

THE UNIVERSITY OF MANITOBA

DELIMITATION OF THE CBD: AN EXAMINATION OF  
RESEARCH AIMS AND TACTICS, WITH SOME  
EXAMPLES DRAWN FROM DOWNTOWN WINNIPEG

by

Khin Khin Aye

A THESIS  
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES  
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE  
OF MASTER OF ARTS

DEPARTMENT OF GEOGRAPHY

WINNIPEG, MANITOBA

October 1975

Delimitation of the CBD: An Examination of Research  
Aims and Tactics, with some Examples Drawn from  
Downtown Winnipeg.

A dissertation submitted to the Faculty of Graduate Studies of  
the University of Manitoba in partial fulfillment of the requirements  
of the degree of

Master of Arts

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## Acknowledgements

I would like to express my thanks with deep appreciation to my supervisor, Mr. Daniel J. Old for his invaluable help and advice throughout the preparation of this thesis, and to Dr. Ramesh C. Tiwari for his guidance and encouragement during the initial stage of my study. My special thanks are also due to Mr. Robert Bednardz of the Department of Geography, Northwestern University for critical reading of this thesis.

For part of the data required for this thesis I am indebted to the Planning Department and the Assessment Department of the City of Winnipeg for their cooperation.

This study has been sponsored by the Canadian International Development Agency and I am grateful to many individuals for helping me in various ways during my stay in Canada. I am also grateful to my family who made this study possible.

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## Chapter I

### Introduction

Geography has always been concerned with problems of areal delimitation in one way or another. Such concern has often been peripheral to the major purpose of research of late but once dominated the discipline, sometimes to the exclusion of all else.

In urban geography, the delimitation of the Central Business District (CBD) has become widely accepted as a valid research procedure. This thesis attempts to evaluate the delimitation method proposed by Murphy and Vance (1954 A) known as the Central Business Index (CBI) method.

The evaluation is carried out in three phases. In chapter two, the development of the CBD concept is traced in the literature of economics, sociology, and geography. The CBD concept is seen to originate in models of urban land use which postulate that competition for space is the major structuring factor, and thus all urban functions are interrelated by this competitive mechanism. It is the highly commercial center which is designated as the CBD: the concentration of uses able to pay the highest rents, deriving the greatest utility from access to the entire urban population.

The delimitation procedure of Murphy and Vance, it is argued, proposes a research strategy which is incompatible with this conceptualization of the area. The nature of the CBD is little understood if the city is viewed as a collection of spatially distinct parts, each separable from the others by precise, objectively determinable boundaries.

It is this 'paradigm' which is imposed by the CBI method, and which originates in the geographic concern with such 'atomization' of space into regions. The method forces CBD research to ignore factors of centrality (hinterland) and functional linkages with non-central uses, and to concentrate on the contents of an objectively (but arbitrarily) defined box.

Chapter three investigates the method itself: how it has been used, the problems it presents regarding evaluation of results, and the question of what is, and what is not, a central business function. The method is shown to ignore major theoretic constructs in the last instance, which exacerbates its incompatibility with conceptual notions of urban structure.

Considerable attention is paid in this phase to an assessment of the purpose which the method was designed to serve: generalizations based on comparisons of uniformly defined CBD's. The position taken here is that where comparative studies have been carried out, the results are either concerned with shape parameters and trivial, not dependent on uniform delimitation, or not based on comparison at all.

Chapter four examines the last defense of the CBI method: its possible use as a taxonomic device for delimitation of 'the CBD.' Data pertaining to the central area of Winnipeg are employed in a series of procedures designed to produce a CBD through moderate variations in the CBI method, or by alternate means entirely. It is postulated that if the CBI method produces a result not significantly different from the



others, then it is a valid 'measure' of the CBD.

The final chapter collects the findings into an evaluation of the CBI method at various levels, and presents conclusions regarding the place of delimitation procedures in studies of urban commercial structure.

## Chapter II

### Origin and Development of the CBD Concept

Conceptualization of the CBD as a distinct 'atomic' component of a 'molecular' city should be examined first in the context of the evolution of notions of urban commercial structure. As demonstrated in the next chapter, these 'atomic' studies encounter their most fundamental methodological obstacles in dichotomizing business functions into 'central' or 'non-central' categories. This chapter intends to show that the CBD concept derives from attempts to order the functions of the city according to competitive mechanisms, and hence that 'centralness' is not a trait particularly suited to binary (presence-absence) measures.

