and all other space not directly involved in the actual manufacturing process. This floor space will henceforth be referred to as manufacturing floor space.

Two major groups continually appear at the top of the list when ranking them by the five aforementioned criteria (Table 4). These two major groups, with their

TABLE 4

RANKING OF MAJOR GROUPS BY CRITERIA

Establish.		Employment				Floor Space			
		Total		Production		Total		Manufacturing	
Maj. Grp.	No.	Maj. Grp.	No.	Maj. Grp.	No.	Maj. Grp.	Sq. Ft.	Maj. Grp.	Sq. Ft.
27	30	23	492	23	455	27	136,254	27	106,777
23	14	27	332	27	247	23	113,850	23	95,830
39	7	36	150	38	52	38	23,200	36	15,000
38	3	38	109	39	44	36	22,000	38	10,100
20	2	29	58	36	40	39	17,650	39	9,675
28	2	28	16	28	14	28	12,000	28	9,000
32	1	20	11	20	7	35	6,500	20	3,500
35	1	32	8	32	7	20	5,000	35	2,500
36	1	35	5	35	5	32	650	32	575
Total	61		1,181		871		337,104		253,157

S. I. C. numbers are: Apparel and Other Textile Products (23), and Printing and Publishing (27). Together, they

account for between seventy and eighty percent of all five criteria:

1. 72% (44) of the total establishments
2. 70% (824) of the total employees
3. 81% (702) of the production employees
4. 74% (250,104 square feet) of the total floor space
5. 80% (202,607 square feet) of the manufacturing floor space.

These findings agree rather well with those of other researchers regarding the character of manufacturing in the Central Business District. The Chicago Plan Commission,[67] for example, found that the printing and apparel industries together comprised 85% of the manufacturing employment in the Chicago Central Business District around 1952. McLeod[68] stated in his thesis on manufacturing in Philadelphia in 1954 that apparel and printing together accounted for over 65% of the total number of manufacturing employees in the CBD. However, in comparison to Kerr and Spelt's[69] findings that the most important major group in Downtown Toronto was Printing and Publishing (employing 1,515 people and representing 22% of the total employment in the area), the most important major group in the St.

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[67]Chicago Plan Commission, op. cit., p. 23.
[68]McLeod, op. cit., p. 33.
[69]Kerr and Spelt, op. cit., p. 8.

Louis CBD is Apparel and Other Textile Products (employing 492 total employees and 455 production employees and representing 42% and 52% of the total and production employment, resepctively). Thus, the two most important major groups in Central Business Districts of large cities in Anglo-America appear to be: Apparel and Other Textile Products (23), and Printing and Publishing (27).

Size of Establishments

This section will discuss the general size of all the sixty-one manufacturing establishments in terms of: (1) number employed, and (2) floor space. As before, these findings will also be compared to those of other researchers.

Number employed

In terms of number employed, and if measured on the basis of number of establishments, the small establishment predominates in the St. Louis CBD (Figure 1). There are forty manufacturing establishments in the CBD that have less than twenty total employees each, and there are forty-four establishments that employ less than twenty production employees each. However, although these small establishments account for from two-thirds to almost three-fourths of the CBD's manufacturing establishments, they collectively employ only approximately one-fifth of its manufacturing employees.

The average plant for all sixty-one manufacturing establishments employs nineteen total employees and fourteen production employees (Table 5). However, there is a large

FIGURE 1

ESTABLISHMENT SIZE

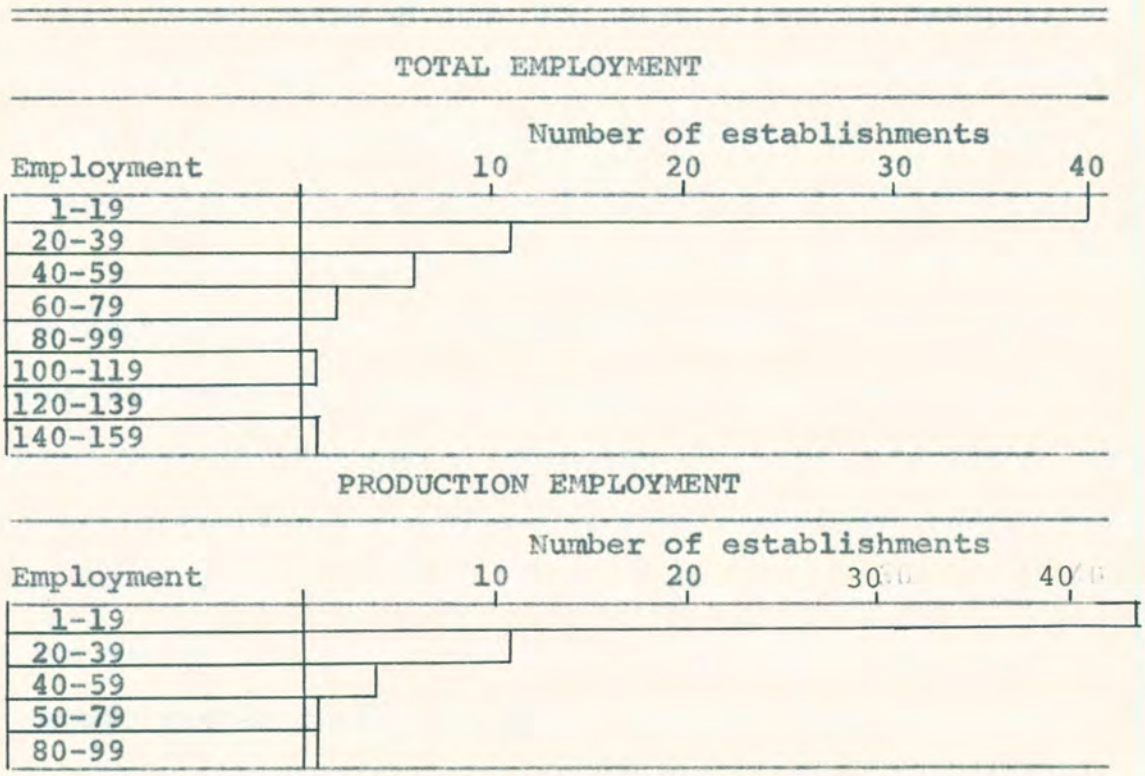

TABLE 5

SIZE OF THE ESTABLISHMENTS BY EMPLOYMENT

Total Employment				Production Employment			
Major Group	Aver. Plant	Larg. Plant	Small. Plant	Major Group	Aver. Plant	Larg. Plant	Small. Plant
36	150	150	150	36	40	40	40
38	36	75	14	23	32	95	1
23	35	102	1	38	17	30	10
27	11	43	1	27	8	32	1
39	8	30	1	28	7	9	5
28	8	11	5	32	7	7	7
32	8	8	8	39	6	18	1
20	6	8	3	35	5	5	5
35	5	5	5	20	4	5	2
Totals	19	150	1		14	95	1

variation in the size of the individual plants in the CBD. The largest plant in the CBD employs 150 total employees and the smallest just one person.

Major Group 36 has the largest average plant in the CBD in both total and production employment. Major Groups 20 and 35 share the distinction of having the smallest average plants in the CBD in terms of these two criteria.

Terence Richard Lee and Kerr and Spelt made similar observations in their studies with regard to "size of the establishments" in terms of number of employees. Lee[70] found that for the CBD in Edmonton, Alberta, "the usual number of workers in each plant is low, often less than twenty, and the largest firm employs less than one hundred workers." Kerr and Spelt[71] found that the industries in Downtown Toronto varied greatly in size, "ranging from very small operations with fewer than ten employees to a large firm employing 400 people."

Floor Space

On the basis of number of establishments the small establishment also predominates in the St. Louis CBD when measured by floor space (Figure 2). There are forty establishments in the CBD that have less than 5,000 square feet of total floor space, and there are forty-four establishments that have less than 5,000 square feet of

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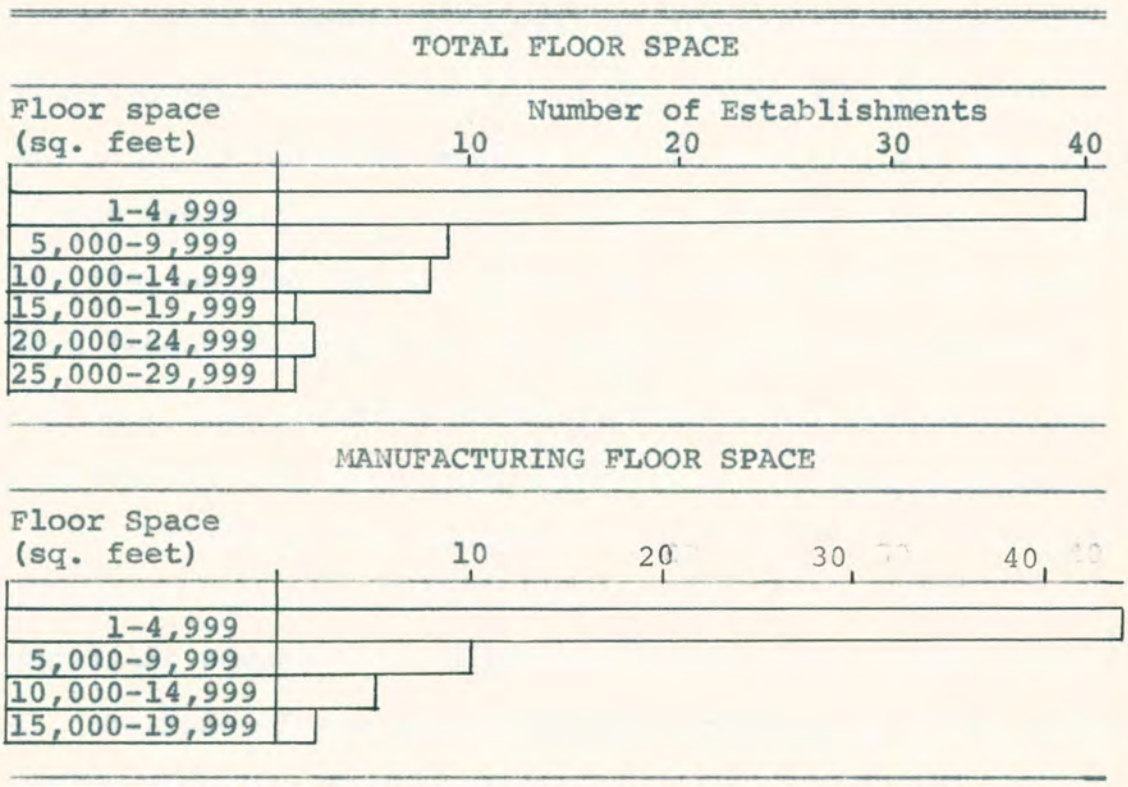
[70]Lee, op. cit., p. 60.

[71]Kerr and Spelt, op. cit., p. 8.

FIGURE 2

ESTABLISHMENT SIZE



manufacturing floor space.[72] These small establishments account for from two-thirds to almost three-fourths of

[72]The data on "manufacturing floor space" is being included only for possible future use. The writer sees no immediate purpose for this data, but the data was available and is being included only for the reader's potential use. The reliability of all data in this thesis should be accepted with caution. The respondents were quite frequently only estimating the information that they gave the interviewer.

the manufacturing establishments in the CBD, but they occupy only approximately one-third of the floor space used by all sixty-one establishments.

Most of the plants in the CBD's of both Edmonton and St. Louis occupy less than 10,000 square feet of total floor space, Lee[73] found that for Edmonton's CBD "the majority of factories studied had an area of less than 10,000 square feet . . . ." Figure 2 shows that the majority (49, or 80%) of the plants in the St. Louis CBD also have less than 10,000 square feet of total floor space. (In fact, the majority of the plants in the St. Louis CBD [66%] have less than 5,000 square feet of floor space.)

Although the average plant for all sixty-one establishments occupies 5,526 square feet of total floor space and 4,150 square feet of manufacturing floor space (Table 6), the size of the establishments in terms of floor space varies greatly. The largest plant occupies 27,000 square feet of total floor space, and the smallest plant occupies only 200 square feet (a range of 26,800 square feet). In manufacturing floor space the largest plant occupies 15,000 square feet, and the smallest plant again occupies only 200 square feet (a range of 14,800 square feet). In both total and manufacturing floor space major group 36 has the largest average plant, and major group 32 has the smallest average plant.

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[73] Lee, op. cit., p. 60.

TABLE 6

SIZE OF THE ESTABLISHMENTS BY FLOOR SPACE

TOTAL FLOOR SPACE				MANUFACTURING FLOOR SPACE			
Maj. Grp.	Aver. Plant	Larg. Plant	Small. Plant	Maj. Grp.	Aver. Plant	Larg. Plant	Small. Plant
36	22,000	22,000	22,000	36	15,000	15,000	15,000
23	8,132	18,500	3,000	23	6,845	13,300	1,800
38	7,733	20,000	1,200	28	4,500	7,000	2,000
35	6,500	6,500	6,500	27	3,559	15,000	300
28	6,000	9,000	3,000	38	3,367	8,000	800
27	4,542	27,000	300	35	2,500	2,500	2,500
39	2,521	10,000	200	20	1,750	3,000	500
20	2,500	4,000	1,000	39	1,382	5,000	200
32	650	650	650	32	575	575	575
Total	5,526	27,000	200		4,150	15,000	200

Location of the Establishments

This section will discuss: (1) the location of manufacturing in the CBD, (2) the location of the major groups in the CBD, and (3) the location of the manufacturing establishments within the buildings. As before, the findings will also be compared to those of other researchers. In addition, answers to the two questions posed in Chapter I regarding the location of the establishments and industries in the CBD will be given. The two questions are:

1. Will there be any pattern of distribution in terms of type of industry?
2. Will there generally be a peripheral

location of the establishments?

Location of manufacturing in the CBD

This subsection will discuss the pattern of distribution of manufacturing in the CBD in terms of (1) total establishments, (2) total employment, (3) production employment, (4) total floor space, and (5) density of total employees to total floor space. This will be done in terms of the numerical total or value of each of the above per city block. Another topic to be discussed in this subsection is "important blocks for manufacturing."

Naturally, it is understood that zoning ordinances might have much to do with the location of manufacturing in the CBD. However, the subject of zoning and its relationships with the present pattern of manufacturing in the CBD was not investigated in this thesis. Therefore, it is not precisely known whether or not zoning is the reason for manufacturing being found where it is in the CBD. The St. Louis City Plan Commission[74] did state in 1948:

> The entire Central Business District has been zoned industrially and contains scattered light manufacturing. Prior to the war, loft buildings suitable for such production were located generally to the south of the retail section [the east-central portion of the CBD] and to the north and northwest.

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[74] St. Louis City Plan Commission, Pattern of Industrial Land Use (St. Louis, 1948), p. 50.

It is the writer's belief that zoning is done on a small scale (that is, by districts) throughout the City, but he is not cognizant whether or not it is done on a large scale (e.g., block by block, or lot by lot).

Total establishments.--The sixty-one manufacturing establishments are located in sixteen (32%) of the fifty blocks constituting the study area (Map 3). Fifteen of the sixteen blocks are located in approximately the western half of the CBD.

Three of the sixteen blocks (Blocks 25, 35, and 38) collectively contain thirty-one establishments, or virtually one-half of all the manufacturing establishments. Block 38 contains the greatest number of establishments (15); this is virtually one-fourth of all the sixty-one manufacturing establishments in the CBD (Table 7).

Total employment.--Most of the total manufacturing employees are located in the northwest portion of the study area (Map 4). Three blocks alone contain the majority of the total manufacturing employees in the CBD: Blocks 35, 38 and 47 (Map 4 and Table 7). These three blocks collectively contain 670 total employees, or 57% of the total manufacturing employees in the CBD. Block 35 has the largest total employment (374, or 32%).

