METROPOLITAN DATA SYSTEMS: A REVIEW OF SIGNIFICANT DEVELOPMENTS AND SUGGESTED PRINCIPLES FOR THE IMPLEMENTATION OF A SYSTEM

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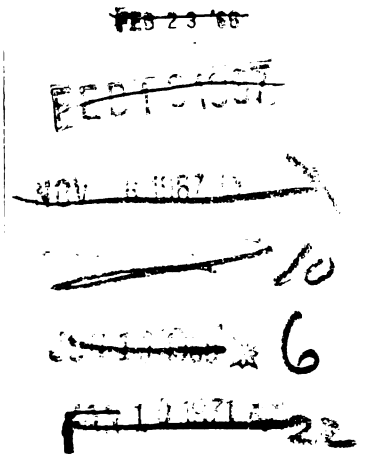

ABSTRACT

METROPOLITAN DATA SYSTEMS: A REVIEW OF SIGNIFICANT DEVELOPMENTS AND SUGGESTED PRINCIPLES FOR THE IMPLEMENTATION OF A SYSTEM

by Richard Thomas McGinty

Urban planning has been defined as the "guidance of the amount, rate, nature, and quality of urban change."[1] If urban planning is to provide this guidance, techniques must be developed which will allow the planner a more accurate and up-to-date perception of the changes which are taking place in the community. Moreover, because changes in the urban pattern are the result of the actions of many individuals, the planner's responsibilities should include the provision of reliable data about present and expected future conditions in order to aid these individuals in making decisions.

Although planners have been aware for some time of the need for a greater quantity of high-quality information and the need to become more intimately involved in the decision-making process, the means for accomplishing these ends was not available. But the capability to fulfill these needs is now within the realm of possibility as a result of two recent developments. The first development is the

electronic digital computer, and the second is the emergence of analytical studies concerning the decision-making process in urban communities. To the extent that planners are able to incorporate these new developments into their operations, the effectiveness of urban planning will be improved greatly.

One of the ramifications of the increasing technical capability to manage large volumes of data has been the initiation of a series of attempts to establish metropolitan data systems, the functions of which would include gathering, processing, and communication of various kinds of data, for a variety of purposes, on a continuing basis. Since this is a relatively new concept, some confusion exists concerning how such a system should function. Major differences exist in the objectives, approach, functions, organization, and financing of various proposed and operating metropolitan data systems.

The Lansing Tri-County Planning Commission has expressed an interest in establishing a regional data system which would serve Clinton, Eaton, and Ingham Counties in Michigan. As a preliminary step to the development of such a system, a review of the experience of others is appropriate. The purpose of this thesis, then, is to examine in some detail several proposed and operating data systems with respect to the above-mentioned differences and to draw from this some general principles which might serve as guide-lines

for the development of a data system for the Tri-County Region.

Background material for this study was obtained through a review of published and unpublished materials, as well as through interviews and written communications with professionals who have been involved in the formulation of metropolitan data systems. After preliminary research, seven metropolitan data systems were selected for review in this thesis. These had been developed to the point where a sufficient amount of information was available concerning their approach, and they represented, in the author's opinion, the major achievements to date in this field.

The scope of the review was limited primarily to the objectives, approach, functions, organization and financing of the selected data systems. Details concerning specific techniques, while important from an operational point of view, were not included in this review. The emphasis was on the role of the data system rather than on the mechanics of its operation.

The major conclusions of this study, as they might apply to the Lansing area, are the following:

1. The regional data system initially should contain only data which has a specific use.
2. New techniques, such as simulation and operational gaming, should be employed to encourage the use of

the data system and to indicate possibilities for an expanded system.

3. Methods should be established which would insure the steady flow of the required data in the proper format into the system.
4. A program for widespread dissemination of information must be established.
5. Much of the potential benefit of the system will be wasted, unless technical skills are provided to aid in interpreting and analyzing the data.
6. Operation of the data system should be a regular function of the Regional Planning Commission but should be regulated by a board of representative elected officials.
7. Much of the initial research and development findings of the data system logically could be provided from sources outside of the Region, but there must be assurance of continued financial support after the system is operational.

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[1]Robert B. Mitchell, Metropolitan Planning for Land Use and Transportation (Washington, D.C.: Office of Public Works Planning, December, 1959), p. 2.

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CHAPTER I

INTRODUCTION

> There is a great demand for methods which would enable the researcher, planner, or decision-maker to deal effectively with extremely complex problems in our ever evolving and rapidly changing social economy. At the heart of the changes . . . is urban growth, for which improved research methods are needed to provide answers for urban planners and public decision-makers.[1]
>
> Robert C. Weaver

BACKGROUND

Throughout history, it can be seen that the advancement of mankind has been due to the ability to assimilate and process knowledge. As man learned to gather and differentiate knowledge, he was able to discern ways to improve his existence.[2]

Conversely, as noted in Fortune, "practically all the wrong decisions over the centuries, from Darius' attack at Marathon to the birth of the Edsel, have been at bottom the result of insufficient or inadequately processed

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[1] Robert C. Weaver, Paper read before the Operations Research Society of America, Cleveland, Ohio, May 27, 1963, quoted by David A. Grossman, "The Community Renewal Program: Policy Development, Progress and Problems," Journal of the American Institute of Planners, XXIX, No. 4 (November, 1963), p. 265.

[2] Irwin D. Bross, Design for Decision (New York: Macmillan Co., 1953), p. 9.

knowledge."[1] Over the years, man has been moving away from decisions based on guesses and intuitive judgment, which he necessarily uses when a lot of relevant facts are missing; he is beginning to rely more and more on deductive and analytical judgment, which proceeds from a body of facts.

This trend, from an intuitive type of reasoning process to a more analytical system, also can be traced in the evolution of the city planning in this country. The modern city planning movement began in this country around the turn of the century with the idea of the "City Beautiful." This era has been described as one which abounded with plans for civic improvement which were "of colossal scale with monumental proportions."[2] It was an age dominated by the architect-planner who sought to bring about a sweeping change in the appearance of the city through the provision of wide boulevards, civic centers, libraries, public buildings and parks. Since these plans were products of the designer's imagination and creativity, the gathering of factual data about the community was not deemed necessary. As Gallin points out, "an air of haughty detachment pervaded the planning, an isolation from the affairs of people and community activities."[3]

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[1]Gilbert Burck, "The Boundless Age of the Computer," Fortune, LXXIX, No. 3 (March, 1964), p. 103.

[2]Arthur B. Gallin, The Urban Pattern (New York: Van Nostrand Co., 1950), p. 81.

[3]Ibid., p. 82.

From this beginning, planning has, of necessity, become more and more involved with the affairs of people and community activities. Through the years, the conception and practice of planning has evolved rapidly. Perloff traces this evolution as follows:

> From (1) an early stress on planning, as concerned chiefly with esthetics, planning came to be conceived also in terms of (2) the efficient functioning of the city--in both the engineering and the economic sense: then (3) as a means of controlling the uses of land-use pattern; then (4) as a key element in efficient governmental procedures; later (5) as involving welfare considerations and stressing the human element; and, more recently, (6) planning has come to be viewed as encompassing many socio-economic and political, as well as physical, elements that help guide the functioning and development of the urban community.[1]

Concurrent with the increasing scope of the concept of planning is the need for more and better data on which to base critical decisions. It is becoming increasingly apparent that intuitive judgment, based on a minimal amount of supporting data, will not suffice in dealing with the urban problems of today. Melvin Webber points out that,

> We are coming to comprehend the city as an extremely complex social system, only some aspects of which are expressed as physical buildings or as locational arrangement. As the parallel, we are coming to understand that each is defined by and has meaning only with respect to its relations to all others.[2]

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[1]Harvey S. Perloff, Education for Planning: City, State and Regional (Baltimore: Johns Hopkins Press, 1957), p. 12.

[2]Melvin M. Webber, "Comprehensive Planning and Social Responsibility," Journal of the American Institute of Planners, XXXIX, No. 4 (November, 1963), pp. 235-236.

Until recently, it would have been impossible to grasp the tremendous interplay of forces which shape the urban environment. However, two significant developments have been emerging during the past two decades which promise to make these forces more comprehensible.

The first is the development of more sophisticated techniques for analysis of problems. These include operations research, linear programming, statistical decision-making, and systems analysis. These techniques already have proven their value in many applications in other fields, but only recently have they been utilized for urban analysis--primarily in the development of land use and transportation models.

The second development, which is intrinsically tied to the first, is the advancement in electronic data processing. Whatever the conceptual power of mathematical models, it was the high speed digital computer which allowed their actual use in specific applications. Moreover, with the computer's ability to handle enormous volumes of data, it is now possible to conceptualize problems in an entirely new frame of reference. A greater number of variables can be examined, and their significance can be tested. The usual procedure of preparing land use and transportation plans, by analyzing facts on population distribution, employment, economic factors, social patterns, and travel habits, can be

accomplished through the use of more precise techniques of evaluation.[1]

Given the fact that the technical capabilities of electronic data processing equipment are rapidly approaching a point where it will be able to handle problems of any magnitude, and given the fact that mathematical techniques are being developed which show promise of bringing about a better understanding of the forces effecting urban change, the opportunity for exercising the planning function in urban government at a new, and higher, level of effectiveness is now present.

These new developments introduce a formidable challenge to the traditional methods of planning practice. John Gifford viewed the situation in the following way:

> The introduction of this new technology, with the revolutionary resource which it offers for the manipulation and processing of data, appears to require a reexamination of the planning function, its constituent operations, and ultimately, a reevaluation of its role in relation to the functioning of the city.[2]

It often has been argued that if urban planning is to be truly effective, it must develop closer ties to the decision-making activities in both the public and private

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[1]Alan M. Voorhees, "The Nature and Uses of Models in City Planning," Journal of the American Institute of Planners, XXV, No. 2 (May, 1959), p. 57.

[2]John V. Gifford, Jr., "The Systems Requirements for an Urban Planning Information System" Paper read before the 1963 Conference on Information Systems and Programs for Urban Planning, University of Southern California, Los Angeles, June 7, 1963.

sectors which operate in the metropolitan areas. One of the prime inroads into these decision-making activities is taking an active part in providing a ready source of accurate, up-to-date information which may be utilized easily by the various decision-makers in planning their future programs. In some ways, this might be patterned after the planning function in a large corporation. As described in Theory and Management of Systems, the role of planning is as follows:

> Business planning is not an entity in itself--its primary purpose is to provide the guidelines necessary for the vital decision-making processes throughout the organization. Planning, therefore, should be geared to obtaining, translating, understanding, and communicating information that will help to improve the rationality of current decisions which are based upon future expectations.[1]

The number of decision-makers in a metropolitan community is indeed large and includes such varied groups as councilmen, mayors, city managers, legislative bodies, heads of city departments, city engineers, financial board members, boards of education, civil engineers, private developers and builders, speculators, private corporations, religious institutions, and countless more. Moreover, their information needs are varied and diverse. However, it would seem that the time has come for the planning agency to assume a more positive role in supplying a good share of these informational needs.

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[1]Richard A. Johnson, Fremont E. Kast, James E. Rosenzweig, The Theory and Management of Systems (New York: McGraw-Hill, 1963), p. 23.

CURRENT SHORTCOMINGS IN THE AVAILABLE SUPPLY OF LOCAL STATISTICAL DATA

At the present time, the various decision-makers in the metropolitan areas, including the planning agencies, are faced with great obstacles in attempting to gather pertinent data relative to a particular problem. Nowhere is there a single repository of a significant amount of available information. Therefore those requiring information must search out for themselves the sources of relevant data. And even when the sources are known, the data is usually not in a form which is readily usable.[1]

As a result of these problems, many decision-makers often are forced to abandon vital studies which might have had a significant effect on the reliability of their decision. In other cases, it has been found more efficient to undertake new studies to gather the needed data rather than utilize existing sources.[2]

In general, the problems associated with the current status of information about a metropolitan area are the following:

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[1] U.S. Congress, Joint Committee on Washington Metropolitan Problems, A Metropolitan Statistical Program for the National Capital Region, 85th Cong., 2nd Sess., 1958, p. 6.

[2] Chester Rapkin and William G. Grigsby, "A Real Property Inventory for the City of Philadelphia" (a report prepared for the Offices of Development Coordinator, Philadelphia, Pa., June, 1959), p. 2. (Mimeographed.)

1. Duplication of effort: Many agencies collect and store the same items of data. And even though these data are used for different purposes by each agency, they are basically the same.[1] This duplication results in a considerable expenditure of time and money, and the quality of the data is probably much less than if the resources of each agency were pooled into a joint effort.

2. Lack of communication between data-collection agencies: In many cases, an entire inventory is carried out unnecessarily, because it was not known that the needed data already were on file in another agency. In other cases, if the informational needs of one agency were known, it might be possible for another agency to gather the needed data as a by-product of its normal operations.[2] For example, a civil defense agency might want to know the potential use of public buildings as fallout shelters. Much of this information could be gathered by the local planning agency while doing an inventory of community facilities.