#### Urban structure as the outcome of competition for space.

The CBD concept originated in North America, presumably because of the very distinctive identity of this part of the urban landscape. The central area of the city has developed its outstanding identity as a business district through time in the process of urban growth. The present century has witnessed the overwhelming growth of cities accompanied by continuously growing urban population, rapidly advancing technology and rising standards of living. Among these, successive improvements in transportation and communication systems have had great impact in shaping the structure of cities, in both a spatial and a functional sense.

The city was very compact when horse-drawn vehicles were the only means of intro-urban transportation. After the steam railroad was introduced in 1850, urban functions were pulled toward the railway

station. This was followed by the period of suburban railroads, cable and electric cars when the city began to extend along axial lines of transportation. Drastic changes in urban structure took place with widespread use of private automobiles. Since then the city has spread away from the center in all directions, unless hindered by topography, beyond the limits of mass transit lines.

This change in structure is associated with subsequent reorganization of functional activities within the city. The city, which was an undifferentiated settlement of intermingled activities in its embryonic stage, has developed complicated functional areas due to increasing specialization and regionalization of activities.

In 1903, Hurd related this growth process and the continually changing structure of land use to economic mechanisms. In his model of the evolution of urban land rent, the land is first conceived in its naked form. When the land is first occupied by early settlers they are endowed with the opportunity of free use of choice land. At that time the land is used but there is no value until competition for its use causes the competitors to bid against one another, with the land eventually being assigned to the highest bidder. The highest bidder is the one who can profit most from the use of that location.<sup>1</sup> The argument is the same as that of Thunen<sup>2</sup> for agricultural land rent, but it is the first direct application of the concept to the use of urban land, and Hurd was most concerned with the notion of servicing the urban populace.

Accessibility to that populace was the determinant of urban land value.

Since value depends on economic rent, and rent on location, and location on convenience, and convenience on nearness, we may eliminate the intermediate steps and say that value depends on nearness.<sup>3</sup>

But nearness means different things for different uses. Although the most accessible location is desirable for many uses, a locational decision is based on consideration of a multitude of requirements for proper functioning of the use. Activities locate themselves at different sites according to their needs.

The pioneer work of Hurd was elaborated by Haig (1927) who maintained that accessibility, or minimization of transport cost, is the prime factor influencing land rent. He formally introduced the concept of friction cost, which is the sum of transport cost and site rent paid to overcome the friction of space.

An economic activity in seeking a locations finds that, as it approaches the centre, site rents increase and transportation costs decline. As it retreats from the centre, site rents decline, and transportation costs increase . . . The theoretically

perfect site for the activity is that which furnishes the desired degree of accessibility at the lowest costs of friction.<sup>4</sup>

Haig discussed the vital question of where things belong in an urban area, analyzing the varying needs of different functional parts and changing trends of business structure. He observed the increasing specialization of functions within businesses and differentiated among office work, buying and selling, fabrication, and warehousing. In general, offices and buying and selling outlets remained in the center; fabrication and warehouse functions moved to the periphery, at least in New York in that period.

The work of Haig and contemporary land economists<sup>5</sup> succeeded in providing a precise description of the relation between land use and land value, particularly of the commercial sectors of the city. The basic model of Haig and Hurd remains the conceptual base of land valuation theory,<sup>6</sup> but it has become refined by consideration of the exogenous factors of zoning, building suitability, and taxation. The central area remains, however, the zone of highest land values for commercial enterprise, since more than often than not, these activities demand accessibility to the population at large, or to other activities which demand such accessibility.

Contemporary with the work of land economists are the studies in urban ecology, wherein the competition for land is couched in a different terminology. The process of development from the simple to the complex,

from the general to the specialized, and from centralization to decentralization in urban growth is perceived with emphasis on the people who comprise the city. The city is viewed by urban ecologists 'as a habitat of civilized man',<sup>7</sup> and hence is characterized by the culture of its inhabitants. Urban society is made up of individuals of varied life and culture; it is an aggregate of communities 'spatially separated, territorially distributed, and capable of independent locomotion.'<sup>8</sup>

Park observed that the process of urban expansion is analogous to that in plant ecology of competition among various population groups, dominance of one group forming a natural or functional area, and invasion of a natural area by a competing group, leading to succession and dominance of the area by a new group.

The idea is incorporated in the model of Burgess (1925), in which he postulates that:

The typical process of the expansion of a city can be best illustrated, perhaps, by a series of concentric circles, which may be numbered to designate both the successive zones of urban extension and the types of areas differentiated in the process of expansion.<sup>9</sup>

The zones are five in number:

- 1) The central business district, which is the center of expansion, is considered the focus of the city's commercial, social, cultural,

industrial life and of transportation.