MAP 3

MANUFACTURING ESTABLISHMENTS PER BLOCK IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT

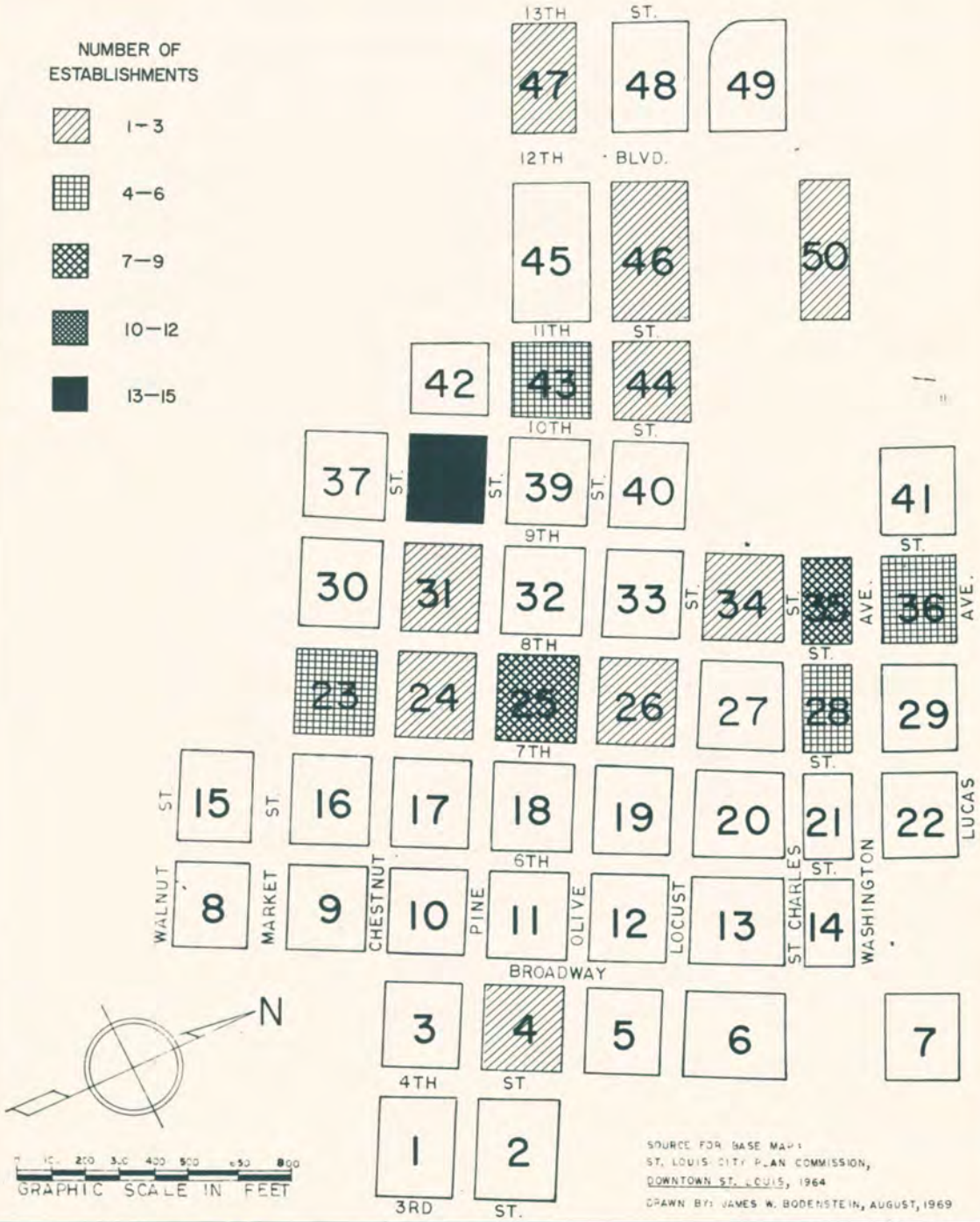
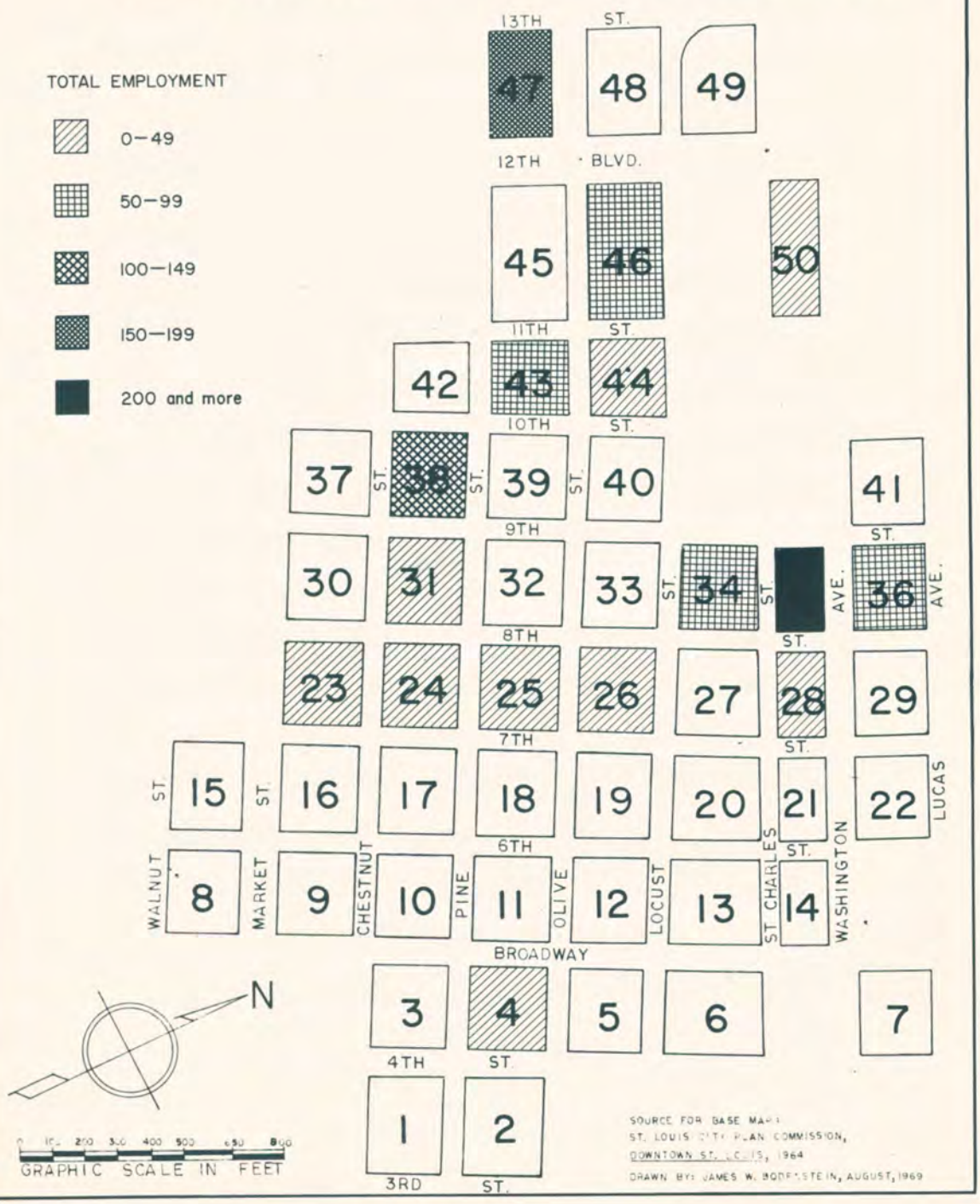


TABLE 7

ESTABLISHMENTS, EMPLOYMENT, AND FLOOR SPACE
BY BLOCK IN THE ST. LOUIS CBD

Blk.	Estab.		Employment				Floor Space			
			Total		Produc.		Total		Manufactur.	
	#	%	#	%	#	%	Sq.Ft.	%	Sq.Ft.	%
4	1	2	40	3	21	2	6,000	2	3,000	1
23	4	7	24	2	18	2	7,454	2	5,252	2
24	2	3	3	0	3	0	3,400	1	3,200	1
25	8	13	36	3	26	3	11,000	3	8,850	4
26	1	2	2	0	2	0	600	0	400	0
28	4	7	41	4	35	4	12,600	4	9,200	7
31	1	2	15	1	15	2	3,000	1	2,250	1
34	3	5	66	6	46	5	11,850	4	8,925	4
35	8	13	374	32	343	39	68,000	20	51,600	20
36	4	7	80	7	80	9	42,750	13	40,480	16
38	15	25	146	12	117	13	68,650	20	56,950	22
43	5	8	68	6	51	6	15,800	5	12,050	5
44	1	2	30	2	20	2	27,000	8	15,000	6
46	2	3	86	7	39	4	29,000	9	15,000	6
47	1	2	150	13	40	5	22,000	6	15,000	6
50	1	2	20	2	15	2	8,000	2	6,000	2
Total	61	103	1,181	101	871	98	337,104	100	253,157	103

MAP 4
TOTAL EMPLOYMENT IN MANUFACTURING PER BLOCK IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT

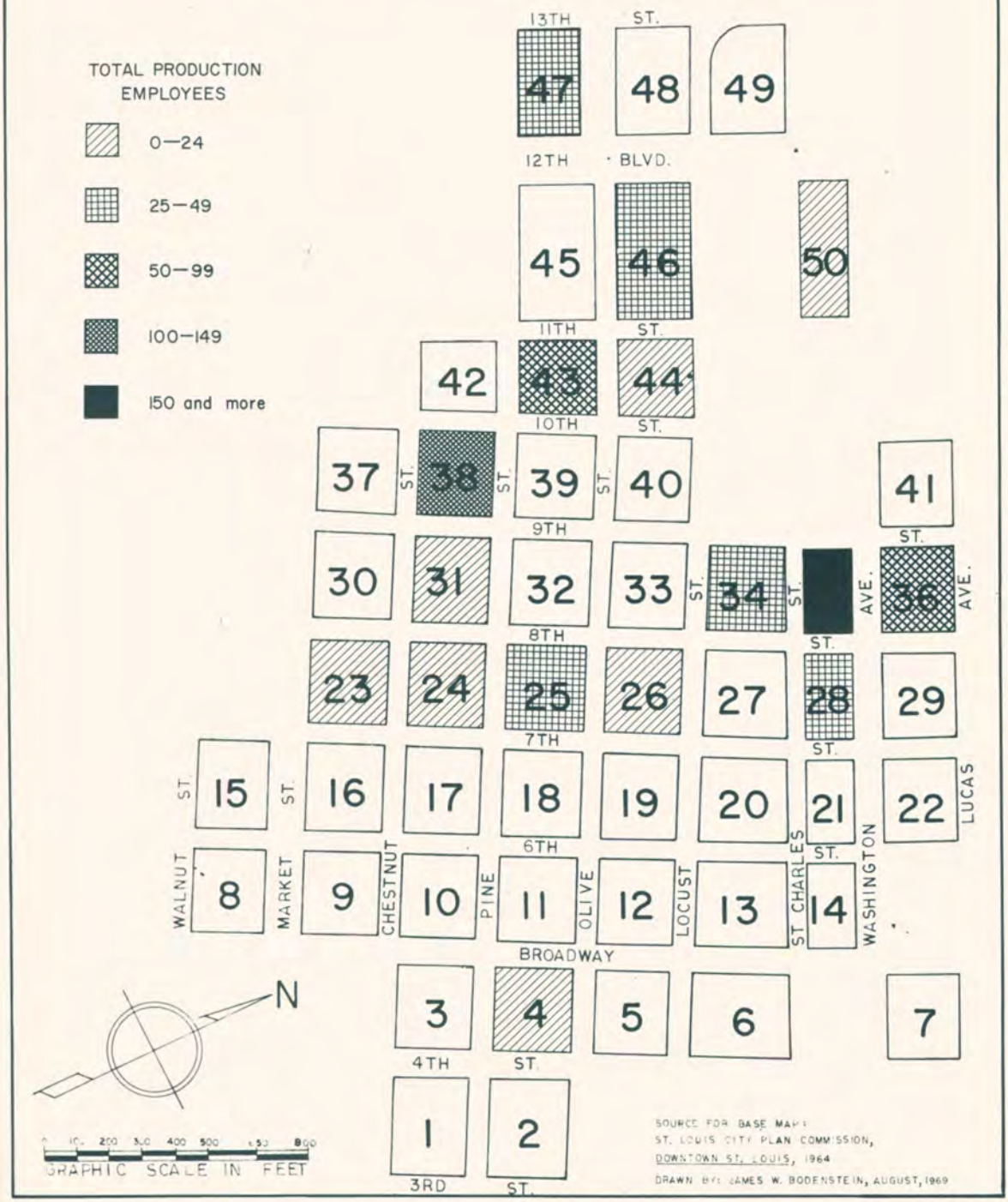


Production employment.--Most of the production employees are also located in the northwest portion of the study area (Map 5). Four blocks (one-fourth of the sixteen blocks studied) contain more than two-thirds of the production employees in the CBD: Blocks 35, 36, 38, and 43 (Map 5 and Table 7). These four blocks collectively contain 591 production employees, or 68% of the total production employees in the CBD. Block 35 has the largest number of production employees (343, or 39%).

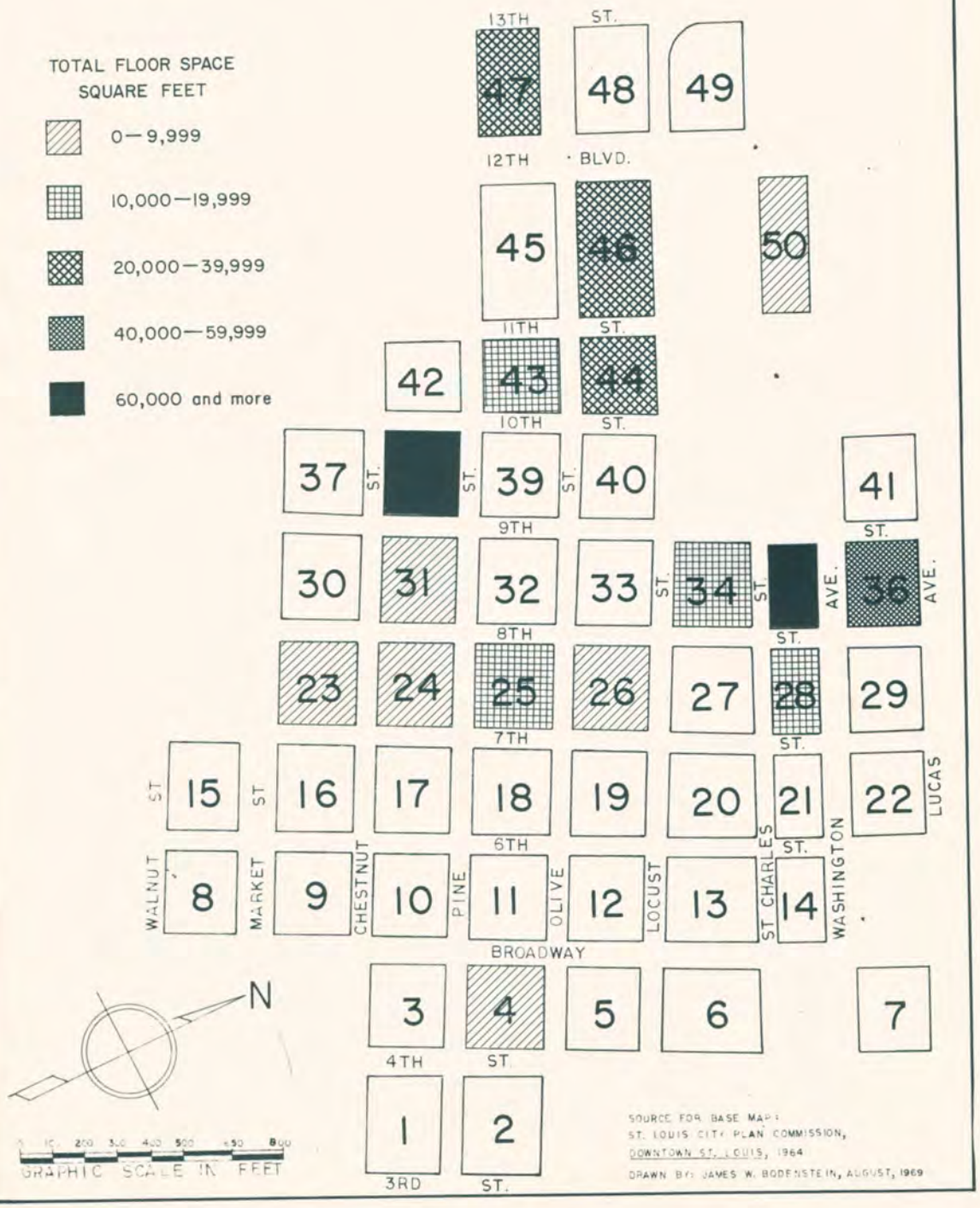
Total floor space.--Most of the total floor space is also located in the northwest portion of the study area (Map 6). Three of the sixteen blocks studied collectively contain the majority (53%) of the total floor space used by the manufacturing establishments in the CBD: Blocks 35, 36, and 38 (Map 6 and Table 7). These three blocks together contain 179,400 square feet of total floor space that are used by the manufacturing establishments. Block 38 has the greatest amount of total floor space (68,650 square feet, or 20%), followed closely by Block 35 with 68,000 square feet or 20%, (Table 7). Together these two blocks contain 136,500 square feet, or 40% of that used by all sixty-one manufacturing establishments.

Density of total employees to total floor space.--There is no general pattern of distribution regarding density of total employees to total floor space. Four blocks have the greatest densities: Blocks 4, 34, 35, and 47 (Map 7 and Table 8). Each of these four blocks has a

MAP 5
PRODUCTION EMPLOYMENT IN MANUFACTURING PER BLOCK IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT



MAP 6
TOTAL FLOOR SPACE IN MANUFACTURING PER BLOCK IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT



MAP 7
DENSITY OF TOTAL EMPLOYEES TO TOTAL FLOOR SPACE FOR MANUFACTURING ESTABLISHMENTS PER BLOCK IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT

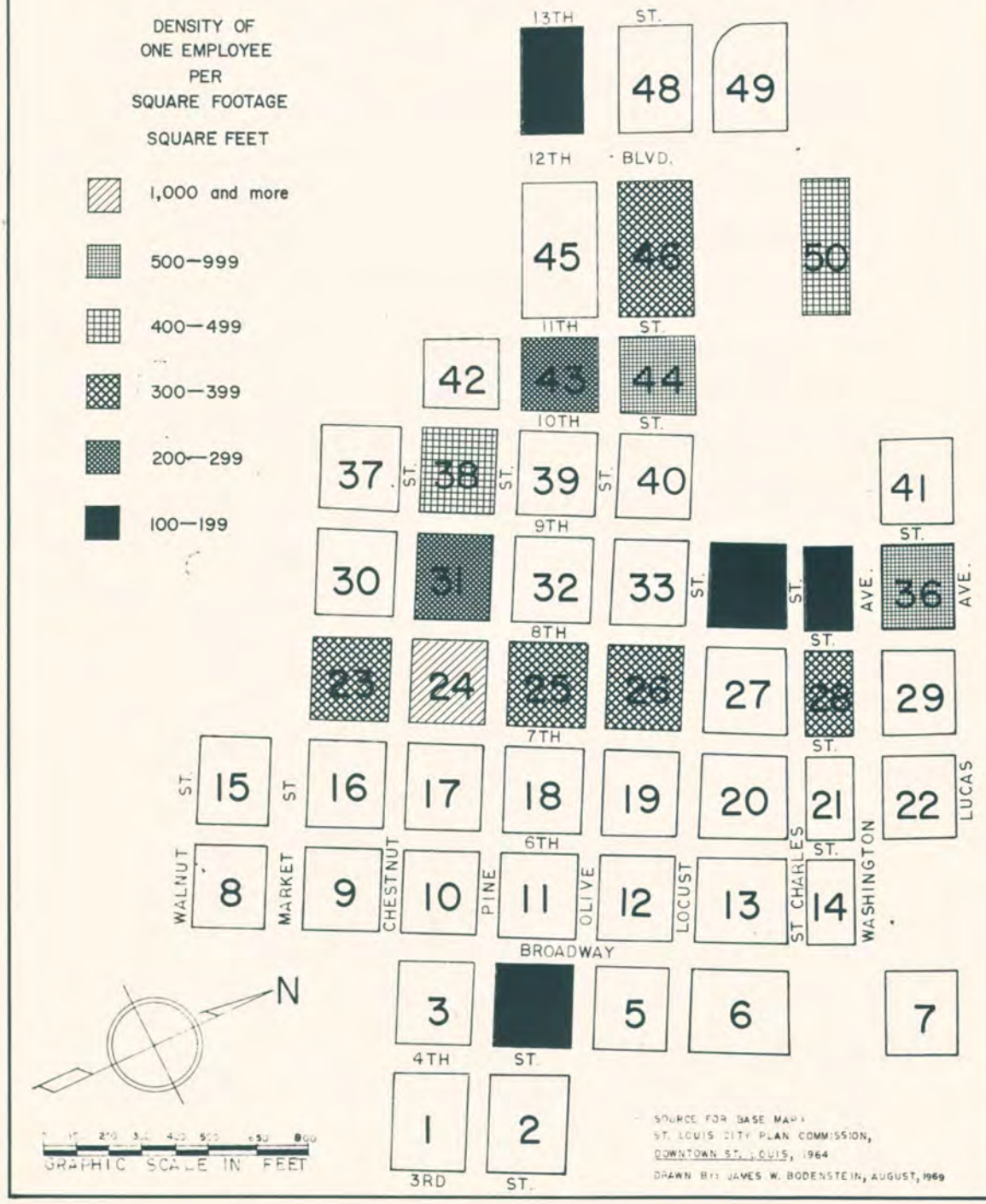


TABLE 8

DENSITY OF TOTAL EMPLOYEES TO TOTAL FLOOR SPACE BY BLOCK IN ST. LOUIS CBD

Block	Density*
47	146.6
4	150.0
34	179.5
35	183.8
31	200.0
43	232.3
26	300.0
25	305.6
28	307.1
23	310.6
46	337.2
50	400.0
38	470.4
36	534.3
44	900.0
24	1,133.3
Total	285.4

* Square footage per employee

density of one employee to from 100 to 199 square feet of total floor space. Block 24 is the least dense block; it has a density of 1,133.3 square feet of total floor space per employee. The general density of total employees to total floor space in the CBD is 285.4 square feet per employee.

Important blocks for manufacturing.--Five criteria were used for determining the important blocks for manufacturing in the CBD: (1) number of establishments, (2) number of total employees in manufacturing, (3) number of production employees, (4) amount of total floor space used by the manufacturing establishments, and (5) amount of manufacturing floor space. Two blocks (Blocks 35 and 38) continually appear in the top two rows of the list when ranking them according to these five criteria (Table 9). Block 38 ranks first for three of the five criteria: number of establishments, amount of total floor space used by the manufacturing establishments, and amount of manufacturing floor space. Block 35 ranks first for the other two of the five criteria: number of total employees in manufacturing and number of production employees.