3. Non-comparable data: In attempting to combine data from various sources, it is often found that there is little correlation. Data, which appears on the surface to be similar, probably will have been gathered for slightly different purposes, by different methods and standards, for different geographic units, and possibly for varying time

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[1] Edward F. R. Hearle and Raymond J. Mason, A Data Processing System for State and Local Government (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1963), p. 29.

[2] Ibid.

periods or on different dates.[1] Moreover, the definition of specific items of information may vary from one agency to another. This results in an almost impossible task when compiling area-wide statistics.

4. Large gaps in coverage and content: Because individual agencies generally limit their data gathering activities to those items which they feel are most essential to their own operation, there is a lack of comprehensive coverage of subject matter. As a result, many important decisions must be made on the basis of inadequate, inaccurate, and incomplete data. For example, nearly every agency requires information on present and future population. Yet, because of time and budgeting restrictions, one agency rarely has been able to compile a complete package describing population movement and change. In addition, there are many instances of incomplete data coverage for certain geographic areas. This is true especially in a regional setting where there are many governmental units, and thus, there is a wide range of operating procedures, personnel, and budgets.

5. Inaccessibility of data: Many valuable data are available at sources which remains untapped because of the difficulty of assembling the data into a meaningful form. The manner in which data are recorded and stored discourages many researchers from exploiting data from standard sources because of the sheer magnitude of the assembly job in the

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[1] U.S. Congress, loc. cit.

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absence of modern data-processing techniques.[1] However, few agencies of themselves can afford to purchase the equipment and technical advice which would allow automation of their systems.

In essence, the two major reasons for the inadequacies and weaknesses in the current available stock of metropolitan data are the "multitude of independent data-gathering agencies and the widespread indifference as to whether individual efforts help to improve the general level of metropolitan information."[2]

PURPOSE OF THE THESIS

In recent years, there have been several attempts to develop methods which would alleviate these problems and lead to improvement in the quality, comparability and usefulness of metropolitan data. The Lansing Tri-County Regional Planning Commission also is beginning to consider the possibility of establishing a regional data system which would serve Clinton, Eaton and Ingham Counties in Michigan. It occurred to the author that a review of the experience of others in this field would be beneficial as a preliminary step to the development of a data system for the Tri-County Region.

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[1] Dick Netzler, "A Metropolitan Statistical Center for the New York Region: Purposes and Function," memorandum of the Regional Plan Association, Inc., May 22, 1962, p. 3.

[2] Wroe Alderson and Stanley J. Shapiro, "A Metropolitan Data Bank for the Business Community," Business Horizons, VI, No. 2 (Summer, 1963), p. 54.

Since the concept of a regional data system is relatively new, some confusion exists in the current thinking concerning how such a system should function. Some major differences exist in the objectives, approach, functions, organization, and financing of various proposed and operating metropolitan data systems. The purpose of this thesis is to examine several of these data systems in some detail and to draw from this some general principles which might serve as guidelines for the development of a data system for the Tri-County Region.

METHODOLOGY

In order to gain an initial perception of the current activities in the field of metropolitan data systems, letters were written to twenty-five professionals who were known to have been involved in this movement. The names and addresses of these people were obtained from a newsletter circulated by Edward F. R. Hearle of the Rand Corporation in May, 1963. A good deal of information was obtained in this manner in the form of written comments, reports, memorandums and bibliographies. Other information was obtained through further written communications, personal interviews, attendance at pertinent conferences, and additional publications.

It was discovered that, while many people were interested in data systems, very few were at a stage where they had developed formal proposals or had a system in operation.

Seven data systems, which had been developed to the point where a sufficient amount of information was available concerning their program, were selected for review in this thesis.

The scope of the review was limited primarily to objectives, approach, functions, organization, and financing. These were regarded as the primary considerations which would be important in developing the overall framework for a proposed data system in the Tri-County Region. Details concerning data processing techniques and equipment, although important from an operational standpoint, were not included in this review. The emphasis was on the role of a metropolitan data system, rather than on a precise description of the mechanics of its operation.

This first chapter of the thesis has provided a general background of the need for metropolitan data systems. The second chapter describes each of the seven selected systems in some detail. Summary comments are given in Chapter III concerning the five aspects of concern in this thesis. The final chapter applies the notions obtained through the review to a proposed data system for the Lansing Tri-County Region.

CHAPTER II

REVIEW OF MAJOR DATA SYSTEMS

INTRODUCTION

The purpose of this chapter is to describe the general characteristics of seven major operating or proposed metropolitan data systems. These systems include the Cleveland Real Property Inventory, Metropolitan Statistical Program for the National Capital Region, Metropolitan Data Center Project, Edward Hearle and Raymond Mason's Proposal for a Data Processing System for State and Local Government, Los Angeles City Planning Department (both Stanford Optner's Feasibility Study and the proposed Automated Planning and Operations File), Penjerdel's Metropolitan Data Bank, and Pittsburgh Department of City Planning's Centralized Information System.

Although many worthwhile ideas have been suggested by each of these systems, evidence exists that none of them are wholly satisfactory. In addition to the descriptive comments concerning the background and operation of each system, various aspects of each data system will be evaluated in the following pages.

CLEVELAND REAL PROPERTY INVENTORY

In the early years of the depression, the Works Progress Administration initiated an extensive study entitled "A Real Property Inventory." There were between 200 and 300 communities which participated in the study. The data were collected through a field survey of all residential establishments and included information on the parcel, building, type of occupant, existence of vacancies, and many significant details on business firms and households.[1]

Because the emphasis of the program was on the provision of temporary employment for white-collar workers and not on the development of a useful metropolitan statistical program, the project was short-lived. Relatively few cities saw fit to continue the project on their own. Thus, a valuable collection of data, gathered with much effort and at great expense, fell into complete disuse.

One city which did recognize the value of a continuing Real Property Inventory was Cleveland, Ohio. Actually, the program in Cleveland preceded the federal inventory by a few years and served as a prototype in establishing some of the procedures which were used in the national survey. One reason for the survival of the Cleveland program was the existence of an organization which was willing to assume the responsibility of keeping the information up to date.[2]

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[1] Rapkin and Grigsby, op. cit., p. 32.

[2] Ibid., p. 33.

The Cleveland Real Property Inventory, which operates as a private non-profit organization, has been in continuous operation for thirty-three years. Its operating costs are met from membership fees derived from 230 subscribers in thirty municipalities. These subscribers include governmental agencies in Cleveland and suburban municipalities, newspapers, utilities, banks, real estate boards, and smaller miscellaneous organizations.

Although the kinds of data provided by the Real Property Inventory are somewhat limited, the scope appears to satisfy the various subscribers.[1] The activities in which the organization engages include an annual survey of all property in the area, which encompasses Cuyahoga County and a portion of Lake County; an analysis of U.S. Census data relating to housing, families, and income characteristics; maintenance and distribution of current files of information collected by other agencies; and certain special studies upon request.

The organization publishes two reports each year. One is entitled "Family and Housing Characteristics" and the second, "Retail Stores and Shopping Centers." In addition, an information sheet is issued each week which includes such items as department-store sales, building permits, bank debits, etc.

The basic objective of the Cleveland Real Property Inventory is to provide a body of selected data which will

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[1] Ibid., p. 35.

enable an evaluation of present and future markets and to make available information on housing and neighborhoods of special significance to governmental agencies. The fact that the information has been utilized widely by a variety of establishments and governmental agencies for many different purposes indicates the high degree of community acceptance and regard for this type of information service.

The major shortcomings of the Cleveland Real Property Inventory are the limited scope of information and the failure to integrate various sources of information.[1] The basic method of data gathering is through an annual field survey of some 400,000 parcels. Although the actual cost of operation has been somewhat less than $50,000 per year, the method appears to be rather cumbersome.

Included in the data recorded for each parcel are the street address, street code, block number, street frontage, census tract, type of structure, and total family units, the number vacant and the reason for vacancy. For non-residential structures, the data includes the type of business, name of business, its location in a shopping center, commercial area, or elsewhere, the year of construction, and whether the establishment is in the front or rear of the structure. Although most of these items are valuable to certain users, their total contribution to the informational needs of the metropolitan area appear to be quite

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[1] Ibid., p. 37.

modest. Nevertheless, it is difficult to argue with success, and the Cleveland Real Property Inventory, measured in terms of its widespread community acceptance and years of service, has been successful.

METROPOLITAN STATISTICAL PROGRAM FOR THE NATIONAL CAPITAL REGION

The concept of a metropolitan data center for Washington, D.C., was first suggested in 1958 in a report prepared by the Joint Congressional Committee on Washington Metropolitan Problems. This Committee, which was charged with the responsibility of making a comprehensive study of the problems associated with urban growth in the Washington area, was greatly concerned with the lack of reliable statistical information on which to base improvement programs. The Committee subsequently engaged a consulting firm, Surveys and Research Corporation, to prepare a report on "the development of area statistics and continuing data processing in the Washington Metropolitan area."[1]

One of the major problems recognized by the Joint Committee was the absence of a clear statement of the policy questions or issues for which the data would be used. Without an understanding of the types of decisions to be made, it was difficult to determine the data which would be required. This problem was partially alleviated through discussions with several key people who were considered to be

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[1]U.S. Congress, op. cit., p. 1.

major users or generators of data in the Washington Metropolitan area. Leading authorities in the fields of planning, government and area development also were consulted with respect to their viewpoints on significant issues. After considerable deliberation, the Joint Committee decided to concentrate on three major fields of subject matter: water supply and pollution, transportation and highways, and economic development.

In order to provide the needed data to deal with these problems, the Joint Committee recommended that Congress authorize the creation of a continuing statistical agency to serve the Washington Metropolitan area. This area would include the District of Columbia, Montgomery and Prince George Counties in Maryland, Arlington and Fairfax Counties in Virginia, and cities of Alexandria and Falls Church in Virginia. It was suggested further that this agency should assume the following functions:

a) responsibility for the continuing development of a statistical program for the area;

b) coordination of relevant area data now collected by Federal, State and local agencies of government and by private firms and organizations;

c) assistance to other agencies in developing area statistical activities, with collection of primary data by its own staff when deemed appropriate;

d) provision of central statistical services related to the metropolitan area, including data processing, when these are otherwise unavailable or inadequate: provided that these services shall be available to both public and private users on a fee basis;

e) maintenance of a central repository and index of statistical information relating to the area.[1]

The major emphasis was put on the development of a statistical program, as opposed to conducting special studies. The objective was to standardize the data gathering activities of the major data generating agencies in the metropolitan area with respect to the "subjects covered: the concepts, categories, and definitions employed, the tabulations, if any were made; the timing and frequency of the collections; and the areal or other units for which reported."[2] But the control over the statistical activities of other agencies would be primarily in the form of technical influence and demonstrated competence. Other important functions to be performed included searching for unpublished and/or unprocessed data, which would be of general use to other agencies, and maintaining an inventory of data, including the location and character of data sources.

In essence, the statistical center, as proposed, would be a repository of a wide range of statistical data. Among the data items to be included in the statistical program were population, school enrollment, business activity, family-income levels, income and wages, employment and labor force, land use and housing, traffic origin and destination, and water supply, demand, and quality.

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[1] Ibid., p. 3.

[2] Ibid., p. 32.

The organizational structure recommended to perform the proposed statistical services was composed of an unsalaried governing council or board which represented the statistical interests in the metropolitan area; an executive director with competence both in data management and public relations; and a capable technical staff. The financing of the operation was to be through fees from both governmental agencies and business and civic organizations which utilized the statistical services.

Several alternatives were offered as to which agency in the Washington Metropolitan area should have the responsibility for developing and operating the statistical service. Among those considered were the following:

a) Joint Commission on Washington Metropolitan Problems

b) The Interdepartmental Statistics Committee of the District of Columbia Government

c) House or Senate District Committee

d) United States Bureau of the Budget, as an adjunct of the Bureau's Office of Statistical Standards

e) National Capital Regional Planning Council

f) The Washington Center for Metropolitan Studies

g) The Washington Board of Trade

After careful review, the two alternatives which appeared to be the most logical to the Committee were the Bureau of the Budget and the National Capital Regional Planning Council. The former was selected because it is legally empowered to coordinate Federal statistics, some of which would be

important elements in a metropolitan data system. These include statistics on population, income, employment, and trade. In addition, the Committee stated that the "interstate character of the Washington Metropolitan area and its importance as the seat of the Nation's capital would appear to justify the attachment of an office for statistical development and coordination within the area to the Federal office which has the same functions for the Nation at large."[1] Moreover, it was pointed out that the Washington Metropolitan area could be used as a pilot area for improving the quality of Federal statistics for other metropolitan areas.

The National Capital Regional Planning Council was chosen as the other alternative, because it was an official body representing area-wide interests, and its concerns and responsibilities encompass precisely the kinds of questions with which the statistical unit would be expected to deal. Some doubts were voiced, however, concerning the Commission's ability to provide adequate financial support to undertake such a program.