2) The zone in transition, encircling the CBD, is the deteriorated residential area of mixed land uses invaded by light manufacturing and businesses, and of blighted conditions and slums.

3) The zone of working men's homes, is the residential area of second generation immigrants who have escaped from the zone transition but still derive easy access to their work downtown.

4) The zone of better housing is characterized by high-class apartments or exclusive restricted districts of singly-family dwellings.

5) The commuters' zone of suburban and satellite communities forms the dormitory suburbs beyond the city limits.

'The conceptual basis of the model is founded primarily on the socio-economic scene of North America in the later part of the nineteenth and the early twentieth centuries, when there was enormous migration from Europe,<sup>10</sup> and on the assumption of upward mobility in social status of immigrants associated with the process of invasion and succession.

The change in arrangement of land use in a definite order with distance from the center is more hypothetical than real. The linear distance is offset by improved communications, but not evenly. In cognizance of excessive expansion along rapid transportation routes, McKenzie (1929) interprets distance in terms of time-cost. Improvement in communication systems and consequent massive migration toward the outer territory of satellite cities led McKenzie to perceive the metropolitan area as a constellation of communities with varying degrees

of dependency upon the central city. Implicit in his view are the multiple growth centres later elaborated by Harris and Ullman (1945). The transportation corridor anomaly was elucidated by Hoyt (1939) as the sector model of urban growth and for some time arguments raged in the literature as to the nature of the city as concentric or sectoral in structure.

Harris and Ullman suggested that the general land use pattern is neither concentric nor sectoral, where both models assumed the expansion of the city from one single centre, the central business district. Rather the pattern is developed around several distinct nuclei. The number and location of nuclei depends on the size of the city, its operating forces, and historical development. The larger cities tend to have a greater number of and more specialized nuclei than smaller places.

Distinctive districts developed around nuclei in most American cities are identified as: the central business district as the focus of intra-city facilities; the wholesale and light manufacturing district near the focus of extra-city facilities; the heavy industrial district near the present or former edge of the city; various residential districts of differing social status; and peripheral suburbs. The nuclei may have existed from the very origin of the city or have developed as the growth of the city stimulated migration and specialization. The requirements of specialized facilities for certain activities are: cohesion of certain like activities for profit from association; repulsion of some unlike activities; and differences in rent-paying ability.



All three models are complementary in describing urban structure in its growth process. In general, they sort the city into distinct parts and the central part represents the identity of the city, in the same way that Jefferson's Primate City embodies the identity of a country.<sup>11</sup> But the parts are conceptual entities in the models of both the land economists and human ecologists, without precise outlines on the ground. In fact, the functional interaction among the uses to which urban land is put is conceived as the structuring element in all the models.

#### The delimitation problem

While geographers like Harris and Ullman participated in this functional relation approach to urban structure another segment of the field devised a research method which has gained widespread, if not universal, attention. The Central Business Index (CBI) method of delimiting the CBD was introduced by Murphy and Vance in 1954. They were concerned that although the term CBD had become generally accepted, it connoted different areas to different users.

Their purpose was to provide a practicable method for areal definition so that the CBD could be delimited on a uniform basis. Using a measure of land use which was likely to be readily available, they formulated a delimitation procedure

based on the classification of land use types into 'central' and 'non-central' categories, and the computation of a measure of intensity of central land uses. This provided the data used to discriminate between 'central' and 'non-central' blocks according to the CBI method, as detailed in the next chapter. The limit of the continuous mass of 'central' blocks provided the boundary of the CBD.

The method was extensively applied in the United States by Murphy and Vance, tried abroad by several workers, notably D. H. Davies (1959), Scott (1959), and Hartenstein and Staack (1967), and is a continuing source of master's theses in North America.<sup>12</sup>

The method was to be one '. . . that was practicable and at the same time could be defended on philosophical grounds.'<sup>13</sup> The contention of the proposers was that only the analysis of comparably measured CBD's could lead to useful generalizations regarding the functional identity of the area. This proposition is extensively challenged in the next chapter, but the concern of the current argument is whether any such method could be defended on philosophical grounds, given the conceptual context in which it is embedded. It was the purpose of the method, ultimately, to contribute 'a necessary step to gaining a deeper understanding of the nature and functioning of the CBD,'<sup>14</sup> although the CBI method was only 'a first step in that direction.'<sup>15</sup>

Several authors have questioned the CBI method, but mostly have concerned themselves with its technical aspects. However in his review of Murphy's book (1972) summarizing work using the CBI method and mentioning, briefly, other CBD studies, Garner (1973) implies that the

process of delimitation is hardly a rich source of insight into the structure of the central area.