It is difficult to say which one of these two blocks (Blocks 35 and 38) is the most important block for manufacturing in the CBD because it is difficult to say which one of these five criteria is paramount in measuring importance. If importance were measured by number of establishments,

TABLE 9

RANKING OF BLOCKS IN THE ST. LOUIS CBD BY ESTABLISHMENTS, EMPLOYMENT, AND FLOOR SPACE

Rank	Estab.		Employment				Floor Space			
			Total		Produc,		Total		Manufactur.	
	Blk	No	Blk	No	Blk	No	Blk	No	Blk	No
1	38	15	35	374	35	343	38	68,650	38	56,950
2	25	8	47	150	38	117	35	68,000	35	51,600
3	35	8	38	146	36	80	36	42,750	36	40,180
4	43	5	46	86	43	51	46	29,000	44	15,000
5	23	4	36	80	34	46	44	27,000	46	15,000
6	28	4	43	68	47	40	47	22,000	47	15,000
7	36	4	34	66	46	39	43	15,800	43	12,050
8	34	3	28	41	28	35	28	12,600	28	9,200
9	24	2	4	40	25	26	34	11,850	34	8,925
10	46	2	25	36	4	21	25	11,000	25	8,850
11	4	1	44	30	44	20	50	8,000	50	6,000
12	26	1	3	24	23	18	23	7,454	23	5,252
13	31	1	50	20	31	15	4	6,000	24	3,200
14	44	1	31	15	50	15	24	3,400	4	3,000
15	47	1	24	3	24	3	31	3,000	31	2,250
16	50	1	26	2	26	2	26	600	26	400

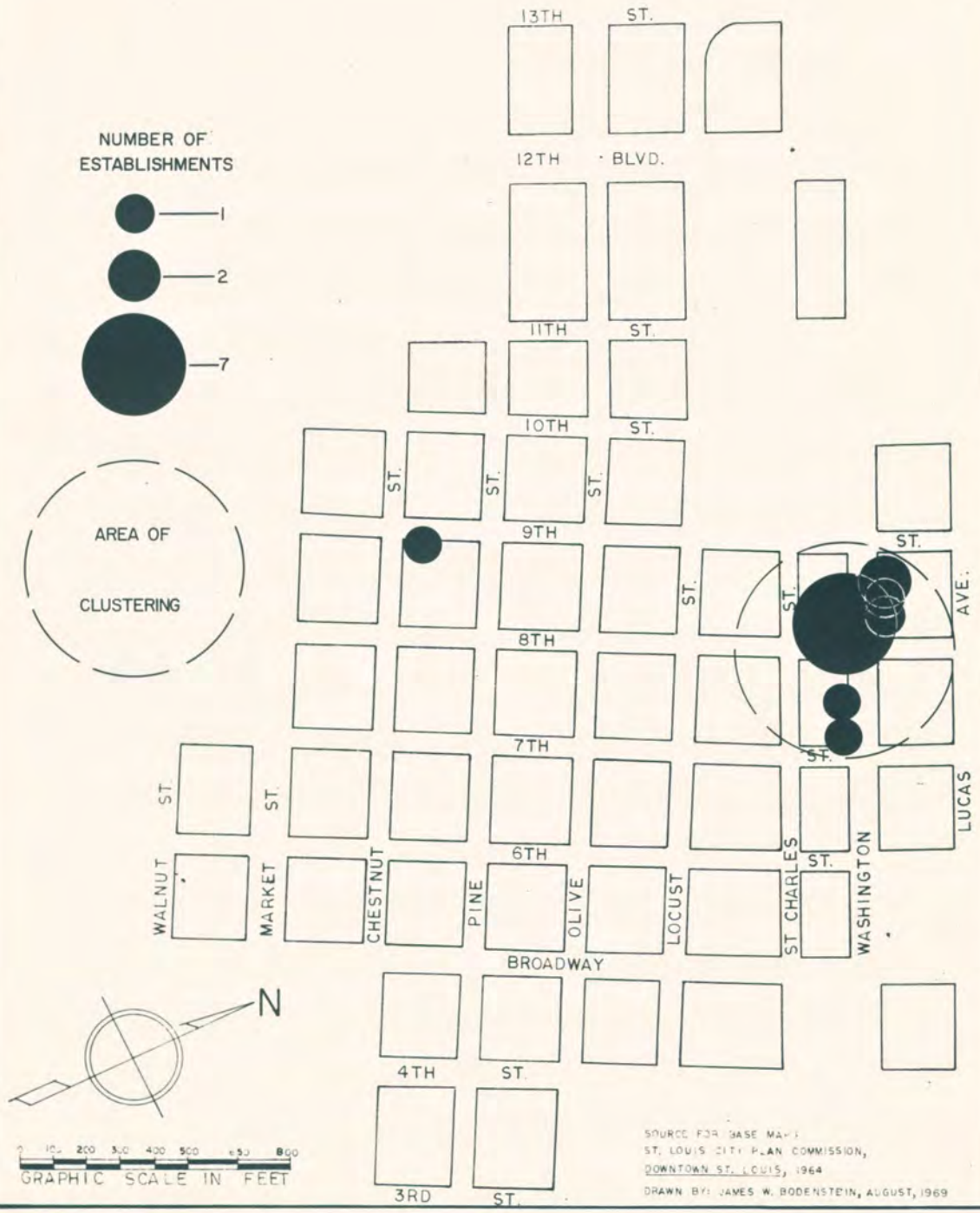
Block 38 would be the most important block, for it contains almost twice as many establishments as does Block 35. If importance were measured by number of employees, Block 35 would be the most important block, for it contains more than twice as many total employees in manufacturing and production employees as does Block 38. If importance were measured by total floor space used by the manufacturing establishments, Block 38 has only 650 more square feet than does Block 35, whereas if importance were measured by manufacturing floor space Block 38 has 5,350 more square feet than does Block 35. Since none of these criteria is more important than the others, both Block 35 and Block 38 are considered the two most important blocks for manufacturing in the St. Louis CBD.

Location of the major groups in the CBD

The Apparel and Other Textile Products major group has establishments located in four blocks in the CBD --three on the north side and one on the south side (see Map 8). Block 35 contains this major group's greatest percentage of: (1) establishments, (2) total employees, (3) production employees, (4) total floor space, and (5) manufacturing floor space.

The Printing and Publishing major group has establishments located in ten blocks in the CBD (including Block 50)--three in the northwest quadrant, two in the

MAP 8
THE APPAREL AND OTHER TEXTILE PRODUCTS MAJOR GROUP IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT



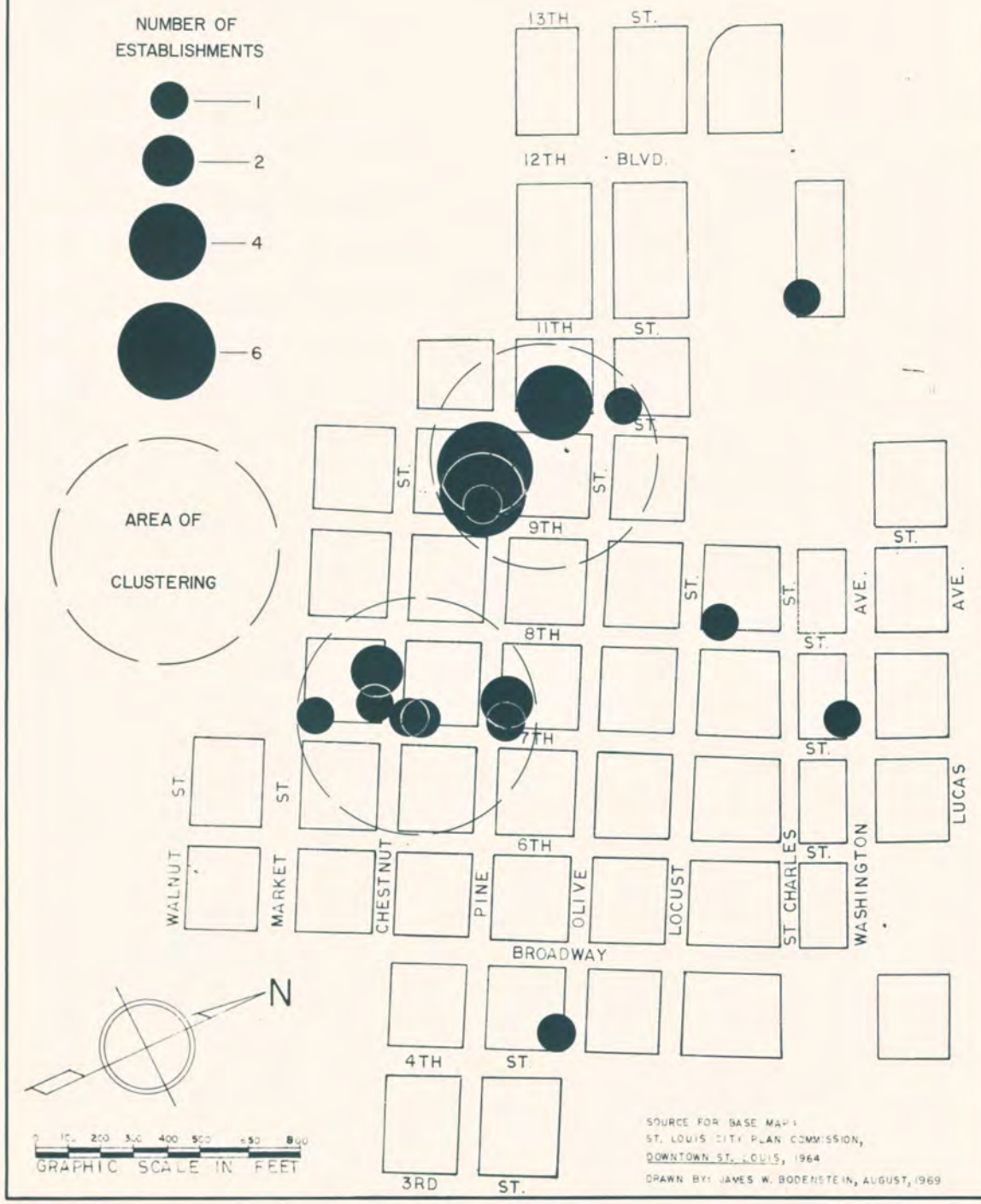
southwest quadrant, four in the southeast quadrant, and one in the northeast quadrant (Map 9). Block 38 contains this major group's greatest percentage of: (1) establishments, (2) total employees, (3) production employees, (4) total floor space, and (5) manufacturing floor space.

The rest of the two-digit major groups have establishments located in nine blocks in the CBD--three in the northwest quadrant, three in the southwest quadrant, one in the southeast quadrant, and two in the northeast quadrant (Map 10). Of these nine blocks, Block 25 has the largest number of establishments (one in major group 38 and three in major group 39).

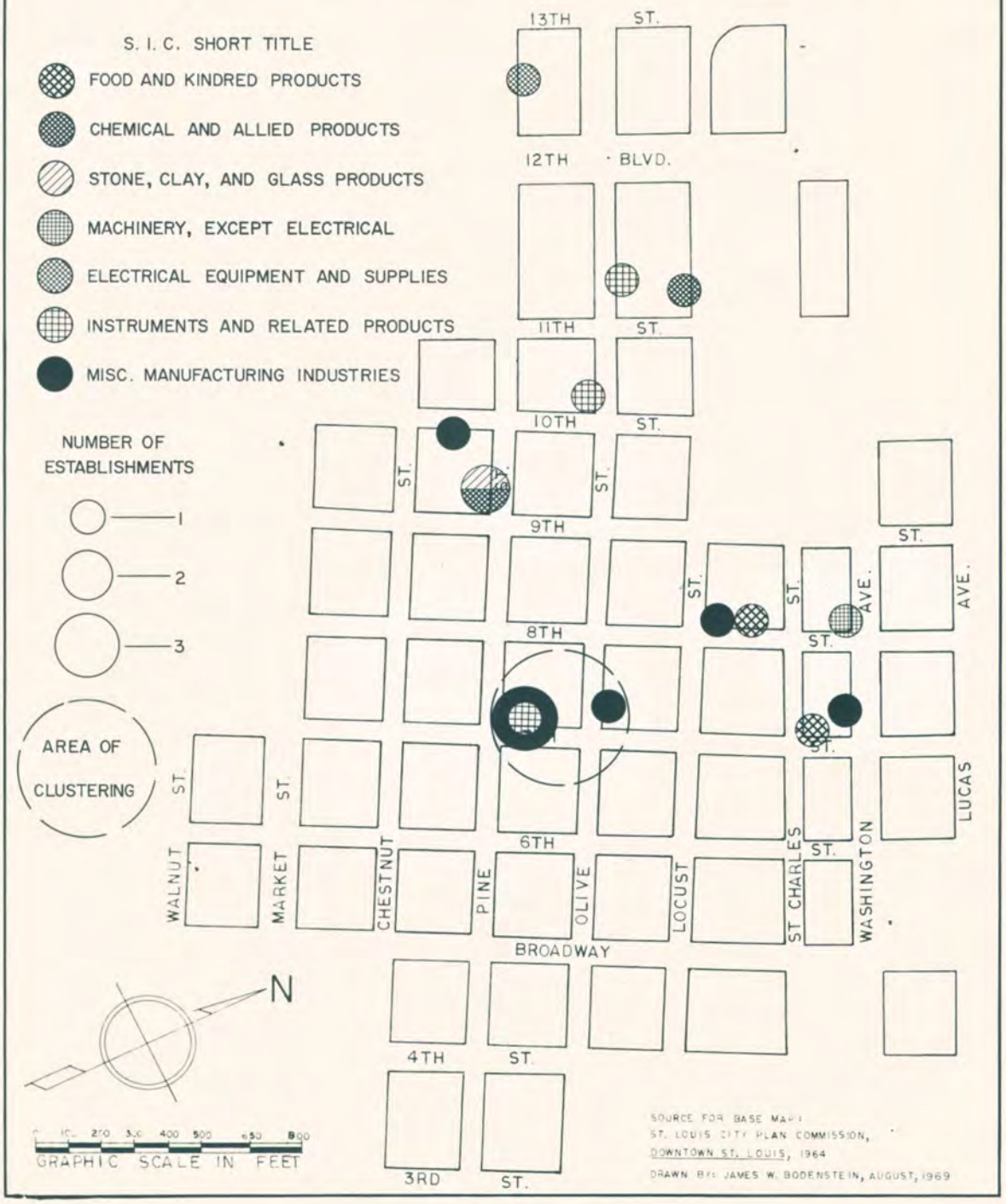
The answer to the first question posed in Chapter I --Will there by any pattern of distribution in terms of type of industry?--is yes, there appears to be an agglomerating tendency for three of the nine major groups studied. Each of these three major groups (23, 27, and 39) has one or more clusters of establishments in various areas of the CBD. Major Group 23 has a cluster of establishments in the northern half of the CBD (Map 8); Major Group 27 has two clusters of establishments (one in the western half and one south of center--Map 9); and Major Group 39 has a cluster of establishments in the center of the CBD (Map 10).

In general, then, there are three principal areas of clustering in the CBD (Map 11); (1) a cluster of establishments belonging to the Apparel and Other Textile

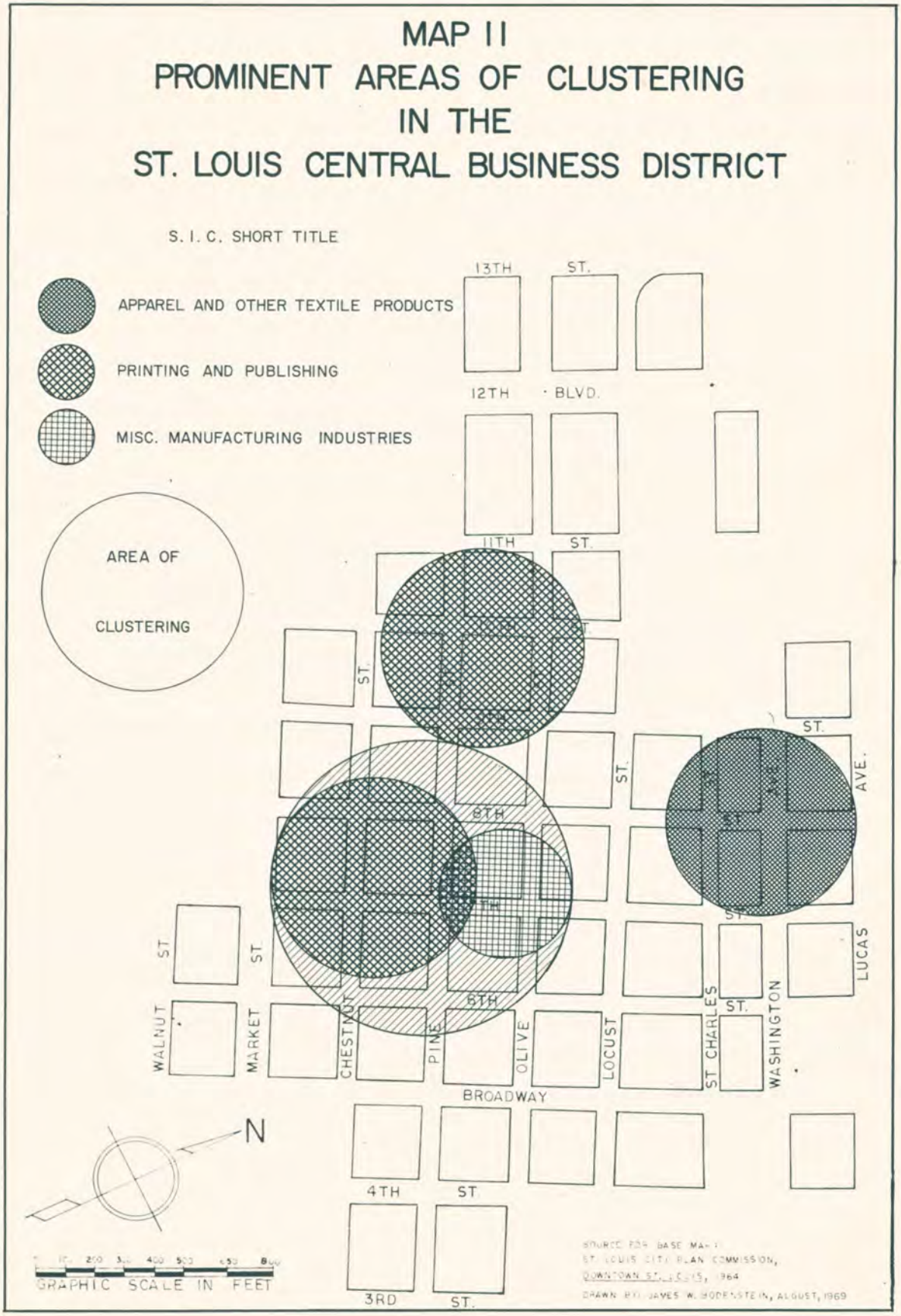
MAP 9
THE PRINTING AND PUBLISHING MAJOR GROUP IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT



MAP 10
MAJOR GROUPS OTHER THAN APPAREL AND OTHER TEXTILE PRODUCTS AND PRINTING AND PUBLISHING IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT



MAP II
PROMINENT AREAS OF CLUSTERING IN THE ST. LOUIS CENTRAL BUSINESS DISTRICT



Products major group in the north central portion of the CBD, (2) a cluster of establishments belonging to the Printing and Publishing major group in the center of the western half of the CBD, and (3) two clusters of establishments in the south central portion of the CBD: (a) a cluster of establishments belonging to the Printing and Publishing group, and (b) a cluster of establishments belonging to the Miscellaneous Manufacturing Industries major group; viz., the jewelry manufacturing industries. However, this last cluster is questionable because it consists of only four establishments.