It is quite possible that the statistical program, as proposed, fell victim to its own ambitiousness. In the seven intervening years, little has been done to create a unit which would have responsibilities of such magnitude. However, the underlying idea has not been lost. The Metropolitan Washington Council of Governments undertook the task

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[1] Ibid., p. 35.

of carrying out some of the proposals on a much more modest scale. This organization, which was formed in 1957, was made up of representatives from the General Assemblies of the States of Maryland and Virginia, the U.S. Congress, and the local governmental units in the area.

In 1961, the Council of Governments and the Washington Center for Metropolitan Studies jointly organized a Statistical Advisory Panel whose function was to formulate a realistic information program which might be developed with the aid of a foundation or federal grant.[1] As a result of the Panel's recommendations and subsequent refinements, an application was submitted to the Urban Renewal Administration for a Demonstration Grant, as provided under Section 314 of the National Housing Act of 1954.

The basic objective of the project was "to describe the means by which quantitative information on an area-wide basis may be produced in two related subject areas."[2] The two subject areas proposed for investigation were land use and housing characteristics. A system will be established which will facilitate comparable or reconcilable classification of data pertaining to these two categories of data. The application stressed that the intent was not to develop a single unified system to serve all jurisdictions, or to

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[1]Metropolitan Washington Council of Governments, "Application for a Demonstration Grant for a Regional Management Information Program," Washington, D.C., December, 1963, p. 6. (Mimeographed.)

[2]Ibid., p. 1.

develop a centralized data system. The goal was, however, to develop a system for each of the participating governmental agencies, whereby their data output would be compatible with all other data of that nature within the metropolitan area.

The techniques to be used to develop this system will include a detailed survey of each of the participating governmental units to ascertain their methods of collection, classification, coding, storage, and processing of data relating to land use and housing conditions. An analysis also will be made of uses of the data for planning purposes. At the conclusion of the survey, a catalogue will be prepared that will relate the land use and housing characteristics data systems of each jurisdiction with one another. In addition, a manual will be prepared which will describe in detail the recommended procedures to be followed by each jurisdiction in order to implement the uniform classification system.

The Demonstration Grant application pointed out some of the benefits which might accrue to other metropolitan areas through the successful execution of this project. The benefits listed were as follows:

a) Others will be able to recognize that it is possible for local governments, even in a large interstate area, to agree on comparable classifications and procedures which will produce comparable data.

b) The ways that local jurisdictions can adapt operating procedures to create comparable systems, with a minimum of dislocation, will be explored and demonstrated.

c) The usefulness of having available such comparable data, and the savings in terms of time, effort and usability of data, as well as funds, will be demonstrated.

d) A successful demonstration will reveal the pitfalls to be avoided, rendering less costly the repetition of such an effort in other metropolitan areas.[1]

While the project, in itself, is a rather formidable task, it is somewhat limited in scope. It does, however, represent a highly significant step in terms of enlisting the cooperation of a large number of governmental units to improve the comparability of data originating from diverse sources. One major omission in the work program, however, was a procedure for measuring the reliability and accuracy of the data. Even though the data are classified uniformly, there also must be techniques included to insure quality control, if the data are to be truly comparable. This might have been merely an oversight in the wording of the application and perhaps may be included in the detailed procedures manual.

METROPOLITAN DATA CENTER PROJECT

The Metropolitan Data Center Project represented a bold attempt of a group of metropolitan planning agencies to establish a comprehensive, integrated data processing system which would be a valuable aid in making sound decisions about

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[1]Metropolitan Washington Council of Governments, "Supplement to Demonstration Grant Project Application," Washington, D.C. (no date), p. 4. (Mimeographed.)

urban planning, renewal, and related activities.[1] The idea was conceived by several planners in the midwest during early 1960. This idea was crystallized further by the regional director of the Urban Renewal Administration who proposed that a cooperative effort be undertaken which would involve several interested planning agencies. Representatives of these agencies met to discuss the proposed project and in July, 1961, submitted an application for a Demonstration Grant to the Urban Renewal Administration.

The principal objectives of the project, as stated in the application, were as follows:

a. to study the feasibility of and problems involved in establishing contralized data processing systems using modern electronic computer equipment and covering land use, housing conditions, occupancy and related environmental factors;

b. to design and test such a system, using readily available land use, housing and environmental data in the files of collaborating agencies.

c. to develop methods and procedures for expanding the scope and use of the system as more comprehensive data becomes available and for keeping the data file current at all times through collaborative arrangements with public and private agencies expected to make use of the system.[2]

In essence, the Metropolitan Data Center Project was created for the purpose of "exploring how expanding data processing

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[1]Robert L. Wegner, "Metropolitan Data Center Projects," Public Administration Review, XXII, No. 3 (September, 1962), p. 145.

[2]Metropolitan Data Center Project, "Application for Demonstration Grant," submitted to the HHFA by the Tulsa Metropolitan Area Planning Commission, Tulsa, Oklahoma, July, 1961, p. 3. (Mimeographed.)

equipment capabilities can be applied to handling data for urban planning."[1]

The five planning agencies involved were: The Planning Office of the City and County of Denver, Colorado; the City of Fort Worth, Texas; the Metropolitan Area Planning Commission of Pulaski County, Little Rock, Arkansas; the Tulsa Metropolitan Area Planning Commission, Tulsa, Oklahoma; and the Wichita-Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas. Each contributed staff and related services to make up the one-third local share of the total Project cost. A central staff, based in Tulsa, had the responsibility for the overall coordination of the Project.

The immediate objective of the Project was to develop a uniform data system and a battery of computer programs which could be utilized by all of the participating agencies.[2] Each agency was asked to formulate and test a specific application of the data to an existing situation. The "application focus" of each of the participating agencies was the following:

Denver - Comprehensive Land Use Inventory

Fort Worth - Central Business District Planning

Little Rock - School Facility Planning

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[1]Metropolitan Data Center Project, Interim Report (Tulsa, Oklahoma: Metropolitan Data Center Project, October, 1963), p. 1.

[2]Ibid., p. 4.

Tulsa - Community Renewal Program and Related Urban Renewal Submittals

Wichita - Capital Improvement Program

The purpose of having each agency develop its own "application focus" was to examine the data requirements for each of these planning programs. Moreover, the techniques developed by each of the agencies in dealing with specific problems could be shared by the others later.

The first year of the Project was spent setting up the administrative structure, refining the goals and objectives, developing a systems concept, and establishing a detailed work program. During that time, it was reasoned that the Project should attempt to develop:

1. standard individual parcel record containing all items needed for all applications of interest in all five agencies (noting that all agencies would allow for this same parcel record but that, no agency would carry all items at the outset);

2. computer program for accepting the data for creating and updating the basic parcel record file;

3. generalized computer retrieval program to extract and provide data in any specified form and/or combination; and

4. performance of the following by each agency on a specific test basis:

    a) identify needed for specific application(s) and assemble these data for selected parcels,

    b) enter these data into parcel file,

    c) establish a system for maintaining current data,

    d) test the systems and procedures which cause the data to flow into the data center, and

e) test the retrieval program on these parcels and these data.[1]

One of the major accomplishments of the current work program has been the identification of the specific types of data which should be incorporated into the system. An extensive screening method was used to determine which data to include. Initially, a comprehensive list of possible data items, relating to parcels of property, was compiled by the RAND Corporation, a consultant to the Project. This list then was circulated to each of the participating planning agencies who then selected particular items which they felt would be useful in their "application focus." This selection, in turn, was reviewed by other planning consultants, and certain revisions were suggested. Then a composite list was prepared, and after careful review by the participating agencies, it was refined further until finally a Consolidated Master Data Item List was developed. After this phase was completed, each agency undertook a survey to determine the nature and sources of the data items which they had selected. Then test areas were selected, and systems and procedures were established for the collection and maintenance of the data within the test areas of each cooperating agency. Meanwhile, computer programs have been developed to permit updating of the data, retrieving the data from the parcel file, and reporting them in a variety of formats.

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[1] Ibid., p. 6.

In recent months, the Project has held a series of Educational Demonstration Conferences. The purpose of these meetings was to illustrate some of the capabilities of the data system to interested observers.[1] Although it was evident that the system had great potential as a decision-making tool, it also was apparent that there were several limitations. Hopefully, some of these shortcomings will be overcome through further research and development.

Some of the problems currently associated with the data system are the following:

1. High cost of information retrieval--Although actual cost figures are not available at present, it was indicated that several requests for data must be accumulated before it becomes economically feasible to extract data from the master file. One reason for this is that the record length (number of data items) for each parcel is so long that it takes considerable computer time to run through the entire tape file.
2. Time lag between request and output--Several days are required to process a request for data. Even though there are standard programs available for routine tasks, each request requires some additional

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[1] One of these Conferences was attended by Richard Duke, Associate Professor at Michigan State University, and Allan Schmidt, Assistant Project Director at the Tri-County Regional Planning Commission. Many of the comments which follow are a result of discussions with them concerning the Metropolitan Data Center Project.

instructions to be written in computer language. Moreover, the current state of the art is such that the computer often does not produce the expected results when first attempted. Instructions must be modified, mistakes corrected, and the program executed again. In the first two Educational Demonstration Conferences, only nine of the fourteen retrieval experiments attempted worked exactly as planned. Another factor contributing to the time lag is the difficulty in obtaining access to a computer when it is needed.

3. Infrequent use of data system--Although the system has not been in existence long enough to test its acceptance and utility by potential data users, there is some question as to whether there is sufficient demand to justify the cost of maintenance. For example, in Little Rock, as of June, 1964, the data system had been used only six times.[1] But infrequent use probably should be expected during the early stages in the development of this type of system. The underlying philosophy in the creation of the system seems to have been the selection of those data items which appeared to have the most

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[1]Frank William Brutt, "The Value and Use of a Land Inventory Data Bank and Electronic Data Processing as Used in the Determination of Solutions of Planning Problems," Unpublished Master's Thesis, Department of Urban Planning and Landscape Architecture, College of Social Science, Michigan State University, 1964, p. 92.

utility for particular planning applications and to delay working out the details of how the data would actually be used until after the data system was automated. In other words, it was a case of supply preceding actual demand. It can be anticipated, however, that as more sophisticated techniques of analysis are developed, more use will be made of the data system. Nevertheless, it would seem that the contents of the data system should be reevaluated to determine if some of the seldom-used data items could be eliminated at this time. This also would bring the cost of operating and maintaining the system down to a more reasonable level.

4. Lack of locally-based technical ability--Most of the detailed technical work involving the computer programming aspect of the Project was done by a consultant under contract. And although during the initial stages of the program there was close liaison between the Project staff and the consultant, the staff does not have complete knowledge at present of how the programs actually work. Thus, while it is possible to operate the programs provided by the consultant, they have not been provided with sufficient information about the programs to make even the slightest modification or alteration. This becomes a very serious problem, especially if the staff is expected to satisfy a variety of requests

in their community at a minimum expenditure of time and money. Hopefully, this situation will be rectified in the near future. But at present, the Project staff is limited in its control of the operation.

5. Limitation on types of data manipulation--The present abilities of the system allow few opportunities for complex analysis of data. In essence, the programs only can retrieve and summarize the data on the tape file. This, in itself, can be extremely valuable for certain types of studies. For example, it is possible to run programs which will compare existing land use with the zoning classification for an area to detect non-conforming uses, or to estimate land acquisition costs for a proposed expressway by tabulating the assessed value of all properties which will be in its path. However, programs have not been developed for carrying any complex statistical interpretations. It would appear, however, that this deficiency could be overcome without too much difficulty. Standard programs are available to do other types of statistical analysis. But because of the limited capacity of the computer which is available to the Project, certain adjustments would have to be made. One alternative would be to create a smaller tape file from the master data file. This would allow a moderately complex problem to be run on their IBM 1401

computer. Another alternative would be to obtain access to a computer with more capacity.

6. Expensive development and maintainence of data system--It was recognized early in the Project that the creation and maintenance of a large-scale data system are not within the resources and capability of most planning agencies. The success or failure is almost completely dependent upon the degree of co-operation provided by other agencies in terms of supplying the necessary data and helping to finance the total operation. Very few planning agencies would be able to carry on this type of function on their own. In addition, if the planning agency were the sole user of the system, it would be difficult to justify its continued operation.

The above comments were not intended as criticisms of the accomplishments of the Metropolitan Data Center Project. Certainly, one of their purposes in undertaking this effort was to uncover the problems, as well as the opportunities, associated with an automated data system. Because of the experience gained by the Project, the transition to an automatic data processing system will be much simpler for a great number of planning agencies throughout the country.

HEARLE AND MASON'S PROPOSAL FOR A DATA PROCESSING SYSTEM FOR STATE AND LOCAL GOVERNMENTS

One of the most important contributions to date in the development of the data system concept has been made by Edward Hearle and Raymond Mason of the RAND Corporation. Over the past few years, they have done extensive research toward the development of the conceptual framework for a data system. The results of these efforts are contained in their recently-published book entitled, A Data Processing System for State and Local Government. The objective of their research was to "provide government officials and other interested persons with an analysis of long-range possibilities and preferred approaches to utilizing advanced data processing equipment to support the functions of state and local agencies."[1]

In the introduction, the authors state that several guide lines were used in developing their approach to the subject. First, state and local government was to be viewed in terms of the total complex of functions which they performed, without regard to which agencies within the governmental structure were responsible for each function. Second, the study would deal with concepts rather than detailed procedures. Third, the study would be futuristic in that the data system would be designed to accomodate "both the new technologies of data processing and the rapidly-expanding

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[1]Hearle and Mason, op. cit., p. v.

functions of state and local governments."[1] Fourth, the study would concern itself with data processing and not necessarily involve computation and manipulation of data within the system, although the system is designed to provide these capabilities.