Carter (1972) is much more thorough in his appraisal of the methods and, as is befitting the role of a text book, quite generous in his assessment of the contributions potentially derivable from such an approach, although it is clear that he is inclined to hold a more skeptical view privately. But his last of four objections to the method is, as he says, the main one, and is the key to interpreting the shortcomings of research of this kind: 'what is the whole point and purpose of defining such a boundary?'<sup>16</sup> Carter seems to think that the question is largely rhetorical, for he does not tenuously pursue and slay the dragon--the purpose of comparability created by Murphy and Vance.

The desire for areal definition is shown by Carter to proceed from the geographic tradition of regionalization. In light of conceptual frameworks provided by early work in land economics and human ecology, such work must bear sterile fruit. 'The time when extrapolation of complex cause from a pattern of areas was productive of progress in this field has long since gone.'<sup>17</sup>

It is the contention here that Carter is indeed correct in his assertions regarding the futility of CBD delimitation, but for reasons which are in a way more fundamental than those cited by him.

Carter in effect is proposing that some conceptualization of a functional system is the proper framework for work on intra-urban structure, and that the atomic paradigm is inappropriate. It can

be argued that the regionalization of the city, in its application as a research tool, defeats the purpose of systematic studies of activity linkages over time.

Murphy and Vance were at least superficially aware of the criticisms being levelled in geography and from without concerning the folly of partitioning space on the basis of static and perhaps arbitrary information. They believed that in claiming for comparative studies the only fruitful approach to unravelling the mysteries of the core, these objections would be obviated. It is superficially apparent that comparative studies are possible with uniformly defined objects. On the other hand, it would seem to be almost as apparent that uniform a priori delimitation on any basis cannot yield new a posteriori information, through comparison, about the nature of the delimited areas. The answers are predetermined by the definitions.

#### Post-War urbanization and the core

Since World War II, the process of urbanization, at least in North America, has undergone such a transformation that conventional models of the ordering of urban functions require a great deal of revision. The once recognizable CBD of Burgess is no longer as recognizable as it once was, and thus provides a further setback to those who try to delimit it.

The widespread use of private automobiles after World War II created a demand for commercial access which was manifest in the abandonment of existing mass transit in favor of the congesting

sedan. Cores of cities designed for predominantly mass transit and pedestrian traffic, became congested menageries as the motor car muscled its way into spaces designed for much smaller actors. Suburbs, formerly nucleated around mass transit terminals, have been able to spread in all directions, and the competition for valuable space 'downtown' intensified further. Inevitably, the ability to travel widely in any direction lessened the competitive advantage of the central area, and the foundation of the centralist models of Hurd, Haig, and Burgess began to crumble. Emphasis in commercial expansion is directed away from the CBD to a new phenomenon--the planned shopping center.

Conveniently located on major transportation routes (built to take automobiles downtown or to connect suburbs laterally), providing a wide range of goods and services, in climate-controlled and, usually, architecturally attractive surroundings, they captured the trade area of the core and augmented the strangulation pressures begun by automobile congestion. The functions of the city which are most easily recognised as requiring maximum population access are retail goods outlets, and these form the backbone of the land rent models. With the rise of the planned shopping center, it is this backbone which is displaced, carrying with it many ancillary activities, whose presence in the CBD was due to the spin-off from retail shopper concentration, and which now find the relic rent structure too rich for them.

Consequently, there is a tendency for a breakdown of the

traditional hierarchical central structure and the emergence of a new system of different networks for different businesses and institutions located at many highly accessible points throughout the urban area. As Vance (1966) comments,

in the past we have called it the central business district but that term is hardly adequate today. There is central business all over the city.<sup>18</sup>

The problems which accrue to the maintenance of structural order in the city under conditions of residential and commercial sprawl have generated in the planning literature schemes to revitalize the central area. The early approach to physical renewal has been coupled with a concern for proper and effective functioning of the business area.<sup>19</sup>

Several proposals have been put forward: to improve congestion in both pedestrian and vehicular movement by subsidizing the public transportation system; to provide convenience in parking; to facilitate shopping with malls and parkways on principal streets; to allow tax concessions and to provide modern buildings and equipment as incentives for action; to remove blight; and to encourage new centres for public attraction. Downtown development plans have been perhaps the most popular and active phase of practice in city planning, and research is called for in related studies to focus on the core. Whether this research should include delimitation schemes is not at issue here. The problem posed by delimitation is what uses are served by its application, and thus whether a rigid code such as that proposed by Murphy and Vance is warranted.