The answer to the second question posed in Chapter I--Will there generally be a peripheral location of manufacturing establishments in the CBD?--is no, there does not appear to be any tendency to locate on the periphery of the CBD. This conclusion, however, was derived from studying manufacturing inside the CBD. It would be interesting to learn what conclusion would be made by studying manufacturing in the area encircling the CBD--the area referred to by some as the CBD "frame."

Location of the establishments within the buildings

In general, the establishments occupy only one floor--the fourth floor (see the "Total Averages" row under the "Average Floor Used" columns in Table 10). The fourth floor is not only the statistical "mean," or average floor used by the establishments; it is also the "mode," or most-used floor. It accounts for 20% of the total floors used

by the establishments and 22% of their total manufacturing floors.[75]

TABLE 10

FLOORS USED BY MAJOR GROUPS

Major Group	Total Floors		Manufact. Floors[a]	
	Aver. # Floors Used	Aver. Floor Used	Aver. # Floors Used	Aver. Floor Used
20	1	1	1	1
23	1	3	1	3
27	1	4	1	2
28[b]	2	1	2	1
32	1	4	1	4
35	1	8	1	8
36[c]	7	1	4	2
38	1	5	1	5
39	1	4	1	4
Total Averages	1	4	1	4

[a]Manufacturing floors: floors containing manufacturing floor space.

[b]This major group contains Industry 2893 which contains only one establishment, but it occupied three floors including a basement which was counted as minus one (-1).

[c]For this major group there was only one establishment, but it occupied three buildings and used a total of seven floors. Four of these seven floors were used for the manufacturing process alone.

[75]Manufacturing floors are floors containing manufacturing floor space.

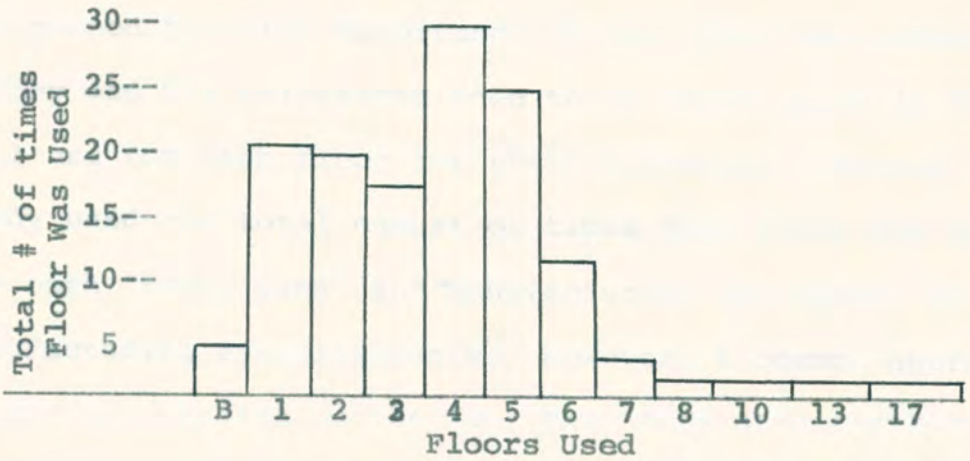
The establishments in seven of the nine major groups found in the CBD occupy an average of only one floor. The other two major groups (28 and 36) contained only one establishment a piece, and they occupied two and seven total floors, respectively, and two and four manufacturing floors, respectively.

The method used for determining the average number of floors used in each major group in Table 10 was to: (1) add the total number of floors used in each major group, and (2) divide by the number of establishments in each major group. The method used for determining the average floor used was to: (1) add the numerical values of the floors used in each major group, and (2) divide by the total number of floors used in each major group. When a basement was used by an establishment it was counted as a floor used and was given a numerical value of minus one (-1).

The first five floors (excluding the basement) are considered the important floors for manufacturing in the St. Louis Central Business District (Figure 3). The fourth floor is considered to be the most important floor for manufacturing, followed by (in descending order of importance) the fifth, first, second, and third. The importance of the floors was determined by the total number of times each floor was used for both "total uses" and "manufacturing use alone."

FIGURE 3

IMPORTANCE OF FLOORS USED BY MANUFACTURING ESTABLISHMENTS IN THE ST. LOUIS CBD



Murphy, Vance, and Epstein[76] found in their study of CBD's of moderate-sized American cities that for up to 400 yards from the peak land value intersection industrial land use is most important on the second floor than on any other floor; next in importance is the first floor, and last in importance is the upper floors above the second, Therefore, the findings of these two studies are somewhat different, but the studies, themselves, are also different.

[76] Murphy, Vance and Epstein, op. cit., p. 39.

Murphy and his colleagues studied only land use up to 400 yards from the peak land value intersection in the CBD's of moderate-sized cities, whereas this study investigated floor space used in manufacturing throughout the entire CBD of a larger city. Another difference in the two studies is the method by which importance of the floor was determined. Murphy and his colleagues used total floor space in industrial use for each floor for their criterion, whereas this study used the total number of times each floor was used for both "total uses" and "manufacturing use alone" by the manufacturing establishments. However, a common approach of the two studies is the fact that both used the Murphy-Vance CBD as their study areas.

Other Aspects of the Character of Manufacturing in the St. Louis Central Business District

In addition to the above observations, some, of which it was shown, were also made by other researchers in prior studies, the writer collected information on other aspects, some of which was not mentioned in the literature dealing with manufacturing in Central Business Districts. This new information, which will be presented in this section, concerns the following topics: (1) nature of business, (2) nature of products, (3) nature of ownership of [illegible] facilities, (4) date of location, and (5) employee density.

Nature of business

"Nature of business" in this study refers to the functions that the manufacturing establishments perform. It was stated in Chapter I that only those establishments that had 50% or more of their overall operations in manufacturing were selected for analysis. Therefore, all of the establishments were primarily engaged in manufacturing.

The first question that the respondent was to answer during the interview was to classify his establishment by naming the primary function of the establishment; that is, the establishment would be classified according to the primary function which the respondent indicated (see Questionnaires A and B in the Appendix). When the respondent mentioned two or more functions as primary the establishment was classified accordingly.

As Table 11 shows, not all of the respondents classified their establishments as manufacturing establishments. However, thirty-eight of the respondents, or 62.4%, did indicate that their primary function was soley manufacturing. A little more than one-fifth (21.2%) of the respondents classified their establishments as non-manufacturing.

The second question during the interview asked the respondent to give the percent of the overall operations of his establishment that each of the following functions provides: (1) manufacturing, (2) wholesaling,

(3) retailing, and (4) other functions. The only other functions mentioned were: (1) service, and (2) distribution.

TABLE 11

CLASSIFICATION OF THE ESTABLISHMENTS

Classification (Primary Function[s])	Establishments No	%
Manufacturing	38	62.4
Manufacturing - Wholsesaling	4	6.6
Manufacturing - Retailing	3	4.9
Manufacturing - Service	2	3.3
Manufacturing - Distribution	1	1.6
Service	9	14.8
Retailing	1	1.6
Retailing - Service	1	1.6
Wholesaling	1	1.6
Contracting	1	1.6
Total	61	100.0

According to the information given by the respondents, manufacturing accounts for an average of 85.2% of all the functions performed by the manufacturing establishments in the CBD (Table 12). Major Group 35 is the only major group that does 100% manufacturing (no other functions). Retailing is the next most important function performed by the manufacturing establishments, followed by service, wholesaling and distribution.

TABLE 12

AVERAGE PERCENT OF OVERALL OPERATIONS

Major Group	Mfg.	Retail	Whole-Sale	Serv.	Distri-bution	Total
20	62.5	37.5	---	---	---	100.0
23	93.3	1.7	4.6	0.4	---	100.0
27	85.8	6.6	---	7.6	---	100.0
28	55.0	8.5	6.5	---	30.0	100.0
32	99.0	---	---	---	1.0	100.0
35	100.0	---	---	---	---	100.0
36	50.0	---	---	50.0	---	100.0
38	80.0	---	20.0	---	---	100.0
39	84.8	13.6	1.6	---	---	100.0
Total	85.2	6.7	2.4	4.6	1.0	99.9

Nature of products

There are basically two types of products that are manufactured: (1) standardized products, and (2) unstandardized products. Standardized products are those that are mass produced, and unstandardized products are referred to in this paper as those that are "custom-made"--that is, manufactured to individual specifications. Hall[77] refers to unstandardized products as those whose characteristics cannot be anticipated.

[77] Hall, op. cit., p. 11.

The majority of the manufacturers in the St. Louis CBD (69%) manufacture unstandardized products (Table 13). Three major groups (32, 35, and 38) manufacture only unstandardized products. Except for Major Group 20, at least one-half of the establishments in each of the other eight major groups manufacture unstandardized products.

TABLE 13

NATURE OF PRODUCTS

Major Group	Percent of Establish. Stand-ardized	Unstand-ardized
20	100.0	---
23	32.0	68.0
27	25.8	74.2
28	50.0	50.0
32	---	100.0
35	---	100.0
36	50.0	50.0
38	---	100.0
39	45.8	54.2
Total	31.0	69.0

Nature of ownership of facilities

Kerr and Spelt's article, "Manufacturing in Downtown Toronto," mentioned rent as a reason for manufacturers locating in Downtown Toronto. It is presumed that they mean the ability to rent property opposed to own property and not the cost of rent. They found that more than one-half (81 out of 152, or 53%) of the firms located in Downtown

Toronto rent their premises.[78]

This study found that 98% (sixty out of sixty-one establishments) of the manufacturers in the St. Louis CBD rent their premises. The difference in the percentage values of the two studies may be a result of the difference in the two study areas. Kerr and Spelt studied Downtown Toronto which is larger than and includes part of the Toronto Central Business District. This thesis studied only the St. Louis Central Business District. The demand for real estate in the CBD makes land there more expensive than land surrounding the CBD. Therefore, the manufacturer in the CBD choses to rent his facilities instead of owning them.

Date of location

Kerr and Spelt[79] said that Downtown Toronto exhibits, in many ways, "the characteristics of a vigorous and young industrial district." They found that of a total of 152 firms, sixty-six (43%) located in Downtown Toronto since World War II. If exhibiting the characteristics of a vigorous and young industrial district is predicated on the date of location of the establishments, then the same might be said of the St. Louis Central Business District, for

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[78] Kerr and Spelt, op. cit., p. 9.

[79] Ibid.

this study found that thirty of the sixty-one establishments investigated (49%) located at their present address in the St. Louis CBD since World War II; six (10%) located here during the war, and the rest (25, or 41%) were located here before the war. However, this thesis is being written approximately ten years after Kerr and Spelt's article was written; therefore, this generalization may not be valid for the St. Louis CBD. In addition, the longevity of the establishments in the St. Louis CBD was not investigated; consequently, the lack of this information unfortunately cannot support this generalization.

The average year that all the sixty-one establishments located at their present address in the St. Louis CBD is 1943 (Table 14). Major Group 35, as a whole, has been

TABLE 14

AVERAGE YEAR LOCATED AT PRESENT ADDRESS

Major Group	Year Located
35	1929
27	1930
38	1938
23	1940
32	1945
36	1948
39	1950
20	1957
28	1958
Total	1943

in the St. Louis CBD longer than any other major group (since 1929), and Major Group 28 is the most recent major group to locate here (since 1958). The oldest establishment in the St. Louis CBD has been at its present address since 1904.

Employee density

In his thesis, "A Manufacturing Geography of Edmonton, Alberta," Lee[80] found that the majority of factories studied in the Edmonton CBD had "an employee density varying from one employee to 200 square feet to one to 795 square feet. Only three firms had over 1,000 square feet per worker."

The majority (39) of the manufacturing establishments in the St. Louis CBD have densities ranging from one employee to 200 square feet to one to 909 square feet (Table 15)--quite similar to Lee's findings for Edmonton. However, there are nine establishments in the St. Louis CBD with 1,000 square feet or more per worker, whereas Lee found but three. There are thirteen establishments in the St. Louis CBD with less than 200 square feet per worker. The largest number of establishments (12) have densities varying from one employee to 300 square feet to one to

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[80] Lee, op. cit., p. 60.

399.9 square feet.

TABLE 15

RANGE OF DENSITIES OF TOTAL EMPLOYEES TO TOTAL FLOOR SPACE FOR THE ESTABLISHMENTS

Density*	No. of Establish.
0-69.9	0
70.0-99.9	6
100.0-199.9	7
200.0-299.9	8
300.0-399.9	12
400.0-499.0	6
500.0-599.9	3
600.0-699.9	5
700.0-999.9	5
1,000.0-1,499.9	2
1,500.0-1,999.9	2
2,000.0-2,999.9	2
3,000.0-5,999.9	1
6,000.0-6,999.9	2

*Square feet per employee

The average total employee to total floor space density for all the sixty-one establishments in the CBD is one employee to 285.4 square feet (Table 16). The average densities for the major groups range from one employee to 81.2 square feet for Major Group 32 to one employee to 1,300 square feet for Major Group 35.

TABLE 16

AVERAGE DENSITIES OF TOTAL EMPLOYEES TO TOTAL FLOOR SPACE FOR THE MAJOR GROUPS IN THE ST. LOUIS CBD

Major Group	Density*
32	81.2
36	146.7
38	212.8
23	231.4
39	304.3
27	410.4
20	454.5
28	750.0
35	1,300.0
Total	285.4

* Square feet per employee

Summary

This chapter discussed the following qualities of manufacturing in the St. Louis Central Business District: (1) the amount of manufacturing found there, (2) the significance of manufacturing in the CBD compared to the rest of the city, (3) the types of industries found in the CBD, (4) the important major groups, (5) the size of the establishments, (6) the location of the establishments in both the CBD and within the buildings, and (7) other aspects of the character of manufacturing in the St. Louis CBD. The

findings for these qualities were also compared to the findings of other researchers who have also studied manufacturing in the Central Business Districts of cities.

Amount of manufacturing in the St. Louis CBD

Altogether, sixty-one establishments were studied, and they account for 1,181 total employees; 871 production employees; 337,104 square feet of total floor space; 253,157 square feet of manufacturing floor space;[81] 75 total floors used; and 69 floors used for the manufacturing process alone.

The significance of manufacturing in the CBD compared to rest of the city

The amount of manufacturing in the CBD is very little when compared to manufacturing found in the rest of the City. The sixty-one establishments account for approximately 3% of the 1,970 establishments found in the City in 1963. Both the 1,181 total employees and the 871 production employees account for only about 1% of the 129,069 total manufacturing employees and the 88,807 production employees in the City also in 1963.

Types of industries found in the CBD

A large variety of industries were found in the St. Louis CBD: nine major groups (two-digit S. I. C. industries),

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[81]Manufacturing floor space is floor space used for the manufacturing process alone.

eighteen industry groups (three-digit S. I. C. industries), and twenty-six industries (four-digit S, I. C. Industries).

Important major groups

Five criteria were used for measuring the importance of the major groups in the CBD: (1) number of establishments, (2) total employment, (3) production employement, (4) total floor space, and (5) manufacturing floor space. The two most important major groups in the CBD are: Apparel and Other Textile Products (23) and Printing and Publishing (27). Together, they account for from seventy to eighty percent of all five criteria.

These findings agree rather well with those of other researchers regarding the character of manufacturing in the CBD's of Chicago, Philadelphia, and Toronto. Thus, the two most important major groups in CBD's of large cities in Anglo-America appear to be: Apparel and Other Textile Products, and Printing and Publishing.

Size of the establishments

This section discussed the general size of all the sixty-one establishments in terms of: (1) number employed, and (2) floor space.

Number employed.--In terms of number employed and if measured on the basis of number of establishments the small establishment predominates in the St. Louis CBD. The average establishment employes nineteen total employees and

fourteen production employees. However, there is a large variation in the size of the individual establishment (from one total employee to 150 total employees). Major Group 36 has the largest average establishment, and Major Groups 20 and 35 have the smallest average establishments. The findings of this thesis for "size of the establishments by number employed" compares rather well with those for Edmonton, Alberta and Toronto, Ontario.

Floor Space.--On the basis of number of establishments the small establishment also predominates in the St. Louis CBD when measured by floor space. Although the average plant for all sixty-one establishments occupies 5,526 square feet of total floor space and 4,150 square feet of manufacturing floor space, the size of the establishments in terms of floor space also varies greatly. However, most of the factories in the CBD's of both Edmonton, Alberta and St. Louis occupy less than 10,000 square feet of total floor space. Major Group 36 has the largest average plant, and Major Group 32 has the smallest average plant in the St. Louis CBD.

Location of the establishments

This section discussed: (1) the location of manufacturing in the CBD, (2) the location of the major groups in the CBD, and (3) the location of the establishments within the buildings. In addition, answers to the two

questions posed in Chapter I regarding the location of the establishments and industries in the CBD were given.

Location of manufacturing in the CBD.--Most of the manufacturing in the St. Louis CBD is located in the northwest portion of the CBD. Except for in one block the manufacturing establishments are located in approximately the western half of the study area. Most of both the total manufacturing employees and the production employees are located in the northwest portion of the study area. Most of the total floor space is also located in the northwest portion of the study area. There is no general pattern of distribution regarding density of total employees to total floor space. Blocks 35 and 38 are considered to be the two most important blocks for manufacturing in the CBD.

Location of the major groups in the CBD.--The Apparel and Other Textile Products major group has establishments located in four blocks in the CBD; the Printing and Publishing major group has establishments located in ten blocks in the study area; and the rest of the major groups have establishments located in nine blocks in the CBD.

The answer to the first question posed in Chapter I--Will there be any pattern of distribution in terms of industry?--is yes, there appears to be an agglomerating tendency for three of the nine major groups studied (Major Groups 23, 27, and 39). In general, there are three principal areas of clustering in the CBD: (1) North-

central, (2) west-central, and (3) south-central.

The answer to the second question posed in Chapter I--Will there generally be a peripheral location of manufacturing establishments in the CBD?--is no, there does not appear to be any tendency to locate on the periphery of the CBD.

Location of the establishments within the buildings. --In general, the establishments occupy only one floor--the fourth floor. The first five floors (excluding the basement) are the important floors for manufacturing in the St. Louis CBD, and the fourth floor is considered to be the most important floor. Next in importance are the fifth, first, second, and third, in that order. Murphy, Vance, and Epstein found in their study of moderate-sized American cities that for up to 400 yards from the peak land value intersection, industrial land use is most important on the second floor than on any other floor; next in importance is the first floor, and least in importance is the upper floors above the second. Therefore, the findings of these two studies are somewhat different, but the studies, themselves, are also different.

Other aspects of the character of manufacturing in the St. Louis Central Business District

In addition to the above observations the writer collected information on the following aspects: (1) nature

of business, (2) nature of products, (3) nature of ownership of facilities, (4) date of location, and (5) employee density.

Nature of business.--"Nature of business" in this study refers to the functions that the manufacturing establishments perform. Although thirty-eight of the sixty-one establishments, or 62%, indicated that their primary function was solely manufacturing, not all of the respondents classified their establishments as manufacturing.