The book begins with a description of the basic characteristics and capabilities of the various components of data processing equipment. The emerging technological developments in equipment capability and some implications of these advancements also are discussed. The authors predict that "by 1970 to 1975, the technological capabilities of information-handling equipment will be sufficient to handle any foreseeable data processing task required by state and local governments."[2]

The next chapter indicates the basic functions of state and local government. These functions are identified under these major categories:

Correction - Probation	Public Welfare and Security
Culture - Recreational	Public Works
Education	Regulation and Licensing
Natural Resource	Sanitation
Protection to Persons and Property	General Government
Public Health	Proprietary

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[1] Ibid., p. 2.

[2] Ibid., p. 10.

This section of the book also deals with the organizational structure, relationships, and significant characteristics of state and local government. Finally, the significant trends which will affect the design of the data system are defined. The authors derived the following assumptions concerning the future:

1. Population will increase, particularly in urban areas.
2. State and local government services will expand, probably faster than population growth.
3. Within the organization of state and local governmental agencies, the leadership and control of the central executive officer will increase, and consequently, the independence of functional departments will decrease.
4. There will be continued expansion in intergovernmental relationships.
5. Some form of area government for dealing with metropolitan problems will evolve in many places.
6. Certain functions will expand rapidly as state and local governments respond to demands for public services.
7. Revenues to support these growing services will continue to be scarce, and it seems likely that the broader revenue base available to state governments will be drawn upon increasingly to provide support by means of subventions to local governments for functions performed at the local level of governments.
8. The administration of state and local governments will become more professional.[1]

In essence, the authors view the trend in state and local government as moving toward greater expansion, integration, standardization and professionalism.[2]

One of the more important aspects of their research was the identification of the data which is utilized in carrying out the various functions of state and local

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[1] Ibid., pp. 25-27.

[2] Ibid., p. 27.

government and the organization of these data into a meaningful form. This organization of data was accomplished by looking at the universe of available data in terms of what each item describes, rather than in terms of who uses it and for what purpose. This led to an initial organization of data into two classes. One class related to the types of data used to carry out the internal operations of the government agencies themselves, such as payrolls, employees, equipment, etc. The second class of data related to the environment in which these agencies operate and for which they are responsible. It is the second category which lends itself to incorporation into a centralized data system.

Based on the assumption that all of the functions of government are related to people and property, environmental data was further classified into three categories: persons, real property and personal property. Within these classifications, a comprehensive list of specific data items, describing persons and property, was assembled. This list is identical to the one submitted to the Metropolitan Data Center Project during the initial phase of their data selection process.

The remainder of the book contains a detailed proposal for a "Unified Information System: which, the authors contend, would be entirely feasible by the 1970's. The basic objectives for the establishment of the system were to "reduce duplication in the collection, storage, and processing

of data used by state and local governments and to increase the accessibility and usefulness of these data."[1]

The organizational structure recommended by the authors placed the Unified Information Center as a separate public agency, serving all units of government but organizationally removed from any one of them. The organizational position of the Center appears to resemble that of a Special District. It would be created by a collective action of a group of governmental units and be responsible to them. The activities of the Center would be supervised by a board of managers elected by the participating units.

It was stressed that the Unified Information Center should be a state-wide function. But the Center did not have to be physically located in one place, although it was pointed out that this would be technically possible with advancements in computer equipment and communications. The authors were inclined toward the creation of several locations which would be linked together by a communication network, as they would function logically as a single Center. The entire operation of the Center would be financed through charges to users. Eventually the Center would be self-supporting, but initially, a legislative appropriation would be required to set the project in motion.

Simply stated, the primary functions of the Center would be storing data, processing data according to the

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[1] Ibid., p. 50.

requirements of the users, and supplying data as needed. However, in carrying out these functions, it would also serve in a more important capacity as "the central element of a comprehensive system in which all phases of data handling are related by coordinated procedures."[1] In this regard, some of the administrative responsibilities suggested by the authors would be:

a) standardization of data terminology and development of uniform coding procedures,

b) instigation of data-gathering activities to fill informational gaps,

c) provision of competent computer programmers and technical people to carry out data processing instructions from participating agencies, and

d) development of techniques for insuring the confidentiality of the data.

The authors discussed, in some detail, the various activities in which the Center would be involved and how these activities would be accomplished. The topics covered included the characteristics of data generation and the techniques and instruments by which data might be collected; output from the Center, both in printed form and visual display; the communication networks which link the Center with the participating agencies and with all other Centers in the state; a description of the data files; and the actual

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[1] Ibid., p. 51.

processing of data, including data editing, retrieval, and statistical computations. In total, the general approach was well-conceived, and the steps toward implementation were covered in considerable detail.

While the concept of a state-wide Unified Information Center appears to be a very worthwhile goal, there may be points at which it is somewhat vulnerable. One element of the system, which appears to be a major weakness, is that it operates "entirely independent of the purposes of procedures for which the data are used."[1] This would seem to constrict a valuable feedback function which is necessary to evaluate the effectiveness of the system. And although the authors state that the Unified Information Center "simply provides a technological facility to file data and to process them according to instructions,"[2] it would appear that its responsibilities should go a step further to include analysis and projection. This function possibly could be housed in a separate agency, but logically, it should be incorporated into the Center. The mere existence of a wide range of data, although a valuable aid, will not necessarily improve the quality of governmental decisions. It would seem that some function of government should acquire a pool of technically-competent people whose function would be to point out existing

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[1] Ibid.

[2] Ibid.

problems and emerging trends and to simulate the effects of certain major decisions.

LOS ANGELES CITY PLANNING DEPARTMENT

A very significant milestone in the development of metropolitan data systems was reached in Los Angeles in 1959. A study produced for that city by Stanford Optner and Associates, entitled Report on the Feasibility of Electric Data Processing in City Planning to the Department of City Planning of the City of Los Angeles, examined for the first time the application of the concepts of systems analysis to city planning. This study represents a unique effort because of its comprehensive approach to the design of an automated urban information system for city planning.

The basic tasks, which were undertaken by Optner in the study, were:

1. an assessment of how to use existing and otherwise available data as part of an electronic data processing system,
2. an evaluation of the practicability of dealing with the Los Angeles Master Plan as a computer application,
3. the design of a proposed data processing system which would encompass zoning, planning, and Master Plan information,
4. flow charts, notes and visual material to describe the proposed systems in sufficient detail to provide a point of departure into final, detailed system design,
5. a statement of the objectives of the planning function in the City of Los Angeles, and the contribution which can be made by electronic data processing.

6. the outline of specific systems or programs aimed at achieving the objectives,

7. the recommendation of an organization and method of operation best suited to execute and maintain the systems and programs, together with cost estimates of establishing these operations.[1]

In essence, the purpose of the study was first, to investigate the feasibility of using systems tools in city planning, and secondly, to outline how these tools might be utilized.

The initial task which Optner undertook was to examine the various functions and operations of the Planning Department and to isolate these into component systems. After defining the characteristics of each of the systems and the purposes and goals for which they existed, a decision was made concerning which systems were to be included in the study.

The basic elements of the overall system, as designed, consisted of a master plan system (which included population estimation, land use, schools, parks, public works and circulation subsystems), a plan effectuation system and a planning economics system. All of the systems and subsystems were to be compatible and integrated into a single master tape file. This permitted the application of simulation techniques to describe the effects of a change in any one of the subsystems on all others. The ultimate

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[1]Stanford L. Optner and Associates, Report on the Feasibility of Electronic Data Processing in City Planning to the Department of City Planning--City of Los Angeles (Los Angeles: Stanford L. Optner and Associates, January, 1959), p. ii.

objective of the program was the integration of all elements of the Master Plan into one responsive computer system against which every planning and zoning action could be evaluated.

To accomplish this objective, a series of mathematical models were developed for each of the subsystems. The relationships between all of these individual subsystems are expressed in terms of what Optner designated "design conventions or design standards," which would enable the planner to evaluate the degree of conformance of existing land uses, or future uses, to the master plan.[1]

An example of the many ramifications, which could be observed if the system were operational, was described by John V. Gifford as follows:

> A change in population, however it might come about, and whether it is concentrated in one area or dispersed, will change the need for housing which will affect residential land values. It will affect land use through the demands which it makes for different kinds of use, including both housing and employment connected uses. The circulation system will be affected by both the change in population and resultant land use change, which will extend to the way in which the various land uses are held together by the circulation pattern. Added to this are the altered requirements for commercial services that will arise, schools, public facilities, and public works of various kinds, and not least, the economic resources necessary to underwrite these changes. This last, of course, will have further repercussions on the population at large through taxation changes, variations in the amount of money in

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[1]John V. Gifford, "The Urban Information System as a Research Tool," Paper presented at the Joint Annual Western Regional Meeting of the Operations Research Society of American and the Institute of Management Sciences, University of California, Berkeley, Calif., April 11, 1963, p. 6. (Mimeographed.)

> circulation, etc. Some of these changes will feed back into the original systems causing additional differential changes.[1]

These are essentially the steps which an urban planner would attempt to take if he had the time and manpower to research completely an important change which took place. The system recommended by Optner attempts to duplicate this process internally through the use of electronic data processing techniques.

The Planning Economics subsystem is designed to provide a means for the Planning Department to evaluate the economic consequences of a particular proposal. In effect, it adds a dollar dimension to planning actions and thereby performs a cost-benefit analysis of an anticipated planning action.

The purpose of the Effectuation Systems is to make available a complete inventory of all current, past, and pending zoning actions. This system would be used to provide data on all cases with comparable problems. By developing an indexing method for easy retrieval of relevant data, the planner will be able to sort through thousands of cases with precision and speed.

In summary, Optner's proposal suggested an optimum goal of automating the elements of the master plan into a

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[1]John V. Gifford, "Memorandum on the Application of System Engineering and Data Processing to City Planning," February 4, 1959, p. 4.

total system so that, through simulation and other statistical techniques, the effects of policy decisions could be evaluated.[1] Although the proposal has considerable merit, it will take a great deal of time and effort before the system can be made operational. Some of the problems to be overcome were pointed out by Glenn O. Johnson, of the Los Angeles Department of City Planning:

> Several assumptions made by Mr. Optner were noteworthy. For example, it was assumed that an automated land use and zoning inventory was available for the City; a common statistical unit of measure was agreed upon by various agencies; a land use classification code existed; and that residential, commercial and industrial standards have been determined. These assumptions were made by necessity but nevertheless reflect the missing gap between our status in 1958 and complete implementation of the electronic data processing programs. It is to this gap to which we are addressing ourselves currently.[2]

A major effort currently is being directed toward the establishment of an Automated Planning and Operational File which would serve several City departments. One of the principal justifications cited for such a file was that in recent years, the City had spent hundreds of thousands of dollars annually in the development and maintenance of automated data systems and programs and that in order to realize a maximum benefit from this investment, an integrated system must be developed. It was pointed out that the longer the delay in establishing such a system, the greater the

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[1] Letter from Glenn O. Johnson, City Planner, Department of City Planning, City of Los Angeles, March 25, 1965.

[2] Ibid.

difficulty and expense to the City when it finally decides to coordinate the various departmental systems.

The proposed Automated Planning and Operations File closely resembles the system devised by Hearle and Mason in A Data Processing System for State and Local Governments. It is a user-adaptive system which is defined as a "system of programs that performs file construction, file updating, information retrieval and analysis, and data input and output in any manner that the user specifies."[1] The system is designed to operate solely around the data items themselves and the objects they describe, and thus there supposedly would be no disruption in existing governmental organization or procedure.[2]

In order to test the feasibility of establishing such a system, a pilot study was conducted in a one-square-mile area in the city. A data file was developed which consisted of a large variety of statistical information related to land use. A total of eighty-seven data items, consisting of 450 characters of information, were collected and recorded for each of the 2600 parcels in the area. Among the data items assembled were: assessed value; parcel size; existing and proposed land use; topographic characteristics; existing and proposed zoning classifications; parking

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[1] Subcommittee on the Automated Planning, and Operational File, "A Proposal for the Establishment of an Automated Planning and Operational File by the City of Los Angeles" (no date), p. 18.

[2] Ibid., p. 21.

spaces; number of dwelling units; floor area; decade built; type of construction and condition; street improvements and characteristics; owner's name and mailing address; and various geographical area indices. After completing the file, several demonstrations of its capability were held for interested parties within the City government. Although the system performed satisfactorily for a variety of applications, it readily was apparent that the cost of developing and maintaining the automated file on a city-wide basis was beyond the financial resources of the Planning Department.