### The need for a historical perspective

The form of the city at any time is brought about by a long sequence of events during which its physical constructs have been changed in response to a complex web of circumstances. Throughout its evolutionary process, new structures have been added to the existing stock while the older ones have been retained or adjusted by renovation and replacement. Consequently the form of structures at any point of time can never represent an ideal solution to the needs of that period. Hence a mere counting of characteristics of formal structures, either buildings or blocks, at one point in time, will not likely provide a meaningful basis for the definition of that city or any of its parts.

In consideration of the process and forces that shape the city, some attempts have been made through this historical process to unravel the complex contemporary situations. Ward (1966) studied the sequence of changes that had taken place since the early nineteenth century until Boston's central area emerged as a business district as a result of the industrial revolution in America.

In their study of Cardiff, Carter and Rowley (1966) analyzed the growth and the controlling factors of growth in a European CBD that has a longer history of urban genesis and therefore is divergent in form from that of the American city. In such areas as Europe where every central area is the product of a long evolutionary process, they warned that 'there is always danger in lifting out of context arbitrarily defined parts of cities.'<sup>20</sup>

Mattingly (1964) attempted to apply the standard CBI method to trace the fluctuations and boundaries of Harrisburg's CBD in the years 1890, 1929, and 1960. His intention to use the CBI method, without modification, was thwarted for the earlier periods because information was not consistently available for upper floors. Thus computation of indices was based on the ground floor use only. Although it was stated that he had to make some changes in central business uses in order to be consistent with the situation of the past, the only example mentioned was the switch from livery stable to parking lot.

It is of interest here to note that retailing, business services (including financial), wholesaling and manufacturing were taken into account by Rannells (1966) in a study of Philadelphia's CBD. In order to trace the changes in patterns of land use within the CBD, movements of the central concentration as well as changes in activities over time were considered. For the complete description of central city activities, he felt that the study area should certainly not be limited to the main concentration of high-rent commercial buildings, since these merely provide accommodation for selected groups of establishments whose operations could scarcely be understood without studying their relationships with other kinds of establishments in the central area. He also suggested taking some territory beyond the present main concentration in the study area for future expansion and adjustment of central activities.



### Subsequent research on the core

A few years after Murphy and Vance had published, an important contribution to the CBD literature was put forward by Horwood and Boyce (1959). They recognised the CBD as a unit made up of two component parts: core and frame.

The core of the CBD was defined with the general properties of intensive land use, vertical growth, concentrated day-time population, and internal linkages among establishments. It is characterized by the city's tallest buildings, heaviest pedestrian traffic, focus of mass transit, largest retailing of goods and personal services, concentration of professional services, offices of executives and policy-making functions of government, business and industrial activities.

In contrast, the frame of the CBD, surrounding the inner core, is an area of mixed land use, mainly occupied by wholesaling, warehousing, light manufacturing, and various kinds of transport facilities. The use of land is less intensive; buildings are not very tall, and sites may be partially built on or devoted temporarily to parking. Functional subregions are well-developed within this area but are not commonly linked to each other. Vehicular movement among establishments is characteristic of this area.

On the operational level, this definition is to be employed as a guide line for establishing areal units for analysis, presumably blocks or portions thereof. Specific numerical criteria will be involved according to the degree of refinement required. The CBD of Horwood and Boyce will obviously have a larger extent than that of Murphy and Vance.

The core may be comparable to the CBD delimited by the CBI method. Murphy (1960, 1972) was unhappy with the inclusion of the frame as part of the CBD and the failure to provide an exact method of delimitation:

' . . . such a mental construct may have value for abstract conceptualization, especially in great cities, but without a delimitation technique it is hard to see how it could be used to compare CBD's and thus to arrive at generalizations.'<sup>20</sup>

The value of such comparative studies is examined in the next chapter. For the moment, the writer wishes only to recall the argument regarding a priori delimitation. If the problem is to delimit a study area for the purpose of examining the results of processes carried on within it, then it is best to make it oversize. Whether such generosity will detract from the precision of generalizations through comparison remains to be seen.

The divergent aims outlined above were brought into focus again in Murphy's (1972) criticism of the statistical CBD defined by the U. S. Bureau of the Census:

an area of very high land value; an area characterized by a high concentration of retail businesses, offices, theatres, hotels, and service businesses; an area of high traffic flow';<sup>22</sup>

and following lines of one or more census tracts. The census CBD's,