According to the information given by the respondents, manufacturing accounts for 85% of all the functions performed by the manufacturing establishments in the CBD. Retailing is the next most important function, followed by service, distribution, and wholesaling.

Nature of products.--There are basically two types of products manufactured: (1) standardized (mass-produced products), and (2) unstandardized ("custom-made" products). The majority (69%) of the manufacturers in the St. Louis CBD manufacture unstandardized products.

Nature of ownership of facilities.--Kerr and Spelt's article, "Manufacturing in Downtown Toronto," mentioned rent as a reason for manufacturers locating in Downtown Toronto. This study found that 98% of the manufacturers (sixty of the sixty-one establishments) in the St. Louis CBD rent their premises.

Date of location.--Kerr and Spelt[82] also said that Downtown Toronto exhibits, in many ways, "the characteristics of a vigorous and young industrial district," for they found that of a total of 152 firms, sixty-six (43%) located in Downtown Toronto since World War II. If what Kerr and Spelt concluded is true, the same might be said of the St. Louis CBD, for this study found that thirty of the sixty-one establishments investigated (49%) located at their present address in the CBD since World War II. The average year that all the sixty-one establishments located at their present address is 1943.

Employee density.--In his thesis, "A Manufacturing Georgraphy of Edmonton, Alberta," Lee[83] found that the majority of factories studied in the Edmonton CBD had "an employee density varying from one to 200 square feet to one to 795 square feet. Only three firms had over 1,000 square feet per worker." The majority (39) of the sixty-one manufacturing establishments in the St. Louis CBD have densities ranging from one employee to 200 square feet to one to 909 square feet--quite similar to Lee's findings. However, there are nine establishments in the St. Louis CBD with 1,000 square feet or more per worker, whereas Lee found but three. The average total employee to total floor space density for all the sixty-one establishments studied in the

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[82] Kerr and Spelt, op. cit., p. 9.

[83] Lee, op. cit., p. 60.

CBD is one employee to 285.4 square feet.

Conclusions

Although a large variety of industries were found in the St. Louis CBD, very little manufacturing was actually found on the basis of number of establishments and number of employees. A total of nine major groups were found, and their sixty-one establishments account for approximately 3% of the City's manufacturing establishments in 1963, and their 1,181 total employees and 871 production employees each account for approximately only 1% of the City's total manufacturing and production employees also in 1963.

The two most important major groups in the St. Louis CBD are: Apparel and Other Textile Products, and Printing and Publishing. These two major groups are also apparently the two most important major groups in CBD's of large cities in Anglo-America. These two major groups together apparently account for from approximately 65% to 85% of the total manufacturing employees in CBD's of large cities.

If measured on the basis of number of establishments, the small establishment predominates in the St. Louis CBD in terms of both: (1) number employed, and (2) floor space. Approximately two-thirds of the establishments in the St. Louis CBD employ less than twenty total employees. Most of the factories in the CBD's of both St. Louis and

Edmonton, Alberta occupy less than 10,000 square feet of total floor space.

Most of the manufacturing in the St. Louis CBD is located in the northwest portion of the CBD. Blocks 35 and 38 are considered to be the two most important blocks for manufacturing in the CBD.

Establishments in Major Groups 23, 27, and 39 appear to locate in clusters. In general, there are three principal areas of clustering in the CBD: (1) north-central, (2) west-central, and (3) south-central. There does not appear to be any tendency to locate on the periphery of the CBD.

In general, the manufacturing establishments in the St. Louis CBD occupy only one floor--the fourth floor, and although Murphy and his colleagues learned that for up to 400 yards from the peak land value intersection of CBD's of moderate-sized American cities industrial land use is most important on the second floor than on any other floor, this thesis found that for the CBD of a larger city (St. Louis) the fourth floor is the most important floor used. However, there cannot be any valid comparisons made between these two studies because the researchers used both different laboratories and different methods.

Although 62% of the respondents indicated that their primary function was solely manufacturing, not all of the respondents would classify their establishments as manufacturing. However, manufacturing accounts for 85% of

all the functions performed by the sixty-one manufacturing establishments.

The majority of the manufacturers in the St. Louis CBD manufacture unstandardized ("custom-made") products, and virtually all of them rent their premises.

Virtually one-half of the manufacturers in the St. Louis CBD located in the CBD since World War II. The average year of location is 1943.

The majority of factories in the CBD's of both St. Louis and Edmonton, Alberta have employee densities ranging from one employee to 200 square feet to one to approximately 900 square feet. The average employee density in the St. Louis CBD is one employee to 285 square feet.

CHAPTER III

FACTORS OF LOCALIZATION

This chapter will discuss: (1) six factors involved in the location of the Apparel and Other Textile Products major group and the Printing and Publishing major group, and (2) the advantages and disadvantages representatives of these two major groups reported in being located in the St. Louis Central Business District. It was not the intention of this thesis to investigate all the factors of localization pertinent to all manufacturing plants in the CBD. These two major groups were selected for more intensive investigation because they were presumed to be and were later found to be, in fact, the two most important major groups in the CBD (see page 50).

The factors that will be discussed are: labor, materials, market, transportation, external economies, and communication. These six factors were chosen because they were inferred from the aforementioned relevant literature (see pages 23-28) to be the more important factors involved in the location of the establishments. Except for communication, these factors were not analyzed to determine their importance to the manufacturers; they were only investigated

in order to better understand their role in the manufacturing industry in the CBD.

The assertions made regarding these factors were based on an analysis of a 25% random sample of the two major groups interviewed with Questionnaire B (see page 34). A 25% random sample was chosen because it was assumed that it would yield a number of respondents sufficient to infer the nature of each factor relating to the two major groups, The actual 25% sample includes six three-digit industry groups, eight four-digit industries, and ten establishments (four for Apparel and Other Textile Products and six for Printing and Publishing)--see Table 17.

Labor

Of seventeen articles found that relate to this thesis,[84] labor was mentioned in eleven of them as affecting the location of a firm in the CBD.[85] Several aspects are possible in analyzing this factor's location relationships with respect to manufacturing establishments in the St. Louis CBD; some of them are: (1) types of labor (skilled, unskilled, female, foreign-born, etc.), (2) supply of labor (both availability and accessibility of labor), (3) wages, (4) labor force variation, and (5) amount used per

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[84] Refer to Chapter I, page 24.

[85] Refer to Chapter I, page 25.

TABLE 17

MAJOR GROUPS, INDUSTRY GROUPS, INDUSTRIES, AND NUMBER OF ESTABLISHMENTS IN EACH IN 25% RANDOM SAMPLE

No. of Estab,	Maj. Gp. Ind. Gp. & Ind. No.	S. I. C. Short Title*
4	23	APPAREL AND OTHER TEXTILE PRODUCTS
1	232	Men's and Boy's Furnishings
1	2329	Men's and boy's Clothing, nec
2	233	Women's and Misses' Outerwear
2	2335	Women's and misses' dresses
1	238	Miscellaneous Apparel Accessories
1	2389	Apparel and accessories, nec
6	27	PRINTING AND PUBLISHING
1	272	Periodicals
1	2721	Periodicals
2	275	Commercial Printing
1	2751	Commercial printing, ex lithographic
1	2752	Commercial printing, lithographic'
3	279	Printing Trade Services
2	2791	Typesetting
1	2794	Electrotyping and stereotyping

*Abbreviations: "nec" -"not elsewhere classified" and "ex" - "except".

unit commodity produced. In this section only the following two aspects will be discussed: (1) types of labor, and (2) availability of labor. Accessibility of labor will be discussed in the section entitled "Transportation" in this chapter.

Types of Labor

Seven articles discussed this aspect of labor. Four types of labor were mentioned: (1) skilled, (2) unskilled, (3) female, and (4) foreign-born. Five studies mentioned skilled labor as being related to manufacturing in or near the CBD. Lowenstein[86] said: "Labor-oriented industries such as those which require skilled technicians . . . prefer to locate in the core so as to draw upon as large a labor market as possible." Maledon[87] said that "the presence of similar firms tends to develop a trained labor supply." The Philadelphia City Plan Commission[88] said that "the central location provides a maximum opportunity for skilled labor . . . ." Other authors mentioning skilled labor were Breese[89] and Kerr and Spelt.[90]

Two studies mention unskilled and female labor, one of which is McLeod's thesis on manufacturing in Philadelphia,[91] where in his section on the CBD he says:

> Manufacturers, by advertising in the help wanted columns [of newspapers] that they are near shopping areas, may be able to lure a supply of semi-skilled and unskilled labor away from firms located in regions where this association of firms does not exist. It goes without saying that such a relationship appeals in large measure to female employees.

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[86]Lowenstein, op. cit., p. 418.

[87]Maledon, op. cit., p. 28.

[88]Philadelphia City Plan Commission, The Plan for Center City Philadelphia (Philadelphia, 1963), p. 24.

[89]Breese, op. cit., p. 38.

[90]Kerr and Spelt, op. cit., p. 13.

[91]McLeod, op. cit., p. 37.

Kerr and Spelt,[92] in their study on manufacturing in downtown Toronto, said the following regarding female and unskilled labor:

> The total female employment in the area amounts to 31 per cent of the total employment. However, of the 25 firms [of a total of 152] that stressed unskilled labour as an important factor in their present location, female labour made up 57 percent of their total employement.

Foreign-born labor was also mentioned in two articles. Thomas[93] discussed this labor element in tenements in the northern flank of Downtown St. Louis: "The majority of the population is foreign-born or of foreign descent, and these elements contribute most of the labor in certain types of light manufacturing plants." Kerr and Spelt[94] said: "Some firms rely heavily on recently arrived immigrant labour living nearby."

The types of labor in St. Louis CBD will be discussed in terms of: (1) quality (skilled and unskilled), (2) nationality (native and foreign-born), (3) race (white and Negro), and (4) sex.

Quality.--According to the information collected for the apparel and printing and publishing industries, most of the manufacturing labor (87%) in the St. Louis CBD is considered by the respondents to be skilled labor (Table 18).

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[92] Kerr and Spelt, op. cit., p. 12.
[93] Thomas, op. cit., p. 47.
[94] Kerr and Spelt, op. cit., p. 13.

TABLE 18

TYPE OF LABOR: QUALITY

Major Group	Skilled No.	Skilled %	Unskilled No.	Unskilled %	Total No.	Total %
23	116	87	18	13	134	100
27	81	87	12	13	93	100
Total	197	87	30	13	227	100

Each of the two major groups employs 87% skilled labor (almost nine skilled employees to every unskilled employee). Only 13% of the manufacturing labor used by these two major groups is considered unskilled.

Nationality.--Practically all (95%) of the manufacturing labor in the St. Louis CBD in these industries is native labor (Table 19). Each of the two major groups

TABLE 19

TYPE OF LABOR: NATIONALITY

Major Group	Native No.	Native %	Foreign-born No.	Foreign-born %	Total No.	Total %
23	71	91	7	9	78	100
27	89	99	1	1	90	100
Total	160	95	8	5	168	100

employs 90% or more native labor. Only 5% of the manufacturing labor used by these two major groups is foreign-born, and Apparel and Other Textile Products employs 88% of it.

Race.--Almost 90% of the manufacturing labor in these two industries in the St. Louis CBD is Caucasian (Table 20). Each of the two major groups interviewed uses 80% or more Caucasian labor. Only 11% of the manufacturing labor employed by these two major groups is Negro, and only one of the two major groups employs Negro labor: Apparel and Other Textile Products.

TABLE 20

TYPE OF LABOR: RACE

Major Group	Caucasian		Negro		Total	
	No.	%	No.	%	No.	%
23	109	81	25	19	134	100
27	90	100	--	--	90	100
Total	199	89	25	11	224	100

Sex.--Female employees account for 52% of the 1,181 total manufacturing employees in the CBD. All told, there are 51 more female manufacturing employees than there are male manufacturing employees (Table A in the Appendix).

According to the information collected from the 25% random sample, females predominate in the following types of labor: skilled, unskilled, Native, Caucasian, and Negro

(Table 21). Apparel and Other Textile Products is the principal employer of female labor for all six types.

TABLE 21

TYPE OF LABOR: SEX

	Type of Labor											
	Quality				Nationality				Race			
Major Group	Skil'd		Un-skil'd		Native		Foreign-born		Cauc.		Neg.	
	M	F	M	F	M	F	M	F	M	F	M	F
23	15	101	2	16	9	62	3	4	13	96	4	21
27	61	20	11	1	68	21	1	--	69	21	--	--
Total	76	121	13	17	77	83	4	4	82	117	4	21

Male employees equal female employees only for foreign-born labor. Printing and Publishing is the principal employer of male employees for four of the six types of labor (all but foreign-born and Negro).

Summary of types of labor

In summary, most of the manufacturing employees in the St. Louis CBD are skilled native Caucasian females. The Apparel and Other Textile Products major group is the principal employer of all the female employees, and it is also the principal employer of the foreign-born and Negro males. The Printing and Publishing major group is the principal employer of the skilled, unskilled, native, and Caucasian males.

These findings agree with those of other researchers who mentioned the importance of skilled labor to manufacturers in the CBD. However, the findings with regard to female and foreign-born labor are variant. Whereas McLeod, and Kerr and Spelt implied that female labor is semi-skilled or unskilled, this study learned that the manufacturers in the St. Louis CBD (especially those in the Apparel and Other Textile Products major group) regard female labor as skilled labor. Another difference between this study and the others regards foreign-born labor. Although Thomas, and Kerr and Spelt implied foreign-born labor to be important to manufacturing in or near the CBD, this study found that foreign-born labor contributes very little to manufacturing in the St. Louis CBD.

Availability of labor

Three of five studies referring to the availability of labor discuss it in detail. Helfgott[95] in referring to the Apparel Industry, said:

> Just as the merchandising of women's and children's apparel must be located where the buyers congregate, so the location of its production is primarily labor-oriented. That is, the availability of labor is the most important determinant of the location of production.

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95 Helfgott, op. cit., p. 49.

Gustagson[96] says the following regarding the Printing and Publishing industry: "Labor is the principal cost component with locational significance." Kerr and Spelt say:[97]

> Firms in the downtown area have little difficulty in enlisting labour quickly; asbentees can be replaced the same day, and costly delays and interruption in the manufacturing process may be avoided.

Others who mention the availability of labor are: McLeod[98] and Thomas.[99]

This thesis found that in general it is difficult for the manufacturers in the St. Louis CBD to replace their employees. Table 22 illustrates this. Table 22 is derived from Question 8 of Questionnaire B which reads: If five of your workers left today, how many of the following types --skilled, unskilled, female, and foreign-born--could you replace within: (a) day, (b) a week, (c) two weeks, and (d) a month? Hardly any of the respondents answered the question regarding the last two types of labor (female and foreign-born); consequently, they were discarded from the analysis.[100]

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[96] Gustagson, op. cit., p. 147.

[97] Kerr and Spelt, op. cit., p. 13.

[98] McLeod, op. cit., pp. 36 and 37.

[99] Thomas, op. cit., p. 12.

[100] Some of the respondents represented very small firms with only one or two employees; consequently, it was difficult for them to answer the question. In this situation they were told to pretend that they had five employees and to answer the question the best that they could.

TABLE 22

AVAILABILITY OF LABOR

Major Group	No. of Estab. Reptd.	Skilled Workers* One Day	Skilled Workers* One Wk.	Skilled Workers* Two Wks	Skilled Workers* One Mo.	Unskilled Workers* One Day	Unskilled Workers* One Wk.	Unskilled Workers* Two Wks	Unskilled Workers* One Mo.
23	4	0	0	0	1	2	2	2	2
27	6	0	1	1	2	0	1	0	1
Total	10	0	1	1	1	1	2	1	2

*Average number of skilled and unskilled workers. These were determined by dividing the total number of workers that could be replaced for each period of time for each major group by the total number of establishments that reported for that major group. Fractions were rounded off to the nearest whole number (even whole number when the fraction was exactly one-half).

For replacing skilled employees an average total for the two major groups of: (1) none can be replaced in one day, and (2) only one employee can be replaced in time periods of one week, two weeks, and one month. Although the Apparel and Other Textile Products major group (23) employs more skilled labor than does the Printing and Publishing major group (27)--see Table 18, the latter apparently has an advantage in replacing its skilled employees.

For replacing unskilled employees an average total for the two major groups of: (1) one employee can be replaced in time periods of one day and two weeks, and (2)

two employees can be replaced in time periods of one week and one month. The Apparel and Other Textile Products major group has less difficulty in replacing the unskilled type of employee than does the Printing and Publishing major group.

These findings contrast to those of Kerr and Spelt[101] who studied manufacturing in Downtown Toronto. They found that "firms in the downtown area have little difficulty in enlisting labour quickly; absentees can be replaced the same day . . . ."

Materials

Four articles mentioned the factor of materials in relation to the location of manufacturing firms in or near the CBD. Maledon[102] says that "industries which use jointly produced materials have a tendency to grow in the same area." Hoover and Vernon[103] said that "to avoid stockpiling their materials in disproportionately large amounts, they [small plants] have clung close to the center of the urban cluster, where they can get materials on short notice; . . . ." Kerr and Spelt[104] say the following in regard to materials:

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[101] Kerr and Spelt, op. cit., p. 13.
[102] Maledon, op. cit., p. 28.
[103] Hoover and Vernon, op. cit., p. 53.
[104] Kerr and Spelt, op. cit., p. 13.

> Very few manufacturing plants in the area use basic raw materials. Most firms purchase secondary materials such as steel, plastics, or plywood, etc., for further fabrication and at least 60 per cent purchase over half of their supplies from wholesalers in Metropolitan Toronto. Small firms in particular, with limited sorage space, depend on nearby warehouses for steady and rapid delivery. Moreover, small firms often lack investment capital to stockpile materials, especially when these are of a great variety, or are used in small amounts intermittently. Spare parts for machines also can be obtained rapidly in the downtown area, eliminating delays in production resulting from failure of equipment. Few manufacturers, however, stressed the factor of materials as a dominant one in the choice of their location, but undoubtedly the accessibility of a large number of wholesalers is advantageous.

Others who mention materials are Thomas[105] and the Philadelphia City Plan Commission.[106]

This factor of materials will be discussed in this chapter under the subheadings of "types of materials used" and "sources of materials." Furthermore, "sources of materials" will be discussed under two subheadings: (1) types of establishments, and (2) geographic areas.

Types of materials used

There are basically two types of materials used by the manufacturing establishments. These are: (1) raw materials, which are those that exist in their natural physical and/or chemical state, and (2) processed (or semi-finished) materials, which are those whose physical or

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[105] Thomas, op. cit., p. 47.

[106] Philadelphia City Plan Commission, The Plan for Center City Philadelphia, op. cit., p. 24.

chemical states has been changed in the manufacturing process. The only materials used by the manufacturing establishments in Major Groups 23 and 27 in the St. Louis CBD are processed materials (Table 23).

TABLE 23

TYPES OF MATERIALS USED

Major Group	Type of Material	
	Raw	Processed
23	--	100%
27	--	100%
Total	--	100%

Sources of the materials

For the purpose of this thesis the source of the materials is the source from which the manufacturer in the St. Louis CBD receives the materials; it is not meant to be the original source of the material. There are two types of sources: (1) type of establishment, and (2) geographic area. For example: although the manufacturer of a piece of textile might be located in New England, the manufacturer in the St. Louis CBD might receive the textile from a wholesaler located elsewhere in the City. In this case the source of the material would be: (1) the wholesaler, and (2) the City of St. Louis, but outside the CBD.