A concerted effort is being made to establish the Automated Planning and Operations File as an ongoing function of the City government, but thus far, this proposal has been met with a mixture of resistance and apathy by the City Council and the City Administrative Office.

The establishment of the system undoubtedly would provide a valuable resource for decision making, especially within the Planning Department. A major benefit would be the opportunity to develop simulation techniques along the lines suggested by Optner. However, there is the nagging question of whether the cost of development and maintenance of the Automated Planning and Operations File can be justified in relation to its expected use. A dilemma immediately seems apparent in this regard. In order to hold the costs to a minimum, only a limited number of data items may be included. But by reducing the variety of data available in the system, its utility to the various departments in the

city is greatly diminished, perhaps to the point where their support would not be warranted.

Thus, if a "user-adaptive" approach is to be used, it appears that there is some threshold of magnitude and flexibility which must be reached before the system can become operational. Based on the results of the pilot study, the Planning Department recommended a file which would include 64 data items. Of these, 22 relate to various geographic parcel identifications, 16 are used to describe the characteristics of the parcel, 15 are concerned with building data, 6 indicate street improvements, and 5 are used for administrative data, such as the owner's name and address. It is difficult to ascertain whether these data items have widespread use and whether other valuable data have been omitted without a detailed study of the operating characteristics of each of the potential users of the data.

Before proceeding toward a city-wide data system, perhaps it would be wise to undertake additional experiments in the pilot area. Each operating department might be given the opportunity to gain additional experience with the pilot system and suggest modifications affecting their activities. Additional data concerning population characteristics also might be included in the pilot system. It would seem that the time and effort spent developing a truly effective and economical system in the pilot area would be an extremely worthwhile investment rather than compounding mistakes on a city-wide basis.

PENJERDEL METROPOLITAN DATA BANK

The Penjerdel proposal is noteworthy because of the wide range of activities which were proposed and because of its emphasis on serving the needs of the business community. The impetus for developing the system originated with the Greater Philadelphia Chamber of Commerce. During 1959-60, the Economics and Taxation Council of the Greater Philadelphia Chamber of Commerce conducted a survey to determine the demand for an area-wide statistical service. Fifty-two large firms and civic organizations, located in the eight-county Philadelphia-Camden Standard Metropolitan Statistical Area, were interviewed. The results of this survey were optimistic and indicated to the Committee the need for a more detailed analysis of the feasibility of creating and maintaining a statistical service.

The Chamber of Commerce applied for a grant from the Pennsylvania-New Jersey-Delaware Metropolitan Project, Inc. (Penjerdel) to cover the cost of preparing the overall design of the statistical service. Penjerdel, a non-profit, non-governmental agency, whose principal functions were (1) to stimulate and sponsor research, principally at colleges and universities in the region, into matters of significant regional concern, and (2) to disseminate information and research findings to the region's citizens, including those principally responsible for the private and governmental decisions affecting the region's future, agreed to provide

financial assistance for the project. The Wharton School of Finance and Commerce of the University of Pennsylvania, commissioned to carry out the research and design, contributed the necessary matching funds.

The objectives of the proposed statistical service were set forth at the beginning in the memorandum of agreement between the University and Penjerdel which stated:

> The general purpose of the proposed Service is to provide systematic current data on pertinent economic activity and other significant phenomena in the Penjerdel area as a central service to business firms and public agencies in that area. The data to be made available will be those required for sound and knowledgeable decision-making by such firms in planning their future programs, and will include data on changes in the size and composition of the population, personal and family income, residential and other construction, consumers expenditures, employment and other statistical series widely used by such firms or agencies.[1]

The study area encompassed eleven counties in three states, including the Standard Metropolitan Statistical Areas of Philadelphia-Camden, Wilmington and Trenton.

After conducting additional research, which included interviews with approximately 75 firms and agencies in the region and certain national firms headquartered in New York, it was concluded that the data requirements of the business community were much the same as those of public agencies. It was stated further that "if an area data service provided the full range of statistical information and services desired by governmental units and health and welfare agencies,

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[1]Alderson and Shapiro, op. cit., p. 56.

it would automatically meet the needs of the various types of business firms located in the Penjerdel region."[1]

The overall design of the regional data system, as envisioned by the research team of the Wharton School, consisted of five separate but related data services. These were termed (1) data utilization center; (2) land use, parcel card inventory; (3) location and traffic; (4) regional accounts; and (5) capital expenditure evaluation. The data utilization center provided the backbone for all the other data services and, therefore, was given the major emphasis.

The data utilization center, as conceived, would have two primary functions. The first would be to improve the quality, usefulness, and comparability of existing statistical resources. This function was to be fulfilled through the following activities:

1. development of uniform standards and definitions for use by those who collect data,
2. agreement upon a uniform method of geographically classifying the sites at which activities take place, people work or live, and property is located,
3. the use of methods to adjust for and partially overcome incomparabilities in data when changes in collection procedures cannot be made,
4. the utilization of obscure, partially-hidden data collected by governmental units and utilities as a by-product of other normal activities, and
5. participation in the design of all specialized studies, one-time projects, and new data collection programs.[2]

The second major function was to provide a centralized service for the storage, processing and dissemination

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[1] Ibid., p. 60.

[2] Ibid., pp. 56-57.

of widely-used statistical information. Some of the activities proposed under this category were:

1. the development and maintenance of a repository of commonly used data,
2. the establishment of a statistical service unit that would provide information on sources to consumers of statistics faced with data problems,
3. the centralized preparation of intercensal estimates of population, housing, income, and other key variables,
4. the development of programs designed to make census data and census operations more useful to the community, and
5. the development of a publication program that would economically disseminate metropolitan data.[1]

While the establishment of the data utilization center was considered to be the most valuable element in the entire program, it was indicated that a more ambitious program was needed to satisfy more specialized data needs.

The land use parcel card inventory was recommended to provide up-to-date information concerning land activity and the people who use the land. The property data were to be collected through secondary sources and field surveys. Various socio-economic population characteristics would be obtained through interviewing residents selected in a random sample. The location and traffic study would concern itself with migration, the flow of goods and people among various activity centers, and the interrelationship between these activity centers.

The preparation of regional accounts would provide an analytical device similar in scope and coverage to what

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[1] Ibid., p. 57.

is now available on the national level.[1] The economic indicators were to be developed only at the regional level and primarily would be of interest to regional planning agencies, large business firms, and federal agencies. The capital expenditure evaluation model for new facilities would deal with cost-benefit analysis of major expenditures. This was intended to be utilized by public agencies contemplating a major public improvement, or individual firms selecting new business locations.

It was proposed a data service be under the jurisdiction of a non-profit corporation or quasi-governmental agency. The operation was conceived of as essentially that of a brokerage service for the Penjerdel region. It was recommended that the bulk of the required financial support be obtained from foundations or the federal government. Local contributions would come from the major business interests in the community. However, some question was raised concerning the legality of restricting the use of the statistical services to contributing agencies and firms when federal and foundation funds would provide the major support.

The final report by the Wharton School was never formally acted upon by Penjerdel. Over a period of several months in 1963, the basic ideas were discussed by committees representing both Penjerdel and the Penn Jersey Transportation

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[1] Ibid., p. 58.

Study. When Penjerdel suspended its program activities last summer, the project became inactive.[1]

Much of the details concerning the operation, organization, costs, and financing of the proposed data service are contained in a 250-page report which was never released to the public. It, therefore, is difficult to cite specific advantages and disadvantages of the proposed system. However, based on the summary review of the project, as described in the Summer issue of Business Horizons, it is obvious that the system was designed to encompass a wide variety of subject matter. It appears to have been an extremely ambitious undertaking. As noted earlier, Washington, D.C., has modified their objectives to include only the standardization of nomenclature and procedures for land use and housing conditions, and this is expected to cost $180,000 and take two years to complete. The cost of developing the data utilization center, which would include a variety of data items in the extensive Penjerdel Region, would, in itself, constitute a considerable initial investment. Nevertheless, there is merit in developing an optimum goal in terms of data accessibility and utility and then scaling the project down to that which is feasible at present.

But the real problem does not lie in the technical or economic feasibility of operating the data system. It

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[1]Letter from Barbara Terrett, former Research Coordinator, Penjerdel, Philadelphia, Pa., March 29, 1965.

probably can be demonstrated that present technology is already capable of accommodating such a system; and that it is far less expensive to establish a centralized data source than to tolerate excessive duplications and wasted effort. The real problem, then, is convincing the potential users of the value of the system. In the case of Penjerdel, the idea failed to progress beyond the committee discussion stage. The same could be said for almost every proposal thus far in this country concerning regional data systems. It seems imperative that key governmental leadership must be involved to begin the process of implementation.

PITTSBURGH DEPARTMENT OF CITY PLANNING'S CENTRALIZED INFORMATION SYSTEM

The data system activities which have been reviewed thus far have consisted primarily of feasibility studies on small-scale pilot programs. Pittsburgh has proceeded far beyond that stage to a fully-operational automated data system. Although their efforts in this field began less than five years ago, they have produced remarkable achievements.

Faced with the problem of inadequate and obsolete data on which to develop a Community Renewal program and the realization of the need for a continuing inventory of real property data for many planning purposes, the Pittsburgh Department of City Planning, in the Fall of 1960, initiated a program to collect, standardize, and record a variety of land use data. It was recognized from the beginning that in

order to cope with the problems of volume and speed, these data should be put into a mechanized system. Thus, selected data were recorded on I.B.M. punch cards for each of the approximately 155,000 parcels in the city.

During the two years which were required to complete this project, there was an increasing awareness that the existence of these data, would not be sufficient to satisfy the requirements of a modern and comprehensive community planning and renewal effort.[1] Attention was then focused on the area of policy decision-making to determine the types of planning and development problems which had to be resolved by municipal policy makers and to ascertain which types of data would aid in solving these problems. This approach, coupled with the Planning Department's intention of developing models to simulate the economic and social consequences of alternative renewal policies, pointed the way toward the establishment of centralized information system.[2]

Once this course of action was decided upon, formalized arrangements were made with many local and state agencies and departments in which it was agreed that they would supply certain selected data in a format specified by the Planning Department. The following are examples of the kinds of data which have been, or will be, gathered on a continuing basis:

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[1]Pittsburgh Department of City Planning, Data Processing, C.R.P. Progress Report, No. 3 (Pittsburgh: By the author), p. 2.

[2]Ibid.

Land Use Changes - building permits, occupancy permits, permits for alterations and repairs (including demolitions), licenses issued
Property Transactions - including the names of the people involved and the selling price
Population Changes - through a triannual school census which will be expanded to include a 100% enumeration
Assessment Changes
Tax Delinquencies
Capital Improvements
Street Vacancies
Zoning Changes
Building Condition
Migration - inter-city and intra-city
Employment - occupation by place of work and residence
Unemployment - duration, etc.
Births and Deaths
Personal and Earned Income
Total Earnings and Salaries
Public Assistance - including public and social welfare caseloads, public medical care, food stamp programs, etc.
Criminal Convictions - adult and juvenile

All of these data have been, or will be, recorded by a uniform geographic unit. In order to insure that some degree of comparability of data could be maintained, the Pittsburgh Department of City Planning devised a spatial classification system which permitted aggregation and disaggregation of specific spatial units. After considerable study, it was decided that the needs of the data system could be served best through the establishment of the city block, or some approximation thereof, as the least unit for which data would be collected. Nearly 4,000 of these units, which were called data blocks, were delineated and mapped withing the City of Pittsburgh. These blocks could be combined to form any one of 29 administrative or functional districts. The following are some examples of the types of areas for which data might be summarized:

Census Tracts	Public Welfare Districts
Police and Fire Districts	Capital Improvement Districts
Transportation Zones	Recreation Areas
Health Districts	Public Housing Projects
School Districts	Political Wards
Diocese and Parishes	Meter Reading Routes

Thus, data could be grouped and compared for a multitude of purposes.

At present, there are eleven major agencies which are actively participating in the program. These are:

City Treasurer's Office
Bureau of Building Inspection
Department of Public Works
Department of Lands and Buildings
Department of Parks and Recreation
Urban Redevelopment Authority
Board of Education
Allegheny Health Department
Pittsburgh Area Transportation Study
State Tax Equalization Board
Real Estate Statistical Service (private firm)

Several other agencies also have contributed significantly to the project. For example, the City Law Department presently is putting all laws and statutes of the City and State into an automated system. When this is completed, it will be possible to search all the legal documents pertaining to a particular subject in a matter of minutes, merely by specifying a few key words which define the subject area.[1]

Most of the data which is stored in the centralized system has been obtained through a series of "trade-offs." The participating agencies generally agreed to provide the

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[1]Interview with Richard Guenther, Director of Research, Pittsburgh Department of City Planning, July 18, 1963.

specified data in the required format in return for the right to have access to other information which was stored in the system, subject to mutually agreed-upon constraints on confidentiality. In addition, the Planning Department provided advice to the various agencies upon request concerning techniques for improving their accounting procedures. The Planning Department also agreed to process certain types of data for analysis and produce reports, if possible. The participating agencies needed only to acquire relatively inexpensive key punching equipment, since the complex processing of data is handled by the Planning Department computer equipment.