Types of establishments.--There are three types of establishments, according to the sample, from which the manufacturers in Major Groups 23 and 27 obtain their materials: (1) manufacturers, (2) retailers, and (3) wholesalers. The largest average percentage of their processed materials (74%) is obtained from manufacturers (Table 24). The next largest percentage (14%) is obtained from retailers, and the smallest percentage (12%) is obtained from wholesalers.

TABLE 24

TYPE OF ESTABLISHMENT AS SOURCE OF MATERIAL

Major Group	Type of Establishment Manfr.	Retailer	Whole'r	Total
23	58%	35%	7%	100%
27	85%	--	15%	100%
Total	74%	14%	12%	100%

Geographic areas.--In the questionnaire there were four areas for the respondents to chose from in order to locate the source or sources of their materials: (1) the CBD, (2) the rest of the City (excluding the CBD), (3) outside the City but inside the Standard Metropolitan Statistical Area (the S. M. S. A. includes both St. Louis City and St. Louis County, and St. Charles, Jefferson, and

Franklin Counties in Missouri, and Madison and St. Clair Counties in Illinois), and (4) outside the S. M. S. A. As Table 25 shows, the area outside the S. M. S. A. supplies almost one-half (45) of the materials to the manufacturing establishments in the St. Louis CBD. Next in importance is the CBD, itself, supplying an average of 36% of the manufacturers' materials.

TABLE 25

GEOGRAPHIC AREAS AS SOURCE OF MATERIALS

Major Group	Geographic Area				Total
	CBD	Rest of City	Rest of S.M.S.A.	Outside S. M.S.A.	
23	35%	7%	1%	58%	101%
27	36%	15%	12%	37%	100%
Total	36%	12%	8%	45%	101%

Summary of materials for the major groups

Major Groups 23 and 27 use only processed materials, most of them supplied by manufacturers mainly located outside the S. M. S. A. Each of them receives a little more than one-third of its materials from within the CBD, but they each receive most oftheir materials from outside the S. M. S. A.

The findings of this thesis agree with those of Kerr and Spelt in one respect, but they differ in another respect with regard to materials. Another aspect, geographic source of materials, could not be generally compared. The aspect in which the studies agree is type of materials used. This thesis agrees with the findings of Kerr and Spelt in that processed materials are the type primarily used by manufacturers in or near the CBD. The aspect in which the studies differ is "type of establishments providing the materials." Kerr and Spelt implied that wholesalers were the primary supplier of the manufacturers' materials in Downtown Toronto, whereas this study found that other manufacturers supply most of the materials to the manufacturers in the St. Louis CBD.

Market

Seven articles mention market as being important to a firms' downtown location. Gustagson[107] writes about the printing and publishing industry's dependence on market:

> Metropolitan newspapers, severely limited in time, and serving a population concentrated in a restricted area, must be at the center of the market.
>
> As in the case of newspapers, the location of job printing depends principally on the location of its customers.

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[107] Gustagson, op. cit., pp. 158, 162, and 163.

> Much job printing is done under tight time schedules, and is in this respect similar to newspapers . . . . The job printer, then, must be practically around the corner from his customers for much of his work.

Lee[108] says in his thesis, with respect to market:

> In some cases, particularly printing and clothing manufacturing, there are considerable advantages in being near to the downtown area. Printing, particularly, requires a location close to its customers who are largely from downtown offices.

Kerr and Spelt[109] say the following in regard to market:

> Of the 133 firms that stated a preference for location in the downtown area, 92 stressed a number of different aspects of the market factor as being of great importance.
>
> The market may be found in the form of allied industries, where, for instance pattern makers work for nearby tool and die makers. Several small printing and publishing companies perform all kinds of printing, typesetting, lithography, and binding for other frims downtown. Of the 35 establishments in this category, 28 firms, employing 33 percent of the workers in printing, publishing, and bookbinding have at least 90 per cent of their market in Toronto. An important market is found intthe central business district where advertising agencies, business offices, and law firms frequently demand the services of local printers and publishers.

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[108] Lee, op. cit., p. 102.

[109] Kerr and Spelt, op. cit., pp. 11 and 12.

Others who mentioned the market factor are Lowenstein,[110] Maledon,[111] McLeod,[112] and Connell.[113]

Market will be discussed in this section under the two headings of "types of customers," and "market area." The former means the types of establishments that buy the products directly from the manufacturing establishments in the CBD, and the latter is the geographic location of these customers.

Types of customers

The most important customers of these two major groups and, inferentially, all the manufacturers in the CBD are: (1) other manufacturers and individual people, each of which buy 29% of the manufacturers' products, and (2) service establishments which buy 16% of their products (Table 26). Each of these three types of customers, accounts for approximately one-fourth of Major Group 27's products.

Market Area

The conclusions drawn from the analysis of this element of the market factor are questionable because of the wording of Question 17 in Questionnaire B, which reads:

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[110] Lowenstein, op. cit., pp. 413 and 414.
[111] Maledon, op.cit., pp. 74, 75, and 28.
[112] McLeod, op. cit., pp. 36 and 38.
[113] Connell, op. cit., pp. 69 and 70.

TABLE 26

TYPES OF CUSTOMERS

Type of Establishment	Major Group 23	27	Total
Manufacturers	33%	27%	29%
Indivd. People	40%	22%	29%
Service[a]	3%	24%	16%
Retailers	3%	13%	9%
Business[b]	8%	8%	8%
Organizational	8%	1%	4%
Wholesalers	--	4%	2%
Government	3%	--	1%
Total	98%	99%	98%

[a]Service establishments: laundromats, hotels, repair shops, amusement and recreation establishments, photo studios, beauty and barber shops, etc.

[b]Business establishments: accountants, lawyers, insurance, real estate, etc.

Approximately what percent of your products do you sell: (a) in the CBD, (b) in the rest of the city, (c) in the rest of the Metropolitan Area (S.M.S.A), and (d) outside the Metropolitan Area (S.M.S.A.)? The respondents may have interpreted the question to mean either: (1) the location of the sale, or (2) the location of the customer. The respondent did not always ask for a clarification of the question, but the question was meant to have the latter

meaning; hence, the conclusions were drawn on the assumption that the respondents answered the question with that aspect in mind.

The majority (60%) of the manufacturers' customers are also located in the CBD (Table 27). The next largest percentage of them (23%) are located outside the S.M.S.A. From one-half to three-fourths of the customers of the two major groups interviewed with Questionnaire B are located in the CBD.

TABLE 27

MARKET AREA

Major Group	Geographic Area				
	CBD	Rest of City	Rest of S.M.S.A.	Outside S.M.S.A.	Total
23	74%	5%	12%	9%	100%
27	50%	9%	8%	33%	100%
Total	60%	7%	10%	23%	100%

Summary of market for the major groups

Major group 23 sells 40% of its products to individual people and 33% of them to other manufacturers, and virtually 75% of its customers are located in the CBD. Major Group 27 sells approximately 25% of its products to

each of the following types of customers: manufacturers, service establishments, and individual people. One-half of them are located in the CBD, and 33% are located outside the S. M. S. A.

The findings of this thesis agree rather well with those of the other researchers who were mentioned at the beginning of this section. These researchers allied this factor particularly to the two major groups being discussed in this chapter and especially to the Printing and Publishing major group. They mentioned the importance of the CBD, itself, as a prime market area which was also found in this study to be the principal market area of St. Louis CBD manufacturers. However, although the other researchers mentioned other manufacturers and business establishments to be the principal customers of CBD manufacturers, this thesis found other manufacturers, individual people, and service establishments to be the principal customers of St. Louis CBD manufacturers.

Transportation

Seven articles mention transportation as a factor of localization. Lee[114] writes about the transportation factor in relation to labor: "There is much to be gained for a clothing factory from a site near the main bus routes.

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[114] Lee, op. cit., p. 102.

Most of its employees tend to be women who travel by public transport rather than by car." The Philadelphia City Plan Commission[115] says the following why some industries should be located in or near the CBD:

> These are a number of industrial firms which benefit by proximity to Downtown hotels, business and banking centers, good transportation, and to each other which should be contained in the Center City area.

Lowenstein[116] says:

> Whenever savings in transportation costs can be realized by a location in the center of the market area, firms which are engaged in these activities [labor--or market-oriented industries] will take the opportunity to do so.

Others mentioning the transportation factor are: McLeod,[117] Kerr and Spelt,[118] Bass,[119] and Hoover and Vernon.[120]

Transportation is to be discussed in three aspects: (1) transportation of materials, (2) transportation of products, and (3) transportation of labor. However, the conclusions drawn for the first item are questionable because of the perplexity of Question 14 in Questionnaire B,

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[115] Philadelphia City Plan Commission, The Plan for Center City Philadelphia, op. cit., p. 24.

[116] Lowenstein, op. cit., p. 414.

[117] McLeod, op. cit., p. 38.

[118] Kerr and Spelt, op. cit., p. 11.

[119] Bass, op. cit., p. 4.

[120] Hoover and Vernon, op. cit., pp. 40 and 41.

which reads: By which of the following media of transportation--car, truck, rail, water, air or other (specify)--do you mainly: (a) receive your materials, and (b) deliver your products? The confusion develops when one thinks of the different media of transportation that can be involved in the process of transporting goods from terminus to terminus. For any manufacturer located in the CBD the obvious medium of transportation used at this terminus is either truck or car (unless he has a heliport atop his establishment). However, if the materials come from outside the S. M. S. A. they might be transported by any one or a combination of the media; this is the point of confusion--which of the total media is the one that is mainly used? The questionability of the conclusions lies in the probability that each of the respondents did not answer the question using the same analytical approach.

The fact that the first aspect is questionable and the other two are not can be explained. The manufacturer receiving the materials might not know the media mainly used by the shipper, whereas he would more likely know the media used both in delivering his products and for transporting his labor. Because the conclusions were questionable the aspect "transportation of materials" was excluded from the following discussion. It is assumed that the medium used by the manufacturer in the CBD for receiving his materials at the establishment is by truck.

Transportation of products

The majority (67%) of the products of the manufacturing establishments in Major Groups 23 and 27 are delivered by truck (Table 28). Each of the two major groups delivers two-thirds of its products by truck. The only other medium used by the Apparel and Other Textile Products major group is rail,[121] whereas the Printing and Publishing major group, in addition to using the rail medium, also delivers a small percentage (8%) of its products by air. None of the respondents reported that they delivered any of their products by the water medium.

TABLE 28

TRANSPORTATION OF PRODUCTS

Major Group	Medium Used			
	Truck	Rail	Air	Total
23	67%	33%	--	100%
27	67%	25%	8%	100%
Total	67%	28%	5%	100%

Transportation of labor

Most (61%) of the manufacturing employees in Major Groups 23 and 27 get to and from work by public transit

[121] The rail medium would be used when transporting products outside the S. M. S. A.

(Table 29). The only other medium used by the employees in these two major groups is private automobile. As was expected, the Apparel and Other Textile Products major group is the principal user of the public transit type of transportation. Female labor accounts for the bulk (88%) of the employment in this major group, and it is assumed that this type of employee is the secondary wage-earner of the family and that the husband takes the family automobile to work thus leaving the wife with no method of transportation. Therefore, she takes the bus because it is more economical than the taxicab. One industry (2389) in this major group reported that as many as 90% of its employees use this medium.

TABLE 29

TRANSPORTATION OF LABOR

Major Group	Medium Used		
	Public Trans.	Priv. Car	Total
23	86%	14%	100%
27	45%	54%	99%
Total	61%	38%	99%

There were no comparisons to make with findings of other researchers regarding this factor of localization. However, the findings of this thesis do corroborate the

comments of Lee and Lowenstein. Apparently, the apparel firms find it advantageous to locate in or near the CBD in order to benefit from the public transportation system, and, as it will be pointed out later, the industries in the St. Louis CBD are primarily market-oriented, so, as Lowenstein said, they have taken the opportunity to locate in the center of the market area in order to save on transportation costs.

External Economies

External economies are savings the establishments gain by having portions of the manufacturing process done by other establishments. The authors of eight articles, books, master theses, and/or reports mentioned this factor.[122] This factor has also been referred to as "economies of agglomeration."[123]

A few quotations germane to the discussion of this factor are by Ward, Hoover and Vernon, and Hall. Ward[124] said in his article regarding the Boston CBD:

> "External" economies derived from the facilities of the financial quarter and from the servicing trades of the warehouse district itself as well as the economies of rent and labor encouraged the growth of workshop industries within the business district.

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[122] Refer to Chapter 1, page 27.

[123] Maledon, op. cit., pp. 27 & 28; and McLeod, op. cit., pp. 37 & 38.

[124] Ward, op. cit., pp. 160 and 161.

Hoover and Vernon[125] said the following with regard to the location of the small establishment in New York City:

> The tie between small plants and central locations arises partly from pull, partly from push--the pull of small plants to high density areas and the push of large plants from them. The pull of small plants . . . stems mainly from the wisdom of sharing certain facilities with others. One reason why small plants often follow this course is that they cannot take on certain costs--such as the salary of a full-time electrician, the purchase and operation of a delivery truck, or the purchase of a heavy-duty lathe--because they are unable to utilize these production factors at a high enough rate of capacity. . . .
>
> . . . . Such plants commonly find outside establishments which specialize in one phase or another of the contemplated production process and which are in a position to act as processors or suppliers.

Hall[126] says the following:

> . . . The principal advantages of the New York Metropolitan Region for the industries analyzed in our case studies [Women's and Children's Apparel, Printing and Publishing, and Electronics] are external economies and the means of reducing costs of personal communication . . . . Unstandardized activities, by clustering close together, using one another, and living off the motely urban environment, can operate more economically than they could if scattered in small cities and open fields.

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[125] Hoover and Vernon, op. cit., pp. 50 & 51.

[126] Hall, op. cit., p. 14.

The basic conclusion derived from this literature is that the Apparel and Other Textile Products major group is the epitome of all industries that capitalize on external economies.[127] Therefore, it was decided to investigate "external economies" in the St. Louis Central Business District.

The establishments in Major Groups 23 and 27 were interviewed with Questions 19, 20, and 21 in Questionnaire B regarding the types and location of establishments (other than those mentioned in the two earlier sections of this chapter, "materials" and "Market") with whom they are associated. The subsequent discussion will be organized in the following manner: (1) types of external economies, (2) external economies utilized by the major groups in general, (3) types of related establishments, (4) location of the related establishments, and (5) summary.

Types of external economies

There are four types of external economies utilized by the manufacturing establishments in the St. Louis CBD: (1) acquistion of materials, (2) repair services, (3) subcontractural work, and (4) delivery services. Since the

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[127] Helfgott aptly discusses the advantages of this factor to this major group located in the Garment Center in New York City. Refer to Chapter I, p. 27.

first one of these has already been discussed in the "Materials" section of this chapter the last three will now be discussed in this section. All percentage values appearing in this section apply only to these three external economies--repair services, sub-contractural work, and delivery services.

Repair service.--In general, repair services account for an average of 68% of the three types of external economies utilized by these two major groups (Table 30). It is also shown in Table 30 that 60% of the establishments in these two major groups reported that they had their repair work done by other establishments.

TABLE 30

TYPES OF EXTERNAL ECONOMIES

Major Group	External Economies						TOTAL	
	Repair		Sub-Contr.		Delivery			
	Est.[a]	Ex. Ec.[b]	Est.[a]	Ex. Ec.[b]	Est.[a]	Ex. Ec.[b]	Es. Total[a]	Ex. Ec.[c]
23	50%	100%	--	--	--	--	50%	100%
27	67%	47%	33%	26%	33%	27%	83%	100%
Total	60%	68%	20%	16%	20%	16%	70%	100%

[a]Percent of establishments utilizing this type of external economy of the total number of establishments interviewed with Questionnaire B.

[b]Average percent of the three external economies.

[c]Total percent of the three external economies.

Two-thirds of the establishments interviewed in Major Group 27 and one-half of the establishments interviewed in Major Group 23 utilize outside repair services. Moreover, this is the only type of external economy used by Major Group 23.

Sub-contractural work.--This type of external economy accounts for an average of only 16% of the three types discussed in this section (Table 30). Only 20% of the ten establishments interviewed with Questionnaire B reported that they sublet some of their work.

Delivery services.--In general, delivery services provided by other establishments are used very little (an average of 16% of the three external economies discussed in this section) by the establishments in these two major groups. As Table 30 shows, 20% of the ten establishments interviewed with Questionnaire B utilize this type of external economy. Apparently, either the establishments in the CBD deliver most of their products themselves,or they do not deliver at all.

External economies utilized by the major groups in general

In general, seven (70%) of the ten establishments interviewed with Questionnaire B capitalize on one or more of these three types of external economies (Table 30). Major Group 27 is the only major group that reported using all three types of external economies discussed in this

section--repair work, sub-contractural work, and delivery services. One-half of the establishments in Major Group 23 and 83% of the establishments in Major Group 27 capitalize on external economies.

Types of related establishments

"Related establishments" are establishments that provide the external economies to the manufacturing establishments in the CBD. They are also referred to as ancillary establishments. Only two types of establishments were found to be related to the manufacturing establishments in the CBD: (1) other manufacturers, and (2) service establishments, and the latter accounts for the larger percentage (81%) of them (Table 31). Apparel and Other Textile Products relies on service, establishments for all of its external economies, and Printing and Publishing depends on this type of establishment for 68% of its ancillary services.

TABLE 31

TYPES OF RELATED ESTABLISHMENTS

Major Group	Type of Establishment		
	Manf'r.	Service Es.	Total
23	--	100%	100%
27	32%	68%	100%
Total	19%	81%	100%

Location of the related establishments

A little more than two-thirds (69%) of the ancillary establishments with whom the manufacturers in Major Groups 23 and 27 are related are also located in the CBD (Table 32). The rest of the City (outside the CBD) is the next most important area for the related establishments; it contains 20% of them. All of the establishments with whom the establishments in Major Group 23 are related are located in the CBD, and virtually one-half of those with whom the establishments in Major Group 27 are related are located also in the CBD.

TABLE 32

LOCATION OF THE RELATED ESTABLISHMENTS

Major Group	Geographic Area				Total
	CBD	Rest of City	Rest of S.M.S.A.	Outside S.M.S.A.	
23	100%	---	---	---	100%
27	49%	33%	---	18%	100%
Total	69%	20%	---	11%	100%

Summary

In general, repair services is the primary type of external economy utilized by the manufacturers in Major Groups 23 and 27. Two-thirds of the establishments

interviewed in Major Group 27 and one-half of the establishments interviewed in Major Group 23 utilize outside repair service.

Seven, or 70%, of the ten establishments interviewed with Questionnaire B capitalize on one or more of these three types of external economies. Major Group 27 is the only major group that reported using all three types discussed in this section. Actually, it was found that the Printing and Publishing major group capitalizes more on external economies in the St. Louis CBD--83% of its establishments use one or more of these three ancillary services--than does the Apparel and Other Textile Products major group.

Only two types of establishments were found to be related to the manufacturing establishments in these two major groups: (1) other manufacturers, and (2) service establishments, and the latter accounts for the larger percentage (81%) of them. A little more than two-thirds of the establishments with whom the manufacturers in Major Groups 23 and 27 are related are also located in the CBD.

The following salient elements of this factor, then, help to explain the question--Why are manufacturing establishments found in the St. Louis CBD?--(1) repair services are easy to obtain, (2) more than two-thirds of the CBD manufacturers' ancillary establishments are found in the CBD, and (3) 36% of the manufacturers' materials are

supplied from within the CBD. However, these findings unfortunately do not elucidate the tendencies of these two major groups to cluster as was learned in Chapter II. To help explain this, the specific locations of the ancillary establishments and the materials suppliers would need to be known.

There were no findings made by other researchers with regard to this factor of localization. However, the findings of this thesis do substantiate to some degree the comments made by the other researchers. For example, the two types of establishments with whom the manufacturers in the St. Louis CBD are related are: (1) other manufacturers, and (2) service establishments which substantiates the statements made by other researchers, saying that the related establishments are ancillary-type establishments. Another discovery of this thesis which helps substantiate the "agglomeration theory" of the other researchers is the fact that a little more than two-thirds of the ancillary establishments with whom the manufacturers in the St. Louis CBD are related are also located in the CBD.

Communication

Five articles mentioned communication in connection with location.[128] Hall mentions the factor of communication

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[128] Refer to Chapter I, page 27.

in his quotation included at the beginning of the preceding section of this chapter, "External Economies" (page 127). The Harvard Researchers[129] quote Dr. Raymond Vernon as saying: "More and more . . . the central city has come to specialize in the 'communications-oriented' segment of manufacturing." Gustagson[130] says: "The unstandardized nature of printed products . . . makes frequent consultation necessary." See also Helfgott's quotation in Chapter 1, page 28.

Face-to-face communication was the only type of communication that was investigated in this thesis. The reason for this is because it was presumed to be the most pertinent type of communication used by the manufacturers with respect to the location of the establishments. This presumption was predicated upon the comments made by the authors of the aforementioned related literature.

It was the intention of this thesis to ascertain: (1) the importance, and (2) the location of face-to-face communication done both among the establishments in the CBD and with other establishments located outside the CBD. Consequently, this factor will be discussed by means of

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[129] Harvard Researchers, op. cit., p. 29, quoting Dr. Raymond Vernon.

[130] Gustagson, op. cit., p. 165.

the following topics: (1) importance, (2) geographic location, and (3) summary of communication.

Importance

The respondents had four choices by which to rate how important they thought that face-to-face communication was to their business: (1) very important, (2) important, (3) not so important, and (4) unimportant. The largest percentage of the respondents (50%) consider this type of communication important to their business (Table 33).

TABLE 33

IMPORTANCE OF FACE-TO-FACE COMMUNICATION

Major Group	Percentage of Establishments				
	Very Imp.	Imp.	Not So Imp.	Un-Imp.	Total
23	75%	25%	--	--	100%
27	--	67%	33%	--	100%
Total*	30%	50%	20%	--	100%

*The total percentages are based on the number of establishments reporting for each category of importance out of a total of ten establishments.

This type of communication apparently is more important to Major Group 23 than it is to Major Group 27. Whereas three of the four establishments (75%) interviewed in Major Group 23 reported this type of communication very

important to their business, four of the six establishments (67%) interviewed in Major Group 27 reported it only important to their business.

Geographic location

In general, most (72%) of the face-to-face communication done by the manufacturers in the St.Louis CBD is, according to the sample, reported to be done in the CBD (Table 34). The next largest percentage (18%) is done outside the S. M. S. A. In other words, most of the business contacts of the CBD manufacturers come to the manufacturers in the CBD to discuss their business.

TABLE 34

GEOGRAPHIC LOCATION OF FACE-TO-FACE COMMUNICATION

Major Group	Geographic Area				Total
	CBD	Rest of City	Rest of S.M.S.A.	Outside S.M.S.A.	
23	92%	4%	4%	---	100%
27	58%	9%	3%	30%	100%
Total	72%	7%	3%	18%	100%

Summary

The largest percentage of respondents (50%) consider face-to-face communication important to their business. This type of communication apparently is more important to Major Group 23 than it is to Major Group 27.

In general, most (72%) of the face-to-face communication done by the manufacturers in the CBD is, according to the sample, done in the CBD.

There were no findings made by the other researchers regarding this factor of localization. However, the conclusions of this thesis regarding: (1) the importance of face-to-face communication, and (2) its geographic location lend support to the comments made by Hall, Vernon, Gustagson, Helfgott, and McLeod.

Advantages of a CBD Location

The ten respondents were asked what they thought were the advantages of being located in the St. Louis Central Business District. In connection with this some of the respondents gave their reasons for being located in the CBD. These two terms are not synonomous, but their connotations are similar enough to discuss them together.

Altogether, ten advantages and/or reasons were mentioned by the respondents. In descending order, according to the number of times they were mentioned, they are: market (5), external economies (2), history (2), materials (2), personal preference (2), prestige (2), transportation in general (2), transportation of labor (2), downtown facilities appealing to female employees (1), and time[131] (1)--see Table 35.

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[131]The meaning of "time" was not explained by the respondents.

TABLE 35

ADVANTAGES OF A CBD LOCATION

Advantages and/or Reasons	No. of times Mentioned Major Groups 23	27	Total
Market	2	3	5
External Economies	--	2	2
History	2	--	2
Materials	1	1	2
Personal Preference	1	1	2
Prestige	1	1	2
Transp. in general	1	1	2
Transp. of labor	1	1	2
Downtown facilities	--	1	1
Time	--	1	1
Total	9	12	21

According to the average number of advantages and/or reasons mentioned per establishment interviewed, the Apparel and Other Textile Products major group (23) has the best reason for being located in the CBD; it mentioned an average of 2.5 advantages and/or reasons per establishment (Table 36). Its four establishments interviewed with Questionnaire B mentioned seven (70%) of the ten advantages

and/or reasons a total of nine times.

TABLE 36

ADVANTAGES AND/OR REASONS MENTIONED PER ESTABLISHMENT

Major Group	Number of Estab.	Advantages and/or Reasons Mentioned Per Establishment		
		Total No.	Total # Times	Aver. No.
23	4	7	9	2.5
27	6	9	12	2.0
Total	10	10	21	2.1

Summary

The ten establishments interviewed with Questionnaire B reported a total of ten advantages and/or reasons for being located in the St. Louis CBD. According to the number of times it was mentioned (5), market is the prominent advantage of a St. Louis CBD location. According to the average number of advantages and/or reasons mentioned per establishment interviewed, the Apparel and Other Textile Products major group has the best reason for being located in the St. Louis CBD.

Disadvantages of a CBD Location

The respondents were also asked what they thought were the disadvantages of being located in the St. Louis

Central Business District. The ten respondents mentioned a total of eleven disadvantages. In descending order, according to the number of times they were mentioned, they are: parking facilities (4), traffic (3), truck service (3), blighted area (1), high rent (1), journey-to-work (1), loft operations (unwieldy vertical transfer of goods0-1), polluted air (1), scarcity of labor (1), taxes (1), and under constant jurisdication (1)--see Table 37. The prominent disadvantages are: parking facilities, traffic, and truck service.

TABLE 37

DISADVANTAGES OF A CBD LOCATION

Disadvantages	No. of times Mentioned Major Groups 23	27	Total
Parking facilities	1	3	4
Traffic	--	3	3
Truck Service	--	3	3
Blighted Area	1	--	1
High Rent	--	1	1
Journey to work	--	1	1
Loft Operations	1	--	1
Polluted Air	--	1	1
Scarcity of Labor	1	--	1
Taxes	1	--	1
Under Const. Jurisd.	1	--	1
Total	6	12	18

Summary

This chapter discussed: (1) six factors of localization that are involved in the location of the Apparel

and Other Textile Products major group and the Printing and Publishing major group in the St. Louis Central Business District, and (2) the advantages and disadvantages the representatives of these two major groups reported in being located in the St. Louis Central Business District. The factors that were discussed are: labor, materials, market, transportation, external economies, and communication. The assertions made regarding these factors were based on an analysis of a 25% random sample of Major Groups 23 and 27 after they had been interviewed with Questionnaire B.

Labor

Most of the manufacturing employees in the St. Louis CBD are skilled native Caucasian females. Almost 90% of the manufacturing labor in the CBD is considered by the respondents to be skilled labor; practically all (95%) is native labor; almost 90% is Caucasian; and 52% of the 1,181 total manufacturing employees in the CBD are females.

The Apparel and Other Textile Products major group is the principal employer of all the female employees, and it is also the principal employer of the foreign-born and Negro males. The Printing and Publishing major group is the principal employer of the skilled and unskilled native Caucasian males.

These findings agree with those of other researchers who mentioned the importance of skilled labor to manufacturers in the CBD. However, the findings with

regard to female and foreign-born labor are variant.

In general, it is difficult for the manufacturers in the CBD to replace their employees. For replacing skilled employees, an average total for the two major groups of: (1) not one employee can be replaced in a day, and (2) only one employee can be replaced in time periods of one week, two weeks, and one month. For replacing unskilled employees, an average total for the two major groups of: (1) one employee can be replaced in time periods of one day and two weeks, and (2) two employees can be replaced in time periods of one week and one month. These findings contrast to those of Kerr and Spelt who found that firms in Downtown Toronto have little difficulty in replacing labor.

Materials

All of the materials used by the manufacturing establishments in Major Groups 23 and 27 are processed materials. The largest average percentage of the manufacturers' materials (74%) is obtained from other manufacturers. The area outside the S.M.S.A. supplies almost one-half of the materials to the manufacturing establishments in the CBD. Next in importance is the CBD, itself, supplying an average of 36% of the manufacturers' materials.

The findings of this thesis agree with those of Kerr and Spelt with respect to "type of materials used," but they differ with respect to "type of establishments

providing the materials." The aspect, "geographic source of materials," could not be generally compared.

Market

The three most important customers of these two major groups are: (1) individual people, (2) other manufacturers, and (3) service establishments. The majority (60%) of the CBD manufacturers' customers are also located in the CBD. The next largest percentage of them (23%) are located outside the S. M. S. A. Except for the aspect, "types of customers," the findings of this thesis agree rather well with those of other researchers.

Transportation

It is assumed that the medium of transportation used by the manufacturers in the CBD for receiving their materials at the establishments is by truck. The majority (67%) of the products of the manufacturing establishments in Major Groups 23 and 27 are delivered also by the truck medium.

Public transit is the medium of transportation used by 61% of the manufacturing employees in Major Groups 23 and 27 for getting to and from work. As was expected, the Apparel and Other Textile Products major group is the principal user of this type of transportation, for female labor accounts for the bulk (88%) of the employment in this major group.

There were no comparisons to make with findings of other researchers regarding this factor of localization. However, the findings of this thesis do corroborate the comments of Lee and Lowenstein.

External economies

External economies (also called "economies of agglomeration") are savings the establishments gain by having portions of the manufacturing process done by other establishments. There are four types of external economies utilized by manufacturing establishments in the St. Louis CBD: (1) acquisition of materials, (2) repair services, (3) sub-contractural work, and (4) delivery services. Since the first one of these had already been discussed in the "Materials" section of this chapter, only the last three were discussed in this section.

In general, repair services is the primary type of external economy utilized by the manufacturing establishments in Major Groups 23 and 27. Seven (70%) of the ten establishments in these two major groups that were interviewed with Questionnaire B capitalize on one or more of these three types of external economies.

Only two types of establishments were found to be related (to provide the external economies) to the manufacturers in these two major groups: (1) other manufacturers, and (2) service establishments, and the latter accounts for the larger percentage (81%) of them. A little more than two-thirds (69%) of the establishments

with whom the manufacturers in Major Groups 23 and 27 are related are also located in the CBD.

The following salient elements of this factor help to explain the question--Why are manufacturing establishments found in the St. Louis CBD?--(1) repair services are easy to obtain, (2) more than two-thirds of the CBD manufacturers ancillary establishments are found in the CBD, and (3) 36% of the manufacturers' materials are supplied from within the CBD. There were no findings made by other researchers with regard to this factor of localization. However, the findings of this thesis do corroborate to some degree the comments made by the other researchers.

Communication

Face-to-face communication was the only type of communication that was investigated in this thesis because it was presumed to be the most pertinent type of communication used by the manufacturers with respect to the location of the establishments. Out of four categories of importance that they had to choose from in order to rate how important face-to-face communication was to their business--(1) very important, (2) important, (3) not-so-important, and (4) unimportant--the largest percentage of the ten respondents (50%) consider this type of communication important to their business. Face-to-face communication is apparently more important to Major Group 23 than

it is to Major Group 27.

In general, most (72%) of the face-to-face communication done by the manufacturers in Major Groups 23 and 27 is done in the CBD. The next largest percentage (18%) is done outside the S. M. S. A.

There were no findings made by the other researchers regarding this factor of localization. However, the findings of this thesis do corroborate the comments of the other researchers.

Advantages of a CBD location

The ten establishments interviewed with Questionnaire B reported a total of ten advantages and/or reasons for being located in the St. Louis Central Business District. According to the number of times it was mentioned (5), market is the prominent advantage of a St. Louis CBD location. According to the average number of advantages and/or reasons mentioned per establishment interviewed, the Apparel and Other Textile Products major group has the best reason for being located in the St. Louis CBD.

Disadvantages of a CBD location

The ten respondents mentioned a total of eleven disadvantages. The prominent disadvantages are: parking facilities, traffic, and truck service.

Conclusions

Type of labor is an important factor for manufacturers in Central Business Districts. Both skilled and female employees are extremely important to CBD manufacturers. Although availability of labor is believed by some researchers to be paramount to a location in the CBD, the ability to immediately replace employees is apparently not a universal desideratum throughout Anglo-America, for this thesis found that accessibility to labor is ostensibly more important to a St. Louis CBD location than availability of labor.

The factor, materials, apparently is not important to manufacturers in CBD's. Most materials used by manufacturers in CBD's are processed, and they are readily available.

Market is a cardinal factor to consider for a CBD location for manufacturers, especially for the Printing and Publishing major group. Although other manufacturers, individual people, service establishments, and business establishments are important customers, from the information available it was not possible to make a generality regarding the most important type of customer of CBD manufacturers. The CBD, itself, is an important market area for CBD manufacturers.

The truck is the preferred medium for transportation of CBD manufacturers' products, and public transit is the medium of transportation used by the majority of the manufacturing employees for getting to and from work. The CBD is a favorable location for the Apparel and Other Textile Products major group, for the CBD is the focus of the public transportation system, and it provides easy access for this major group's employees who are primarily females.

External economies is an important factor for manufacturers located in the Central Business District. Being in close proximity to similar establishments provides for: (1) easy access to materials, (2) a good market, and (3) ancillary services. Some examples of these ancillary services are; (1) repair services, (2) subcontractural work, and (3) delivery services.

Face-to-face communication is regarded by St. Louis CBD manufacturers as an important factor of localization to their business. Most of this communication is done in the St. Louis CBD.

The Apparel and Other Textile Products major group apparently has a slight advantage over the Printing and Publishing major group for a location in the CBD. However, both major groups are appropriate for a CBD location. The market factor is the prominent advantage of a CBD location; parking facilities, traffic and truck service are the

prominent disadvantages.

The answer, then, to the question--Why are manufacturing establishments found in the St. Louis Central Business District?--is because of the following salient factors: (1) accessibility to labor, (2) market, (3) external economies, and (4) face-to-face communication; and of these four factors, market is the most important.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Well over one-half of all employment in most central cities occurs in, or very near, the Central Business District. Manufacturing accounts for from ten percent to fifteen percent of the land use and from ten to twenty percent of the number of structures in that area generally known as the Central Business District of large cities in the United States. Moreover, the CBD's of some cities in the United States seem to contain a substantial part of each city's or metropolitan area's total manufacturing.

Seventeen major groups, or 80%, of a total of twenty-one major industries classified as manufacturing by the U. S. Bureau of the Budget have been found by researchers either in, or very near, Central Business Districts. The apparel and printing industries seem to predominate.

This thesis found that although a large variety of industries were found in the St. Louis Central Business District, very little manufacturing was actually found on the basis of number of establishments and number of employees. A total of nine two-digit major groups were found, and their sixty-one establishments account for approximately 3% of the City's manufacturing establishments in 1963, and their

1,181 total employees and 871 production employees each account for approximately only 1% of the City's total manufacturing and production employees also in 1963.

The two most important major groups in both the St. Louis CBD and CBD's of large cities in Anglo-America are Apparel and Other Textile Products, and Printing and Publishing. These two major groups together apparently account for from approximately 65% to 85% of the total manufacturing employees in CBD's of large cities.

From information collected on CBD's of St. Louis, and Edmonton, Alberta, the small establishment predominates in terms of both number employed and floor space. Many of the establishments in both of these cities' CBD's employ less than twenty employees, and most of the factories in the CBD's of both occupy less than 10,000 square feet of total floor space. (In fact, the majority of factories in the St. Louis CBD occupy less than 5,000 square feet.) The average total employment of the sixty-one establishments in the St. Louis CBD is nineteen employees, and their average total floor space is approximately 5,500 square feet.

Most of the manufacturing in the St. Louis CBD is located in the northwest portion. Manufacturing establishments are found in sixteen (32%) of the fifty blocks constituting this thesis' study area. Blocks 35 and 38 are considered to be the two most important blocks for

manufacturing.

Establishments in Major Groups 23, 27, and 39 appear to locate in clusters. In general, there are three principal areas of major groups in the CBD: (1) north-central, (2) west-central, and (3) south-central. There does not appear to be any tendency to locate on the periphery of the CBD.

In general, the manufacturing establishments in the St. Louis CBD occupy only one floor--the fourth floor, and although other researchers learned that for up to 400 yards from the peak land value intersection of CBD's of moderate-sized American cities industrial land use is most important on the second floor than on any other floor, this thesis found that for the CBD of a larger city (St. Louis) the fourth floor is the most important floor used. However, there cannot be any valid comparisons made between these two studies because the researchers used both different laboratories (different sized cities) and different methods.

Although 62% of the respondents indicated that their primary function was solely manufacturing, not all of them would classify their establishments as manufacturing. However, manufacturing accounts for an average of 85% of the overall operations performed by the sixty-one manufacturing establishments. The majority of the manufacturers in the St. Louis CBD manufacture unstandardized

("custom-made") products, and virtually all of them rent their premises. Virtually one-half of them located in the CBD since World War II, and the average year of location is 1943. The majority of factories in the CBD's of both St. Louis and Edmonton, Alberta have employee densities ranging from one employee to 200 square feet to one to approximately 900 square feet. The average employee density in the St. Louis CBD is one employee to 285 square feet.

Type of labor is an important factor for manufacturers in Central Business Districts. Both skilled and female employees are extremely important. Although availability of labor is believed by some researchers to be paramount to a location in the CBD, the ability to immediately replace employees is apparently not a universal desideratum throughout Anglo-America. This thesis found that the ability to get labor to the job is ostensibly more important to St. Louis CBD manufacturers than the ability to immediately replace their employees.

The factor, materials, apparently is not important to manufacturers in CBD's. Most materials used by manufacturers in CBD's are processed and are readily available.

Market is a cardinal factor to consider for a CBD location for manufacturers, especially for the Printing and Publishing major group. Although other manufacturers, individual people, service establishments, and business

establishments are important customers, from the information available it was not possible to make a generality regarding the most important type of customer of CBD manufacturers. The CBD, itself, is an important market area for CBD manufacturers.

The transportation factor appears to be more important to manufacturers in CBD's with regard to transportation of labor than it is for transportation of either materials or products. Public transit is the preferred medium for transporting CBD manufacturers' employees to and from work, and truck is the preferred medium for transporting their products.