Despite the relative success of the Planning Department's efforts in maintaining the data system, there have been some major problems. One of these has been the inability to fulfill many requests for specific data outputs. Each request necessarily requires a program to be written to extract the data in the form desired. And although there have been over 100 programs written for obtaining various types of output, it has been difficult to keep up with the requests. Occasionally, the data system does not perform as expected, and the desired answers are not provided. A major contributing factor has been the inability to retain qualified and experienced personnel to overcome the technical obstacles inherent in any automated system.[1]

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[1]Pittsburgh Department of City Planning, op. cit., p. 4.

The major problem, however, has been the severe drain on the budget which is caused by the maintenance of the data system and the unforeseen demand by various agencies. This has caused the Planning Department to reconsider its obligations. Much of the data incorporated into the system had specific value to the Planning Department for simulating the effects of alternative plans, but when this phase is completed, its data needs will be much more modest and, therefore, will not be able to afford the luxury of keeping all of the data on hand. Efforts to convince the city officials of the need for continuing the system with municipal funds have, thus far, been futile. The Planning Department, anxious to maintain the foothold that has been gained in this area, is now considering the possibility of encouraging a private firm to take over the data system and maintain it on a subscription basis.

The experience in Pittsburgh has shown that an operational data system can be valuable to a number of city departments and agencies. There is no doubt that a data system will be uneconomical during the early stages. But once it becomes operational and is utilized by various departments and agencies, its value can be tested more realistically. The major criteria should not necessarily be the absolute cost but whether the quality of the decisions are improved relative to the cost. Pittsburgh has shown that, with the proper impetus from the Planning Department, a workable data

system can be implemented. It is now up to the city officials to provide for its continuance so that its true value can be measured over the long run.

CHAPTER III

REVIEW OF MAJOR FINDINGS AND IMPLICATIONS

INTRODUCTION

While the previous chapter described each of the major data systems in some detail, this chapter will focus on five elements of these systems. These elements are objectives, approach, functions, organizations, and financing. Basic differences between the various systems will be noted, and general comments relating to each of these elements will be offered.

SUMMARY OF OBJECTIVES

All of the studies implied a long-range goal of developing a body of readily accessible statistical data which would lead toward the improvement of decision-making in the metropolitan area. In addition, the general intent was to reduce excessive duplication of data gathering activities. There were, however, some rather fundamental differences in the underlying conditions and problems to which some of the proposals addressed themselves. The following are excerpts of the stated objectives for each of the data systems:

Cleveland:

"To provide a means of evaluating present and future markets and to make available information on housing and neighborhoods of special significance to governmental agencies."[1]

Washington, D.C. (1952)

To develop a continuing statistical program for the Washington metropolitan area which would provide data for area-wide planning--with particular emphasis on data concerning water supply and pollution, transportation, and economic development.

Penjerdel:

"To provide systematic current data on pertinent economic activity and other significant phenomena in the Penjerdel area as a central service to business firms and public agencies in the area."[2]

Pittsburgh:

"The immediate objective of the Centralized Information System is to provide an information processing facility which meets the needs of the Department of City Planning. Over time, there is the intent to hopefully reduce duplication in the collection, storage and processing of data required by those public, quasi public and civic agencies who are involved in physical, social, economic, or governmental planning in the Pittsburgh area."[3]

Metropolitan Data Center Project:

To test "(a) the feasibility of establishing, by use of electronic data processing equipment, a metropolitan data center for the storage and analysis of information concerning land use, housing condition and occupancy, and related subjects including environmental factors, and (b) the feasibility of maintaining the center so that information may be kept up-to-date and be readily available to assist various

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[1]Rapkin and Grigsby, op. cit., p. 33.

[2]Alderson and Shapiro, op. cit., p. 56.

[3]Pittsburgh Department of City Planning, op. cit., p. 5.

local agencies in making sound decisions on urban planning and urban renewal problems."[1]

Los Angeles (Optner's proposal):

To automate "the elements of the master plan into a total system so that through simulation and other statistical techniques, the effects of policy decisions could be evaluated."[2]

Los Angeles Planning Department:

To create an automated planning and operations file which would "consist of all the pertinent statistical information required to meet the needs of City agencies conducting environmental and operational planning."[3]

Hearle and Mason:

"To reduce duplication in the collection, storage and processing of data used by state and local governments, and to increase the accessibility and usefulness of these data."[4]

These objectives indicate a prime concern for the improvement of the quality and quantity of local statistics. While it is implied that this will provide a valuable resource for decision-makers, there is little evidence of explicit intentions toward relating the data systems to the decision-making process. The emphasis seems to be on increasing the availability of metropolitan data rather than on developing techniques and capabilities for the effective utilization of these data.

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[1]Metropolitan Data Center Project, Interim Report, op. cit., p. 1.

[2]Letter from Glenn O. Johnson, loc. cit.

[3]Subcommittee on the Automated Planning and Operational File, op. cit., p. 2.

[4]Hearle and Mason, op. cit., p. 50.

APPROACH: "INFORMATION REQUIREMENTS" vs. "INFORMATION AVAILABILITY"

There are several approaches which might be used in establishing a metropolitan data system. But rather than being separate and distant approaches, they may be considered as being part of a broad continuum. At one end of this continuum is a data system which is developed to serve a particular, well defined need and contains only that data which is required to solve certain specific problems. At the other end is a more general-purpose system which contains a great variety of data, but the applications of these data are less explicit. These two approaches were defined by Hearle as follows:

1. The "information requirements" approach, whose objective is to design a system to handle only that information required for specific decisions and operations which have themselves been analyzed in considerable detail.
2. The "information availability" approach, whose purpose is to design a system that will handle a wide range of information, largely independent of the uses to which information is put.[1]

Each of the data systems which were reviewed in the preceding chapter can be generally classified in terms of its placement along the continuum. The following chart gives an approximate ranking of each of the data systems in terms of their approach.

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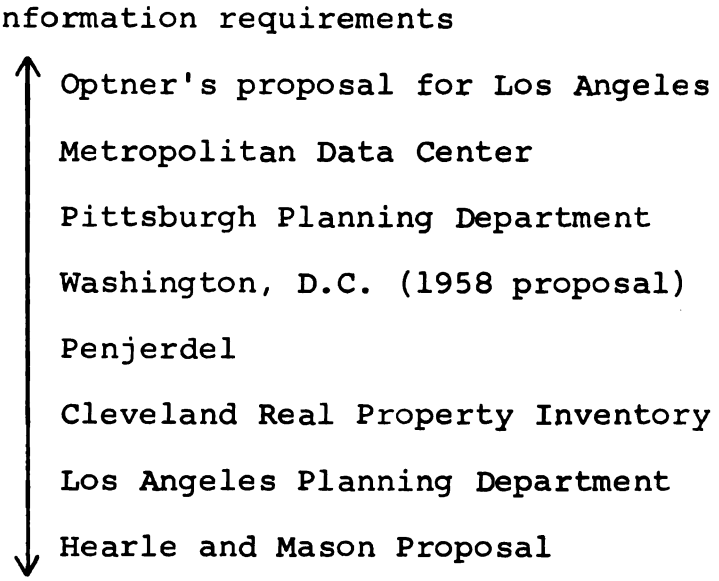
[1]Edward F. R. Hearle, "Information Systems for Urban Planning," Paper presented at the Conference on Information Systems and Programs for Urban Planning, University of Southern California, June 7, 1963, p. 3.



Optner's proposal for the Los Angeles area was strongly oriented toward the "information requirements" approach. His design attempted to establish a dynamic system which would fulfill the needs of a normal metropolitan planning program. All of the data included in the system would have a specific use in analyzing various planning problems. In most cases, the data was to be used to simulate the effects of policy decisions.

The Metropolitan Data Center also used what might be considered an "information-requirements" approach. The data, which was finally entered into the Master File, consisted only of those items which the participating agencies considered to be most useful to their particular application. But even though an extensive screening process was used to determine which data items to include, the specific use of each data item was not clearly defined. Thus, while each of the participating agencies developed a file of data items

typically used in planning operations, the task remains of determining exactly how these data will be used in making planning decisions.

Pittsburgh appears to have developed a dual approach. The original concept was to create an automated file of physical, social, and economic characteristics which would be used for specific applications in the simulation models. However, as a by-product, they appear to have gone beyond their particular needs toward a city-wide system which has a variety of applications.

The original Washington, D.C., proposal tends toward an "information availability" approach. And although the subject areas included only transportation, water, and economic development, the proposed system consisted of a wide variety of data items. Moreover, the particular uses of these data were not clearly specified. The current efforts of the Metropolitan Washington Council of Governments is more "information requirements" oriented, although it is limited in scope. The land use and housing characteristics data which they seek to consolidate on a region-wide basis, have direct application to various transportation and urban renewal programs currently underway in the area.

Penjerdel attempted to develop a broad statistical base which would serve a variety of markets. The function of the data system was to provide basic demographic, physical, and economic data which could be used as a starting

point for more detailed research and analysis by the various users.

Cleveland's approach apparently has been molded by its long experience in operating a data service. Its function has been to provide land use and population data by small areas and general economic indicators. Its approach would be classified as "information availability," since its role is to provide a general-purpose file for various subscribers.

The strategy of the Los Angeles Planning Department was to develop a city-wide data system which could be used by all operating departments for a variety of purposes. However, it was indicated that if and when the data system is effectuated, the Planning Department will be able to draw upon it for operating complex models and, in effect, develop its own data subsystem.

The proposal by Hearle and Mason represents the ultimate in the "information availability" approach. It would include nearly every item of data concerning people or real property which is collected by public agencies. The authors stated that "the primary criterion for placing data within the System files would be that a particular item of information is of interest to some agency other than the one which originally collects it."[1] The data system operates in almost complete detachment from the actual use of the data.

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[1] Ibid., p. 11.

There are advantages and disadvantages to both the "information requirements" and the "information availability" approaches. The "information requirements" approach involves a process of (1) defining the planning and operating decisions which will be required, (2) exploring the types of policies available for making each decision, and (3) determining the data requirements implied by each decision policy, and (4) developing a rational data processing technique to obtain the required output.[1] This approach is more feasible within a single organization than within a complex metropolitan structure where a multitude of decision processes are constantly taking place. Nevertheless, this approach minimizes the development of unnecessary information, because only data likely to be meaningful in decision-making are collected. Thus the principal advantages of the data system based on the "information requirements" approach are:

1. The emphasis is on the development of better information-decision systems reather than on optimization of the data processing techniques.
2. The existence of the data system can be justified, because of specific applications.
3. The data system is more economical to create and maintain.
4. It is easier to update and control accuracy because of the limited amount of data items.

This approach also has major disadvantages. The most severe problem is the lack of flexibility. The capability is limited by the designer's perception of the issues

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[1]David S. Stoller and Richard Van Horn, Design of a Management Information System (Santa Monica, California: The RAND Corporation, 1958), p. 2.

to be decided, and these issues are constantly changing. Moreover, it assumes that the critical items of data can be determined with certainty. Thus, the opportunity to experiment with unknown relationships is limited. Finally, depending on the scope of the program, it is likely that only a few agencies would be directly involved with the use of the data system.

The "information availability" approach necessarily involves a large number of participants. Each contributes, on a continuing basis, all of the data gathered in their normal operations which may be of interest to other agencies. In return, they may draw on the broad statistical base available in the data system. Some of the advantages of the "information availability" approach were listed by Hearle as follows:

1. Data are being collected, and will continue to be collected, by many agencies for many purposes. Organizing these data into a unified system produces direct economies as well as improved information availability.
2. It provides data to enable the sensitivity testing necessary to permit designation of the "optimum" sets of data for specified decisions which the "information requirements" approach requires.
3. Decision data requirements are difficult to make explicit to everyone's satisfaction, and managers are going to require that a wide range of data be provided to them for a number of reasons, including their traditional availability, entirely apart from what the analysts say are "<u>the</u>" relevant data.
4. New and unforeseen decisions require unforeseen data. Such decisions will continually arise, and therefore, urban information systems should be designed to handle a wide range of data items,

> rather than only those items which we are able to specify a need for today.[1]

The major disadvantages of the "information availability" approach is the enormous cost and effort required to create and maintain the system. A large initial investment in computer equipment and technical personnel is required. Active support must be enlisted from all contributing agencies, so that their system of record keeping and data management is compatible with the needs of the data system. This support may be difficult to obtain, merely by virtue of the inertia which has developed of doing things in a traditional manner. Finally, there is the likelihood of having the expensive burden of carrying a great deal of data in the system which has little or no value to the users.

Thus, there are considerable benefits and hazards associated with both approaches. The differences are such that it is unwise to state that one is "better" than the other. The choice of which course to pursue in a particular area depends primarily on the objectives which are established, the degree of sophistication and technical competence existing in the area, and the available financing.

SUMMARY OF FUNCTIONS

Most of the data systems set, as a prime function, the coordination of data gathering activities within their

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[1]Hearle, op. cit., p. 13.

area of interest. In most cases, this included the standardization of definitions used to describe data and a system for recording data by an agreed-upon geographic unit.