External economies is an important factor for manufacturers located in the Central Business District. Being in close proximity to similar establishments provides for: (1) easy access to materials, (2) a good market, and (3) ancillary services. Some examples of these ancillary services are: (1) repair services, (2) sub-contractural work, and (3) delivery services.

Face-to-face communication is regarded by CBD manufacturers as an important factor of localization to their business. Most of this communication is done in the CBD.

The Apparel and Other Textile Products major group apparently has a slight advantage over the Printing and Publishing major group for a location in the CBD.

However, both major groups are appropriate for a CBD location. The market factor is the prominent advantage of a St. Louis CBD location; parking facilities, traffic, and truck service are the prominent disadvantages.

It should be mentioned that the conclusions of this thesis are not without their limitations. In order to accurately investigate some academic questions with a minimum of limitations requires a great deal of time and energy (more than the writer had at his disposal for this particular research project). Therefore, in answering a question within a limited time period and without completely prostrating the researcher a certain amount of limitations usually are inherent. The salient limitations of this thesis are:

1. Many conclusions were derived from information regarding only a sample (sometimes a very small sample) of the entire population of the various elements of manufacturing.
2. Although it is believed that the literature relevant to this thesis topic was adequately researched, it is possible that some literature that could greatly affect the conclusions of the thesis was overlooked.
3. Although it is believed that the study area was thoroughly canvassed for manufacturing establishments, it is possible that some

were not detected.

4. Much of the information provided by the representatives of the manufacturing establishments was only estimated; consequently, there could be large errors in the data.
5. There is also the possibility that the respondents might have misunderstood some questions during the interviewing and, consequently, answered these questions incorrectly.
6. As was mentioned in the body of the thesis, the conclusion drawn regarding the peripheral location of manufacturing establishments in the St. Louis CBD was obtained by studying manufacturing within the CBD; it is possible that a different conclusion could be drawn by studying manufacturing surrounding the CBD.
7. It is unfortunate that in studying manufacturing within the buildings the writer used a different method than that used by Murphy and his colleagues in determining the important floors used for manufacturing. This difference in methods has precluded a possible general conclusion regarding floors used for manufacturing within CBD's.

8. There always exists in mathematics the possibility of computational errors; consequently, this type of error might have provided some false conclusions.

The writer also became aware of other topics of inquiry closely associated with this thesis topic during the research, preparation, and presentation of this thesis. Some of these topics of investigation are:

1. What percent of the total establishments, employees, and floor space in the City and in the S. M. S. A. for the major groups found in the CBD is found in the CBD?
2. The correlation of the spatial pattern of floors used for manufacturing in the CBD with the spatial pattern of heights of buildings in the CBD.
3. Why are certain floors used by each major group?
4. The historical geography of manufacturing in the CBD.
5. What are the plans of the manufacturers in the CBD regarding their existence, location, expansion, etc., and what is the projected future for manufacturing in the CBD?
6. Why is most of the manufacturing found in the northwest portion of the CBD?

7. Manufacturing in the CBD "frame", or manufacturing in the St. Louis City Plan Commission's Central Business District.
8. An application of more sophisticated quantitative techniques to the spatial distribution of manufacturing in the CBD.
9. A more rigorous investigation of the "external economies" factor of localization, or the tendencies of agglomeration.
10. How does manufacturing locate relative to other CBD activities?

APPENDIX

APPENDIX

QUESTIONNAIRE A

Block Number_____
Type of Structure_____
Building Number_____
Cornerstone Date_____
Floor Number_____
S.I.C. Number_____
Send Report_____

Date:_____
Name of Company:_____
Address:_____
Representative Interviewed:_____
Position:_____
Phone Number:_____

I. Background

1. What is the primary function of this establishment --that is, would you call it a manufacturing establishment, wholesale establishment, retail establishment, etc?
   Type of establishment_____

2. What per cent of the overall operations of this establishment is each of the following functions?
   a. Manufacturing?_____%
   b. Wholesaling?_____%
   c. Retailing?_____%
   d. Other:
      1)_____%
      2)_____%
      3)_____%

3. When did this establishment locate here?_____

4. Do you own or rent the premises?
   a. Own_____
   b. Rent_____

II. Products

5. What are the principal kinds of products that you manufacture?

a. _____

b. _____

c. _____

6. Are the products that you manufacture:

a. Standardized--that is, are they mass produced? _____

b. Unstandardized--that is, manufactured to specifications of individual customers? _____

III. Size of Establishment

A. Labor

7. What is the number of employees employed in this establishment according to the following classifications?

	Male	Female
a. Total	_____	_____
b. Production (manufacturing)	_____	_____

B. Floor Space

8. What is the amount of floor space (in square feet) used by this establishment in:

a. Total? _____

b. Manufacturing alone? _____

9. How many and which floors do you occupy (a) in total, and (b) in manufacturing alone?

Kind of Use	Number of Floors	Which Floor
a. Total	_____	_____
b. Manufacturing	_____	_____

QUESTIONNAIRE B

Block Number: _____
Building Number: _____
Type of Structure: _____
Cornerstone date: _____
Floor Number: _____
S.I.C. Number: _____
Send Report: _____

Date: _____
Name of Company: _____
Address: _____
Representative Interviewed: _____
Position: _____
Phone Number: _____

I. Background

1. What is the primary function of this establishment--that is, would you call it a manufacturing establishment, wholesale establishment, retail establishment, etc.?
   Type of establishment: _____

2. What per cent of your overall operations is each of the following?
   a. Manufacturing _____%
   b. Retailing _____%
   c. Wholesaling _____%
   d. Storage _____%
   e. Other:
      1) _____ _____%
      2) _____ _____%
      3) _____ _____%

3. When did this establishment locate here? _____

4. Do you own or rent the premises?
   a. Own _____
   b. Rent _____

II. Products

5. What are the principal kinds of products that you manufacture?

   a. _____
   b. _____
   c. _____

6. Are the products you manufacture:
   a. Standardized--that is, are they mass produced?_____
   b. Unstandardized--that is, manufactured to specifications of individual customers?_____

III. Size of establishment

A. Labor

7. What is the number of employees employed in this establishment according to the following classifications?

Type	Sex: Male	Sex: Female
a. Total	____	____
b. Production (manufacturing)	____	____
(THE FOLLOWING APPLY TO THE TOTAL EMPLOYMENT.)		
c. Quality		
1) Skilled	____	____
2) Unskilled	____	____
d. Nationality		
1) Native	____	____
2) Foreign-born	____	____
e. Race		
1) Caucasian	____	____
2) Negro	____	____
3) Other:		
a)	____	____
b)	____	____
c)	____	____

8. If five (IF THEY DON'T EMPLOY FIVE, PRETEND THEY DO) of your workers left today, how many of the following types--skilled, unskilled, female, and foreign-born--could you replace within:

	Skilled	Unskilled	Female	Fore' born
a. a day?	_____	_____	_____	____
b. a week?	_____	_____	_____	____
c. two weeks?	_____	_____	_____	____
d. a month?	_____	_____	_____	____

B. Floor Space

9. What is the amount of floor space (in square feet) used by this establishment in:
   a. Total?_____
   b. Manufacturing alone?_____

10. How many and which floors do you occupy: (a) in total, and (b) in manufacturing alone?

Kind of Use	Number of Floors	Which Floor
a. Total	_____	____
b. Manufacturing	_____	____

IV. Materials

11. What per cent of the two kinds of materials--raw or unprocessed and processed--do you use?

a. Raw or unprocessed _____%
b. Processed _____%

12. What per cent of these materials do you obtain from the following types of establishments?

	Raw or Unprocessed	Processed
a. Other manuf.	____%	____%
b. Wholesalers	____%	____%
c. Others:		
1) _____	____%	____%
2) _____	____%	____%
3) _____	____%	____%

13. What per cent of these materials do you obtain from the following geographic areas?

a. In the CBD _____%
b. In the rest of the City _____%
c. In the rest of the Metropolitan Area (St. Louis City, St. Louis County, St. Charles, Jefferson, and Franklin counties in Missouri, and Madison and St. Clair counties in Illinois) _____%
d. Outside the Metropolitan Area _____%

V. Transportation

14. By which of the following media of transportation-car, truck, rail, water, air, or other (specify) --do you mainly:

a. Receive your materials?_____
b. Deliver your products?_____

15. What per cent of your employees use the following types of transportation in getting to and from work?

a. Public transit _____%
b. Taxicab _____%

c. Private car _____%
d. Other:
1) _____ ____%
2) _____ ____%
3) _____ ____%

VI. Market

16. Approximately what percent of your products do you sell to the following types of consumers?

a. Establishments:
1) Other manufacturers ___%
2) Retailers ___%
3) Wholesalers ___%
4) Service establishments (Laundromats, hotels, repair shops, amusement and recreation establishments, photo studios, beauty and barber shops etc.) ___%
5) Business firms (accountants, lawyers, insurance, real estate, etc.) ___%
6) Governmental establishments ___%
7) Storage (warehouses) ___%
8) Organizational establishments (churches, fraternal orders, colleges, etc.) ___%
b. Individual people ___%

17. Approximately what per cent of your products do you sell:

a. In the CBD? ____%
b. In the rest of the City? ____%
c. In the rest of the Metropolitan Area? ____%
d. Outside the Metropolitan Area? ____%

18. Do you make many of your sales to people staying in downtown hotels, that you know of?
a. Yes ___%
b. No ___%
c. Don't know ___%

VII. Linkage and "external economies"

19. Other than procuring materials and marketing your products, what per cent of your other business transactions are involved with the following types of establishments?

a. Other manufacturers _____%
b. Retailers _____%
c. Wholesalers _____%
d. Business firms _____%
e. Service establishments _____%
f. Governmental establishments _____%
g. Storage (warehouse) _____%
h. Organizational establishments _____%
i. Residential _____%

20. What per cent of these transactions are in respect to:

a. Obtaining repair services? _____%
b. Sub-contractural work? _____%
c. Other:
1) _____ _____%
2) _____ _____%
3) _____ _____%

21. What per cent of these business transactions take place:

a. In the CBD? _____%
b. In the rest of the City? _____%
c. In the rest of the Metropolitan Area? _____%
d. Outside the Metropolitan Area? _____%

VIII. Communication

22. How important is face-to-face communication in these transactions?

a. Very important _____
b. Important _____
c. Not so important _____
d. Unimportant _____

23. What per cent of this communication takes place:

a. In the CBD? _____%
b. In the rest of the City? _____%
c. In the rest of the Metro. Area? _____%
d. Outside the Metro. Area? _____%

IX. Summary

24. In summary would you state what you believe are the advantages and disadvantages for your location in the St. Louis Central Business District?

a. Advantages: _____

_____

_____

b. Disadvantages: _____

_____

_____

LETTER A

SOUTHERN ILLINOIS UNIVERSITY

Edwardsville, Illinois

Social Sciences Division
Earth Sciences

Dear Sir:

I am writing a Master's thesis in geography on the topic "Manufacturing in the St. Louis Central Business District." The purpose of this thesis is to ascertain the character of manufacturing in the St. Louis Central Business District.

I have prepared a questionnaire which I hope to use in interviewing either the president or general manager of each establishment. The interview will take less than ten minutes.

I will most sincerely appreciate any cooperation you can give me in obtaining this interview. You will be hearing from me soon.

Sincerely yours,

James W. Bodenstein
Graduate Student in Geography

LETTER B

SOUTHERN ILLINOIS UNIVERSITY

Edwardsville, Illinois

Social Sciences Division
Earth Sciences

Dear Sir:

I am writing a Master's thesis in geography on the topic "Manufacturing in the St. Louis Central Business District." The purpose of this thesis is to ascertain: (1) the character of manufacturing in the St. Louis Central Business District, and (2) the factors of localization associated with the manufacturing establishments.

I have prepared a questionnaire which I hope to use in interviewing either the president or general manager of each establishment. The interview should take between twenty and thirty minutes. The questionnaire covers such items as principal kinds of products, number of employees, amount of floor space, materials, transportation, market, your business relationships with other establishments, the importance of face-to-face communication involved in this relationship, and your opinions regarding the advantages and disadvantages of your location. Except for the items of number of employees and amount of floor space all the questions may be answered in percentage terms.

I will most sincerely appreciate any cooperation you can give me in obtaining this interview. You will be hearing from me soon.

Sincerely yours,

James W. Bodenstein
Graduate Student in Geography

TABLE A

NUMBER OF EMPLOYEES

Maj. Grp.	Grp. No.	Ind. No.	Total			Production		
			Male	Female	Total	Male	Female	Total
20	207	2071	2	9	11	2	5	7
23			59	433	492	40	415	455
	232	2329	7	8	15	7	8	15
	233		41	375	416	29	361	390
		2335	29	210	239	20	205	225
		2337	7	33	40	6	29	35
		2339	5	132	137	3	127	130
	237	2371	1	1	2	1	1	2
	238	2389	3	18	21	0	15	15
	239		7	31	38	3	30	33
		2391	4	26	30	0	25	25
		2395	3	5	8	3	5	8
27			252	80	332	197	50	247
	272	2721	20	20	40	13	8	21
	275		89	30	119	75	20	95
		2751	52	14	66	45	10	55
		2752	35	12	47	28	6	34
		2753	2	4	6	2	4	6
	278	2782	10	18	28	5	18	23
	279		133	12	145	104	4	108
		2791	100	12	112	81	4	85
		2794	33	0	33	23	0	23
28			12	4	16	11	3	14
	283	2834	2	3	5	2	3	5
	289	2893	10	1	11	9	0	9
32	329	3292	2	6	8	2	5	7

TABLE A--Continued

Maj. Grp.	Grp. No.	Ind. No.	Total Male	Total Fe-Male	Total Total	Production Male	Production Fe-Male	Production Total
35	354	3544	5	0	8	2	5	7
36	366	3662	125	25	150	40	0	40
38	385	3851	67	42	109	52	0	52
39			41	7	38	34	10	44
	391		31	7	38	25	0	25
		3911	30	7	37	24	0	24
		3913	1	0	1	1	0	1
	399		10	10	20	9	10	19
		3993	10	1	11	9	1	10
		3999	0	9	9	0	9	9
TOTALS			565	616	1,181	383	488	871

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Other Sources

The following representatives of their respective companies were interviewed on the following dates:

L. A. Acosta, Owner, L. A. Acosta and Jewelers, 4-16-68
Adrian Aguado, President, Adrian Typesetting Co., 4-16-68
Grace Anderson, Owner, Grace Anderson Hair Shop, 9-7-67
Chauncy Baldwin, Jr., Owner, Baldwin Regalia Co., 9-30-67
Mr. Bantle, Owner, Joseph D. Bantle Printing Co., 4-23-68
Ronald Bennett, Manager, Heat Proof Table-Mat Co., 4-15-68

Harold Brinkman, Foreman of Mfg. Dept., Kinsley & Sons, Inc. 4-18-68
Charles Broeffle, Mgf., Schwarz Sample Co., 4-17-68
Sam Challeff, President-Treasurer, Toby Lanes, 4-16-68
Al Cinciripini, Foreman, Associated Typographer Inc., 4-19-68
Walter Cola, Vice-President, New Fashion Tailor Inc., 4-18-68
Harold Colbut, President, Commerce Publishing Co., 9-16-67
Mildred Cromer, Plant Superintendent, Country Set Inc., (Plant #2), 10-2-67
Mr. Darrish, President, Marvil Art Needlework, 4-17-68
Donald Dempsey, Secretary, Van Note Printing Co., 4-15-68
Lawrence Dolci, President, Holloywood Rubber Stamp Co., 4-16-68
Kenneth Erickson, President, Erickson Hat Die Co., 9-30-67
Mrs. A. Fabel, Owner, Accurate Print. & Letter Co., 9-16-67
Mr. Forrester, Owner, Intoximeters Midwestern, 4-17-68
S. K. Frelich, Secretary-Treasurer, Frelich Inc., 4-16-68
Mr. Friedlander, President, Janie Juniors, 4-16-68
Frank Furlong, Jr., Partner, E. P. Furlong Print. Co., 4-15-68
Schell, Furry, President, National Typographer Inc., 4-15-68
Norman Golbart, Owner, Norman Frock Co., 4-16-68
John Greerling, President, Associated Typographer Inc., 4-19-68
Ross Griffis, Owner, Central Pleating & Button Co., 4-16-68
P. A.Gunn, General Manager, Dick Dunn Drug Products Co., 4-22-68
Mr. Harf, President, Arbe Manufacturing Co., 9-30-67
Henry Hilb, President-Owner, Henry Hilb & Co., 4-27-68
Wm. F. Hood, President, St. Louis Law Print. Co., 4-18-68
Bob Hopmann, Operation Manager, Potter Electric Signal Company, 4-25-68
Louis Horowitz, Owner, Acme Letter Service, 4-18-68
L. Kantor, Partner, Sterling Typographers, 4-15-68
Frank Kessler, Vice-President, Saxony Frocks, 9-30-67
Arch King, Owner, Arch King Diamond Tool Co., 4-17-68
Frank Kublik, Treasurer, Reinert-Preisler Electrotype Co., 9-16-67
W. D. Lawler, Manager, Modern Ophthalmic Lab., 4-15-68
Mr. Low, President, Premier Printers, Inc., 4-15-68
Gibb Mason, Owner-President, Screencraft Engraving Co., 9-16-67
Kenny Moore, Owner, Kenny Moore Offset Printer, 4-18-68
Virginia Misplay, Manager, The Corn Kettle, 4-24-68
Russell Moll, President, Majestic Lithographing Co., 9-16-67
Lewis Nolfo, Head Cutter, Elanor Frocks, 9-30-67
John O'Keefe, President and Company Owner, Central Optical Co., 4-18-68

Wm. Palecek, Partner, Kessler Jewelry Mfg., 4-18-68
Louis Palmer, Office Manager, Olive Ruling Co., 4-15-68
Melvin Parentin, Owner, Kuestner Printing Co., 4-15-68
Mrs. Reily, Secretary-Treasurer, Roberts & Heineman Engraving & Printing Co., 4-17-68
Herbt Ross, Chairman of Board, Treasurer, Ross-Curran Co., 4-19-68
Gloria Rudloff, Cost Estimator, York Typographers Inc., 4-19-68
Alvin Segelbohm, President, Alvin Optical Co., 4-15-68
Mrs. Schnedier, wife of owner, Schneider Furs, 4-10-68
Mr. Smith, Owner, Amy Smith Candies, 8-7-67
Mr. Stone, Owner, Stone Printing Co., 9-16-67
Ervin Thuet, Vice-President, Regal Typography Inc., 4-18-68
A. L. Tomkins, Owner, Tomkins Printing Co., 19-16-67
Howard Weis, Owner, Star Engraving Co., 4-19-68
Lois Weinberger, Partner, Weindberger Garment Co., 4-17-68
Dessa Whitfield, Secretary, Paragon Typographers Inc., 4-19-68
Mrs. Winney, Secretary, Norman Winney Art & Printing Service Inc., 4-15-68
Paul Zimbelmann, Owner, Menu Service Inc., 4-15-68
Mr. Zucher, President, St. Louis Print. & Legal Form Co., 9-16-67

Graduate School
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Note the Colleges or Universities Attended, the Years attended, the degree earned, and the Major Field.

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Sept. 1957 - June, 1965
(B.A.)
June, 1965 - Aug., 1969
(M.A.)

Thesis Title: "Manufacturing in the St. Louis Central Business District"

Dr. Robert Koepke