A significant contribution toward standard definitions of data items was made by Hearle and Mason in their attempt to classify data in terms of what it describes, rather than how it is used. Although this would appear to be a rather elementary concept, it is very relevant in the establishment of a uniform system. Traditionally, most agencies have generally organized their data in terms of their functional uses, such as police data, welfare data, and agricultural data. This practice has resulted not only in extensive duplication in the collection of certain data, but it has also restricted the opportunity to compare data from different sources. Hearle and Mason suggested that, if a system were devised which would reduce all data to merely a description of the characteristics of people and property, these problems would be greatly alleviated.

Another major effort toward compatibility of data is the latest Washington, D.C., proposal. A great deal of time and effort will be spent in developing a standard procedure for collecting and reporting land use and housing characteristics data. Some guidelines for this type of program already have been developed by the Housing and Home Finance Agency and the Bureau of Public Roads through the

establishment of a suggested technique for the uniform classification of land use information.[1]

The design of a system for a standard geographical reporting unit is not nearly as complex as defining terms. The major difficulty is getting people to record data by a common unit. Several choices are available by which data may be assembled. Among these are: parcels, planning blocks, census blocks, census tracts, neighborhood units, and grid cells. The most flexible and useful unit is the parcel, since the data can be combined into an endless variety of areal patterns. It also is the most difficult and expensive to maintain. The data systems which incorporaged the parcel as the universal data unit were Los Angeles, Penjerdel, Metropolitan Data Center Project, and Hearle and Mason.

Pittsburgh recorded a great deal of information at the parcel level but felt that the ultimate key to a uniform geographic system was unit which was termed a "data block." This unit was selected after a detailed study of all possible spatial units with regard to size, homogeneity, boundaries, and availability of data. The Planning Department has been successful in obtaining data from the participating agencies on a block basis.

Cleveland summarizes all of its data by census tract. The publication of data on a block basis, undertaken in the

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[1]Housing and Home Finance Agency and Bureau of Public Roads, Standard Land Use Coding Manual (Washington, D.C.: U.S. Government Printing Office, January, 1965).

past, has been abandoned in recent years, because it was felt that there was insufficient demand for this type of information.

Aside from the tasks of standardization of definitions and relation to geographic units, most of the data systems were concerned to varying degrees with: coordination of the data gathering activities of the participating agencies and firms; maintenance of an automated file of commonly-used data items; routine data processing; and the regular publication of pertinent statistical information.

Most of the data systems appear to be committed to the concept of developing an extensive repository of information which would have broad utility. However, little attention has been given to analysis of data. It is implied that the user will be able to specify exactly what he needs to make decisions. This assumption does not seem to be justifiable in view of the current state of local public administration. It would seem that, in order to gain maximum benefits from the data resources available in the system, a program for developing analytical techniques should be included.

SUMMARY OF ORGANIZATIONAL STRUCTURES

The organizational structure of a metropolitan data system has a considerable influence on its scope of operation, powers and the functions performed. In the previous chapter, several types of organizational structures were

indicated. Hearle and Mason proposed a public agency created by the collective action of state and local governments, and governed by a board of managers elected by the participating agencies. The original Washington, D.C., proposal called for a unit to be established within the Bureau of the Budget or the National Capital Regional Planning Council. This unit also would operate under the guidance of a non-salaried governing council. The Pittsburgh data system originated as an operating function of the Planning Department but appears to be gravitating toward the establishment of a private non-profit corporation under the direction of a managerial board and a technical advisory committee. Penjerdel proposed a private non-profit corporation or quasi-public agency but did not indicate whether the policy direction would come from a governing board. Cleveland has been operating for several years as a self-directing, non-profit corporation. Los Angeles and the Metropolitan Data Center Project are both in the process of exploring different organizational arrangements.

It can be observed from the above that a difference of opinion exists as to whether the operation of the data system should be a government function or a service provided by a private concern. The experience of the Cleveland Real Property Inventory provides evidence that a private operation can be moderately successful. Pittsburgh's difficulties in obtaining governmental support for its program and subsequent investigation into the possibility of encouraging a private corporation to assume responsibility for

maintenance of their data system also appears to point toward the desirability of a non-government operation.

Presumably, the rationale for private operation of a metropolitan data system is that a private organization would not be able to afford wasted effort and, therefore, would take steps to insure maximum efficiency. Moreover, it is argued that a private concern can offer the salaries and benefits necessary to attract people with greater technical competence than would be possible under the normal governmental salary schedules. While there may be some truth in these statements, this is not sufficient justification when measured against the advantages of having a government-operated data system. Several of these advantages were pointed out by Henry Cohen, Deputy City Administrator for New York City. They are:

1. Only government has the legal powers to overcome the normal inhibitions of individuals and firms to disclosing information.
2. Private business cannot manage on a sustained and voluntary basis the financial resources to carry out massive statistical operations. In fact, the collection of certain types of data, if organized by business association, might subject them to anti-trust charges.
3. A large amount of data collected by government agencies flows from a wide variety of administrative and regulatory activities. Government can, as it were, dip into a great reservoir of information.
4. Certain statistical and research activities are vital for policy making on matters recognized as affecting the general welfare of the nation.[1]

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[1]Henry Cohen, "Organization for Data Collection, Analysis and Reporting," American Economic Review, LII, No. 2 (May, 1962), p. 377.

Therefore, it would seem that if a truly effective metropolitan data system is ever to be implemented, it should stem from the actions of the proper governmental officials. The problem, up to now, seems to have been that the data system's relationship to the decision-making process has not been clearly defined. With more effort in this direction, it seems safe to assume that the support of government officials would be forthcoming.

SUMMARY OF FINANCING ARRANGEMENTS

While some variations in financing were revealed in the various proposals, nearly all of them indicated that the data system should be self-supporting. The principal means of support was to be through subscriptions or charges for services.

Hearle and Mason felt that the initial establishment of the system should be financed through a legislative appropriation, but this eventually would be paid back over a period of years. Charges for the data service would be based on the number of people, and/or parcels within a jurisdiction, and the number and type of transactions which were performed.

The actual financing of the Washington proposal was left unanswered. It was indicated that most of the costs would be covered through charges for services. But there was less optimism concerning the prospect of the system's being able to completely support itself.

Penjerdel anticipated that the bulk of the financing would come from federal or foundation funds. The remainder would come from contributions by business leaders, rather than through subscriptions or specific charges.

The operating costs of the Cleveland Real Property Inventory are met from membership fees derived from 230 subscribers, which include both public agencies and private firms. Special studies are conducted on a cost basis.

Pittsburgh's data system has been financed almost entirely from the Planning Department's budget. This budget, however, consists of both federal and local funds. Additional support was obtained through contributed services by various local agencies.

The question of financing can be very critical to the success or failure of a metropolitan data system. Despite the statements to the contrary, it is doubtful whether a metropolitan data system can be self-supporting. A great deal of trial and error will be necessary before the system will function smoothly, and perhaps several years will pass before a break-even point is reached. Research and experimentation to improve the system will continue to be a significant cost factor.

But the fact that the data system does operate at a deficit should not deter its continued operation. As stated earlier, the major criteria should not be the absolute cost of operating the data system, but whether the quality of the decisions are improved relative to the cost.

It would seem that much of the experimental costs in developing and improving the data system logically could be assumed by the federal and state government, especially if the results of the research could be utilized by other urban areas. Federal funds also could be justified to support a local data collection program which would replace the federal census.

But the major share of the normal operating costs should be met through local government appropriations. By having a vested interest in the data system, there would be a tendency to utilize the system to a greater extent and to demand high-quality service. And where the data can be directly related to the decision-making process, the cost of the data system then is "directly related to the cost of doing business, even when the business is governmental."[1]

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[1] Ibid., p. 376.

CHAPTER IV

APPLICATION OF BASIC PRINCIPLES TO THE TRI-COUNTY REGION

The review of the selected data systems gives some insight into the various approaches being used in several metropolitan areas throughout the country. The experience of others can be most helpful in developing the framework for a regional data system which could be applicable to the Tri-County Region. Based on the lessons obtained through examining these other data systems and a working knowledge gained as a staff member of the Tri-County Regional Planning Commission, a basic outline of the objectives, approach, functions, organization and financing of a regional data system is described below.

OBJECTIVES

1. Organize existing data and develop new sources of data

The major problem in the Lansing Region is not excessive duplication of data gathering activities but rather the lack of comprehensive statistical information. The Tri-County Region is made up of 75 local units of government,

each with its own system for collecting and recording data. Because the bulk of these local units consists of small villages and townships with relatively uncomplicated administrative problems, they have not felt the need for detailed record keeping. This is true particularly in the case of assessors' records of real property data. But in a regional context, this type of information is vital for many operational and planning functions. Thus, a primary objective should be to encourage the adoption of a uniform format and procedure for recording real property data which are compatible throughout the Region.

Other sources of data which could be valuable are school census information, public utility records, health and welfare surveys, building permits, subdivision plats, and zoning actions. But again, most of these data in their present form do not provide complete coverage of the entire Region, nor can they be assembled easily for comparison.

2. Foster cooperation and understanding among decision-makers

Obviously, the mere existence of an operational data system in itself will not necessarily improve the relationship between various agencies. But such a system may well serve as a catalyst for better coordination. It can at least provide a common statistical base to guide decision-makers in their operations. For example, one of the major elements in many decisions affecting the future development of an area is population data. Each department or agency

tends to base its plans and proposals on its own independent estimate of present and future population size and distribution. Alone, probably none of these agencies would have the resources to develop reliable and accurate data. But by pooling efforts, either through contributed services or finances, and investing the responsibility for producing the required data in one agency, there is a greater likelihood that the data will have greater value for all of the users. In addition, by using agreed-upon basic data, it would seem that there would be a higher probability that a greater consensus could be reached concerning the justification for certain proposals.

3. Improve the performance of the current operations, future planning, and research activities by public and private agencies

If the time and money expended by each agency in acquiring basic data for its own use can be reduced considerably, more effort can be devoted to an efficient utilization of the data in the decision-making process. Moreover, if each agency has as a starting point ready access to a higher quality and greater quantity of basic data than was otherwise available, the opportunities for more precise analysis would be greatly enhanced. But beyond the mere availability of good data, if the quality of operations, planning, and research is to be improved, a sound battery of analysis and forecasting techniques must be developed. Users of the data must have access to a source of technical competence which

would enable the application of various mathematical techniques, including descriptive statistics, matrix algebra, correlation and regression analysis, linear programming, factor analysis, and simulation.

Assuming that a resource were available which could provide relevant basic data and that techniques were developed which could manipulate these data with meaningful results, a wide range of opportunities would emerge which could increase the effectiveness of current operations, planning and research.

In the area of current operations, it would be possible to develop a methodology to mathematically simulate the effect of a particular action or program. Future planning would be improved through the availability of better predictive devices on which to base planning programs. Moreover, with the development of a system which could provide indicators of potential problems it would be possible to anticipate undesirable changes and take preventative action. Opportunities for research would be expanded because of the availability of important basic data.

APPROACH

1. Initial effort should be toward an "information requirements" approach

Although there is considerable merit in the "information availability" approach as proposed by Hearle and Mason, this type of approach would not be feasible in the

Lansing area for several years. The major obstacles at this time are budget restrictions, diverse government organizational structure, and a general lack of sophistication in decision-making techniques.

One of the major lessons to be gained from the review of other data systems is that the transition to an operational system must proceed slowly and methodically. Specific uses for the data must be demonstrated at each step if the data system is to be acceptable as a continuing function. Many of the data systems which have been attempted have failed to generate local interest, because they were too broad in scope and neglected to tie directly into the decision-making process. This does not imply that a comprehensive long-range scheme should not be developed. An overall framework is imperative. But the proper staging of component parts also is important if the concept of an integrated data system is to gain acceptance in the area. Thus, the system should be designed to serve the immediate needs of certain key agencies and also fit congruently into the long-range plan.

The current work program of the Tri-County Regional Planning Commission provides a logical starting point for a data system based on an "information requirements" approach. The Commission, in carrying out its responsibility for the development of a Land Use-Natural Resource-Transportation Plan, has embarked on an extensive program of analyzing and predicting certain characteristics in the Region. The

specific elements to be dealt with include population, income, employment, land use, and traffic. Each of these elements will be analyzed and predicted through the use of mathematical models. These models will require large volumes of data of particular types and formats. In addition, the continuing function of the Planning Commission will require that the data inputs be maintained reasonably up to date, so that the effects of unforeseen developments can be tested through mathematical simulation and the plans altered when necessary.

The data requirements necessary for fulfilling the responsibilities of the Commission also are basic to the operations and planning of many other agencies and firms in the Region. These data include population characteristics, median income, time-distance factors to places of work, shopping, and recreation, residential density, physical features, employment by type, and street characteristics. All of these data will be available by small geographic area. Aside from the capability to provide raw data, the Commission's data system also will be able to provide a certain amount of data concerning expected future conditions in various sub-areas in the Region.

2. <u>New techniques should be implemented to encourage the use of the data system and to indicate possibilities for an expanded system</u>

As stated earlier, if a data system is to be successful, it must be linked directly to the decision-making

process. One of the difficulties in establishing this linkage has been the lack of knowledge on how the decision-process operates within the Region.

One method for gaining an insight into this process is to conduct an extensive survey of all potential users of the data system. The types of information to be sought could include the nature of the issues to be decided, the data required and its characteristics, how the data were utilized, the effect of the decision on other agencies and firms, and the paths of information flow.

While the results of such a survey would be very helpful in designing an integrated data system, a more powerful method for obtaining this type of information would be through an operational gaming technique. This could be done by designing a laboratory situation in which various issues and conditions are simulated. Administrators and managers would be asked to participate in a series of experiments in a "real world" environment. In effect, they would be presented with certain issues and asked to react to these issues in whatever manner they choose. Using this technique, it would be possible to observe the processes which certain administrators and managers go through in arriving at decisions and to obtain valuable insights to guide the design of the data system.

A second benefit of this technique is that it can be used as a training device to accustom decision-makers to the use of an automated data system. The mechanics of the game

situation would be such that instant retrieval of a wide variety of data would be possible. This would serve to illustrate the advantages of having a source of readily available data as an aid in solving emerging problems and to demonstrate the usefulness of new analytical techniques.

In summary, the approach suggested for the establishment of a data system for the Tri-County Region is an "information requirements" approach based initially on the data needs of the transportation and growth models. The data system should be expanded gradually to include other data as their validity is determined and as new theoretical approaches are developed for solving urban problems.

FUNCTIONS

1. Develop a system for geographic coordination of data

If data are to be valuable in an operational and planning sense, they must be tied to a discrete location. Moreover, if maximum flexibility in aggregating these data is to be attained, the data should be recorded by as small an area as economically feasible. Three basic principles should be incorporated to accomplish these objectives.

A. Accurate base maps should be acquired which depict all parcel boundaries, streets, railroads, water courses, and jurisdictional boundaries in as precise detail as possible. This provides a major source for area and distance measurements and location coding and thus should be extremely reliable

documents. These maps should be endorsed as an official source document by all the participating agencies in the data system.

B. The selection of standard unit geographic areas is one of the more critical decisions in the design of the data system. As noted earlier, this can range from a parcel up to an entire political jurisdiction. Ideally, the parcel record would be the most useful unit for recording data. Unfortunately, this is not feasible in the Tri-County Region at this time. The principal source for parcel data is the assessor's records, and in this area, there are extremely large informational gaps. For most of the Region, there is not so much as a map showing the location and size of individual parcels. This situation should be improved within the next few years with the creation of a County Board of Equalization in each of the three counties.

An alternative choice for the least data unit is the data block. This generally would consist of city blocks in urbanized areas and sections in rural areas and should coincide with the following boundaries where applicable: census blocks, section lines, jurisdictional boundaries, traffic zones, and physical and man-made barriers. The advantage of this system is that it still has some flexibility in terms of aggregating data into larger districts, and

it is less costly to develop and maintain. It is difficult, however, to indoctrinate others into the use of a block system. But this difficulty could be overcome by the development of a computer program which could convert street addresses to the proper data block. Thus, input data could be coded simply by street addresses.

C. A uniform location code should be adopted, and all data should be spatially identified with this code. Several systems have been tried in other areas, but the one which has the most utility is the grid coordinate system. In this system, individual data units are identified geographically in terms of their distance north and east from a known reference point. Thus, each data unit is assigned a unique number which indicates its precise location. This type of system is particularly amenable to automatic data processing. Distances and areas can be computed automatically, and computer programs are available which utilize grid coordinate numbers to position data output and, in effect, are capable of mapping selected data.

2. Prescribe functions of constituent agencies in regard to their role in required data on a continuing basis

Although the subject matter initially will be limited to population, income, employment, land use, and transportation, there is a wide range of data items within these

categories. Many of these data are gathered by several agencies in the normal course of their operations but thus far, has been utilized only sporadically by other agencies.

It has been aptly demonstrated in other areas that one agency cannot operate a metropolitan data system on its own. It must have strong support from several contributing agencies in order to survive. Among the agencies, which would be expected to be intimately involved in the data system, are the local assessors, planning departments, building inspectors, health departments, zoning commissions, school boards, road commissions and public works departments. Valuable assistance also could be provided by several state agencies, including the Employment Securities Commission, Tax Commission, Highway Department, and the Department of Economic Expansion. Other useful data could be obtained on a contract basis from such firms as R. L. Polk Company and Dun and Bradstreet.

It should be emphasized that the selected data items must be supplied on a continuing basis. Procedures, therefore, must be established which would facilitate the flow of data in the proper form to the agency responsible for the maintenance of the data system.

3. Coordination of relevant data collection programs

In order to reduce possible duplication of effort and to take advantage of potential opportunities to fill informational gaps, the data system agency should be consulted prior to the launching of an extensive data collection

program. Moreover, this agency should take an active part in the design of such a program.

One aspect of this function is active participation in the federal census program. The data system agency should be designed as the "key census tract person" in the Region and as such, should be responsible for the local administration of that program.

4. Maintain an index of sources of information relating to the Region

A wealth of available data concerning the region is unused because its existence is unknown to potential users. These data, although not logically a part of the automated data system, could be extremely valuable to people engaged in particular types of research. These data exist in many forms, including reports, general files, thesis and dissertations, and other publications. A valuable function which could be performed by the agency responsible for the data system would be to provide information concerning the places where additional data can be found, the characteristics of the data, and means of access to it. This information should be described in detail; indexed according to subject matter and area; and entered into a separate automated file.

5. Provide technical skills for data analysis

To the extent possible, the data system agency should have in its employ or under contract a team of experts whose function would be to provide technical assistance to those who request it. As stated earlier, the mere existence of

data will not improve decision-making unless its significance to particular problems is interpreted. Since it is unlikely that individual agencies could afford to hire specialists to assist in interpreting the data, much of the potential benefit of the system will be lost. However, by pooling their resources, it may be feasible to obtain services of competent professionals on a part-time basis.

6. Publish regular periodic reports which would describe data and the implications of these data; progress on current programs; and anticipated future projects

The only commodity with which the data system deals is information; and information has no value unless it is transmitted to the user. Obviously, certain mechanisms will have to be developed which allow participating agencies to have access to required data. But beyond this, there should be wide dissemination of pertinent data to interested parties throughout the Region.

In addition, the public should be kept informed on progress of current programs and future projects under consideration. The requirements for periodic accounting of the data system activities will provide some basis for evaluating the efficiency and productivity of its personnel.

ORGANIZATION

1. Development of the Regional Data System should be carried out as a normal function of the Regional Planning Commission

The advantages of having the data system operated by a governmental or quasi-governmental agency rather than by a private firm have been stated in the previous chapter. The only public agency in the Tri-County Area which has regional jurisdiction and has sufficient breadth of interests to be concerned with a wide variety of data is the Regional Planning Commission.

The vast amount of data which has been collected in the process of developing a long-range plan for the Region can be used to form the nucleus of the data system. Moreover, during this process, the Commission's staff has gained considerable experience in large-scale data management. In contrast, no other local public agency in the Region has utilized electronic data processing in its operations to date.

The Tri-County Regional Planning Commission, under its enabling legislation, already may have the legal power to create and maintain a data system. The Regional Planning Commission Act (Act 281, P.A. 1945) states in part:

> The regional planning commission may conduct all types of research studies, collect and analyze data, prepare maps, charts, and tables and conduct all necessary studies for the accomplishment of its other duties; . . . it may provide advisory services to the participating local governmental units and to other public and private agencies in matters relative to its

> functions and objectives, and may act as a coordinating agency for programs and activities of such agencies as they relate to its objectives.

This Act also permits the regional planning commission to obtain data from other governmental agencies. This is stated as follows:

> The regional planning commission shall be given access to all studies, reports, surveys, records and all other information and material in the possession of such governmental agencies as shall be required by the regional planning commission for the accomplishment of its objectives.

Whether a regional planning commission does, in fact, have the power to create and maintain a regional data system may be subject to legal interpretation. But the establishment of such a system certainly appears consistent with the primary objective of regional planning which is to promote orderly and efficient growth in the area.

2. A separate division should be established within the Commission and staffed by competent specialists

To insure that undivided attention will be given to the problems of maintaining the data system and that its operation will not be influenced by other work-load pressures of the Commission, the data system function should be carried out by a semi-independent division of the Commission. This division should have its own director who would operate under the general supervision of the Executive Director.

Initially, this division should be staffed by a planner, a systems analyst, a statistician, a programmer, and several key punch operators. Ultimately, other specialists

should be brought in on a consulting basis. These would include economists, demographers, social scientists, political scientists, geographers, market analysts, and other professionals, depending upon the particular needs and problems.

3. Advisory committees should be established to provide policy guidance

The committee approach is valuable in that it brings together a community of interests in the Region. It encourages participation and cooperation which are absolutely essential to the success of the program. Several functions can be performed by an advisory committee, such as, describing existing data problems, providing technical assistance, transmitting new ideas, giving direction and guidance to the staff in light of perceived needs, and obtaining cooperation of their respective governmental units. This committee should be composed of members of several agencies and should represent the interests of government, education, planning, health and welfare, public works, finance, and business.

An executive committee also should be formed which would not only serve in an advisory capacity, but would have the power to regulate the activity of the data system staff, as well. The purpose of this committee would be to provide a check against engaging in activities which may be detrimental to the general public and to insure that ethical standards are maintained. This committee would be made up

of representative governmental officials within the Region.

FINANCING

1. Initial research and development should receive major support from federal, state, or foundation funds

Because of the experimental nature of a regional data system, it would be difficult to finance such an undertaking with local funds. Also, because it is experimental and the results, both the successes and the failures, may benefit other metropolitan areas, there is justification for the financing of the initial stages of the program by external sources. Obviously, the local agencies, which would be the prime benefactors, would be expected to share in the costs.

Federal grants very likely would be available for this type of project. This assumption is based on the fact that the Housing and Home Finance Agency has demonstrated an interest in urban data systems and appears to be willing to support programs which involve research in the area. Furthermore, a recent policy of the HHFA permits grants to planning agencies for the purpose of developing a continuing updating program.

The state also might be willing to lend some financial and technical support. Their interest might stem from the possibility of using the Lansing area as a pilot study for a state-wide system. Support from foundations

might be stimulated by the educational and research potential available when the system becomes operational.

2. Once operational, the system should continue to be financed through the planning budget, but this budget should be increased to cover additional costs

The provision of accurate, up-to-date information as an aid to decision-makers is a logical function of a planning agency. And just as individual departments are not assessed for various components of a master plan, neither should they be charged separately for informational services. It is realistic, however, to charge costs for computer time and special services. But it would be almost impossible to ascertain each user's share in the cost of creating and maintaining the data file.

Serious consideration should be given to the possibility of allowing the Regional Planning Commission the power to levy a tax which would be collected by each of the three counties for the continued support of the data system and regional planning activities. A basic prerequisite for the establishment of a metropolitan data system is that there must be a clear guarantee of continued financing. An extremely large investment is required to put the system in operation, and unless future financing is assured, it will be a tremendous loss.

In order to justify the increased planning budget, each participating governmental unit first must be convinced of its value for the management of their affairs. This

represents a great challenge to the planning agency, but it must be met if the program is to succeed.

CONSIDERATIONS FOR THE FUTURE

While the Regional Planning Commission already may have the authority for conducting research and developing a regional data system, certain powers and duties ultimately should be specifically granted through enabling legislation to insure the effectiveness of the system on a continuing basis. These additional considerations should come about only after the usefulness and feasibility of the system have been adequately tested and most of the difficulties have been resolved.

The following summarizes the powers and duties which, if implemented, would give the regional data system a firm foundation.

Powers:

1. Authority to levy taxes for continued financial support.
2. Authority to accept private and public grants and donations and to charge for special services.
3. Authority to require constituent agencies to provide vital data at specified times in a compatible format.
4. Authority to review major data collection activities in the Region.
5. Authority to contract with private agencies for necessary services.

Duties:

1. Maintenance of an automated file of pertinent data.
2. Periodic distribution of reports of special statistical significance.
3. Continual development and expansion of the basic capabilities of the system.
4. Regular accounting of activities to a board of elected officials.

5. Provision of adequate safeguards to insure that adequate ethical standards are maintained.

This last point may well be the most critical. All indications are that, in one form or another, metropolitan data systems will be developed ultimately. Regardless of their organization, whether public, semi-public, or private, the most pressing problems will develop in the regulation of their ethical use. It has been proved that knowledge is power. Never before has it been possible for one man, or a limited group of men, to have such complete knowledge about the lives, property, and personal interaction of the citizenry.

A metropolitan data system can be a most useful tool for urban analysis. It also can be a most destructive tool if used for devious personal gain. Public ignorance of this potential will permit abuse, while an aroused public will be the greatest obstacle to the development of data systems which could be very beneficial. Thus, the most difficult problem to be faced in the future will be the formulation and enforcement of ethical standards which will allow the greatest legitimate use of this capability, while at the same time provide reasonable protection of man's basic rights.

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